

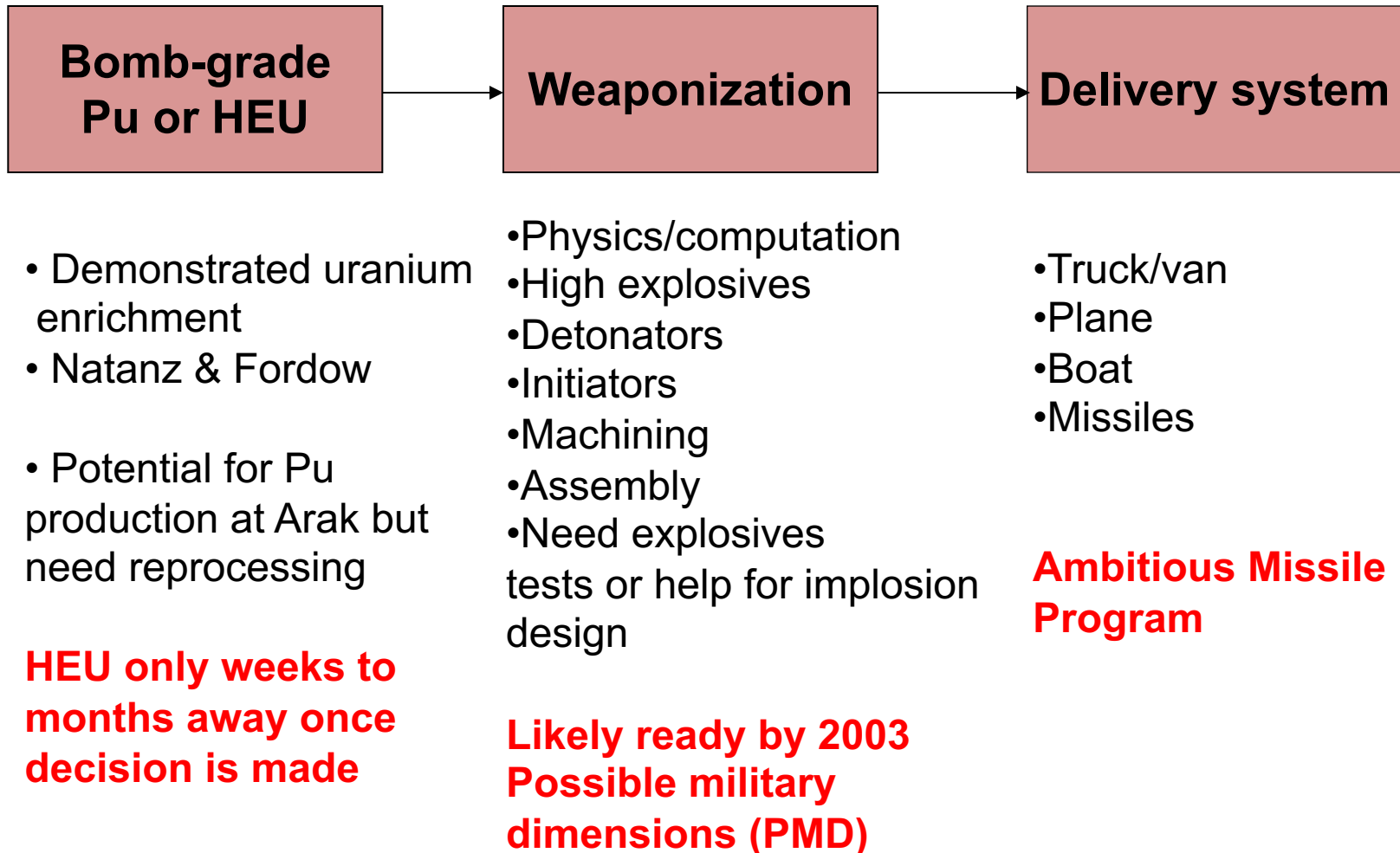
**Iran and North Korea :
Looking back and looking ahead**

**Siegfried S. Hecker
Center for International Security and Cooperation
Stanford University**

***Alice & Lawry Mann Los Alamos Public Lecture
January 11, 2020***

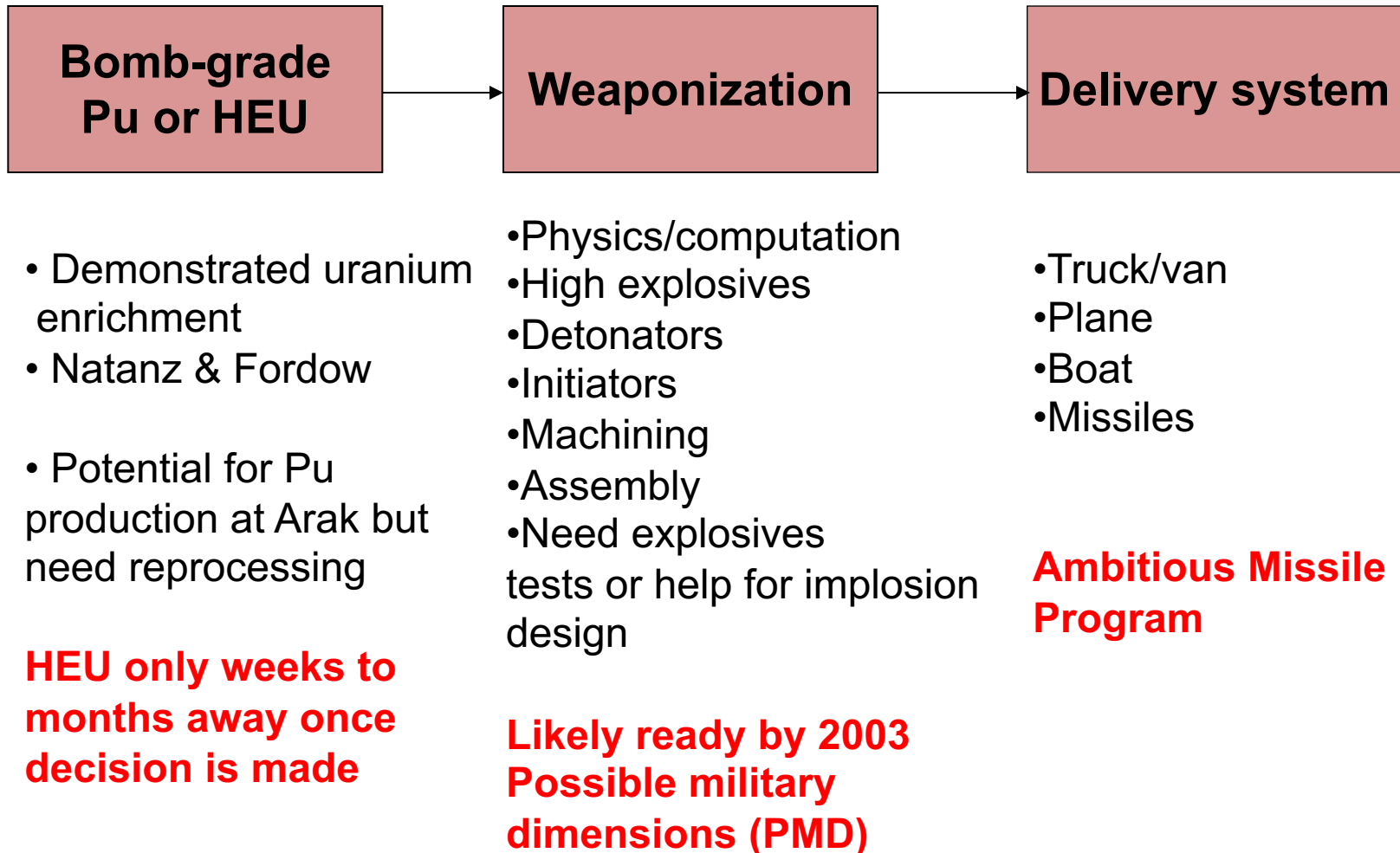


How close was Iran to the bomb if it chose to pursue it?



Before the deal (JCPOA) in 2015 Iran likely had all pieces in place for the nuclear weapon option.

How close was Iran to the bomb if it chose to pursue it?



The JCPOA increased break-out time to 1 year.

Joint Comprehensive Plan of Action 14 July 2015



**DOE Secretary Ernie Moniz
with Ali Akbar Salehi, Head, IAEO**



May 8, 2018

Trump Pulls U.S. out of Iran Nuclear Deal.

Calling Pact 'An Embarrassment'



Response to Trump administration JCPOA pullout

- U.S. employs maximum pressure – crippling sanctions against Iran
- Iran responds with “maximum resistance” to “economic warfare”
- Targeted U.S. facilities and military assets – directly and by proxies
- Shipping in Persian Gulf and Strait of Hormuz; shot down U.S. drone
- Attacked major Saudi oil facility

Quds force commander **Gen. Suleimani** masterminded Iran’s proxy militias



Gen Qasem Sulemani

- Iraqi militiamen, Lebanon’s Hezbollah, Yemen’s Houthi rebels, and all-volunteer Basij force



Jan. 3, 2020

Photo: Iraqi Prime Minister Press Office/Associated Press



Gen Qasem Soleimani



Video Shows Aftermath of U.S. Strike That Killed Top Iran Commander
by David S. Johnston and Mike Torrey



Soleimani – a hero's funeral



Iran retaliates

10 missiles struck Ain al-Assad, one hit the base in Irbil, and four missiles apparently fell short.



Tehran framed Ain Assad Airbase attack as having “concluded” its retaliation

History of Iran's nuclear program

- 1950s - 60s: U.S. “Atoms for Peace”
- 1970s to 1979: Grand nuclear power plans and covert bomb ambitions (with Israel, South Africa ?)
- Ayatollahs abandon, then go covert in mid-1980s
- 1990s: Iran goes shopping, steps up covert program
- 2002 – 12: Program discovered and admitted. Lack of transparency and inadequate cooperation with IAEA leads to suspicion of military program
- 2013 – H. Rouhani elected. Shows new flexibility.
- 2015 – Signs JCPOA



Iran does not have the bomb or fissile materials.

JCPOA bargain: In exchange for agreeing to verified limits on its civil nuclear program, Iran won relief from punishing sanctions

After May 2018 Trump pullout from JCPOA – Iran began systematic effort to restore civilian nuclear program.

- **May 2019: Cease complying with limits on stockpiles of heavy water and enriched uranium.**
- **July 2019: Exceed limits on enriched uranium; exceed limits on enrichment percentage.**
- **Sept. 2019: Will no longer comply with R&D limitations.**
- **Nov. 2019: Inject UF₆ into Fordow Facility and enrich uranium there.**

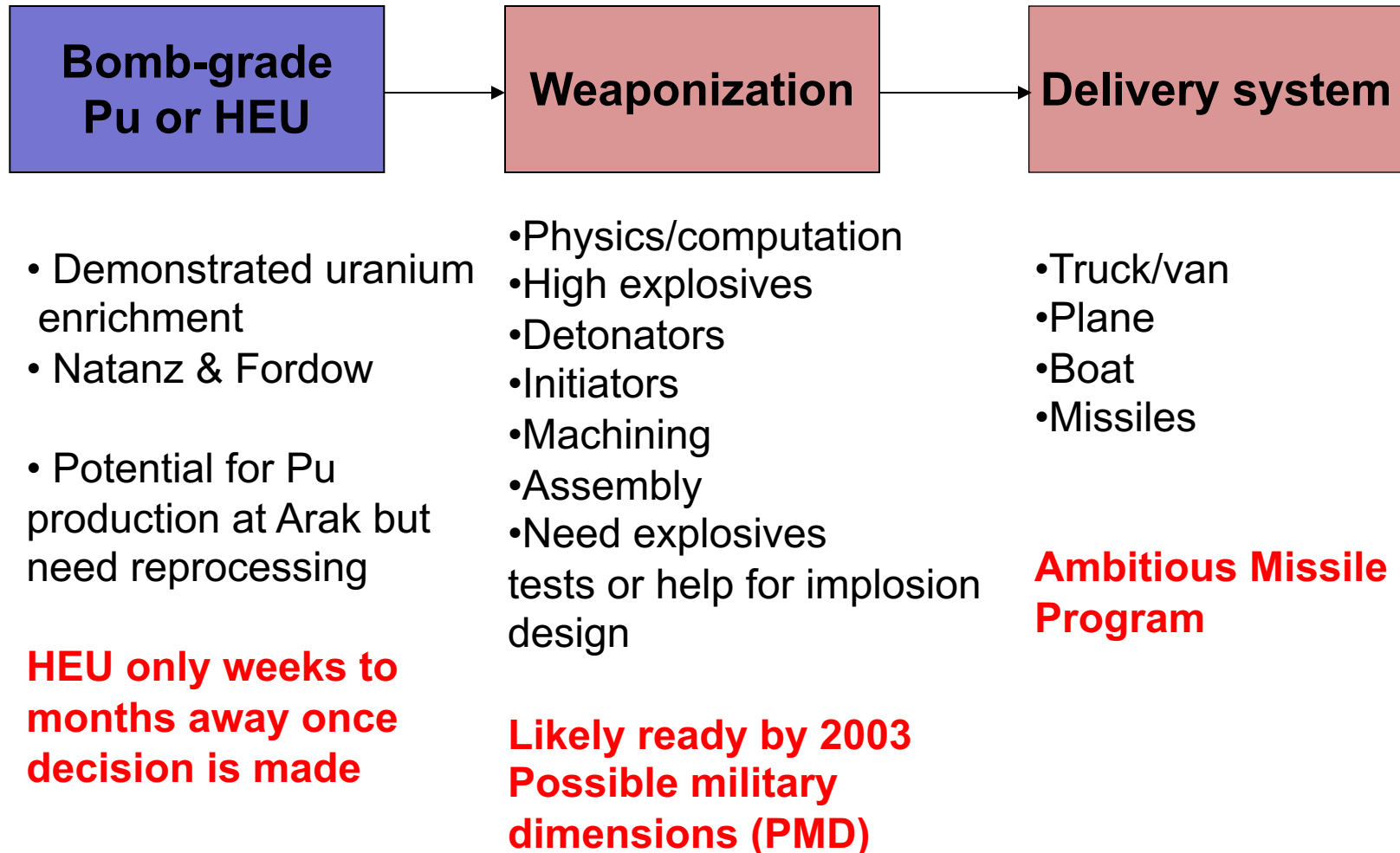


Atta Kenare/AFP via Getty Images

On January 5, 2020, Tehran announced that it will cease to honor all “operational restrictions” imposed by the 2015 JCPOA – no limits on centrifuges

**Iran did not pull out of the JCPOA.
And Iran remains in NPT and IAEA continues its access.**

What will happen now with Iran's nuclear program?



Iran will systematically reduce the breakout time

But the real concern is Iran's nuclear archive



THE JEWISH  STAR

May 2, 2018

Bibi proves Iran deal is based on lies by Tehran

Project Amad



Iran is continually expanding the range of its nuclear-capable missiles

Shahab 3
1,000 km



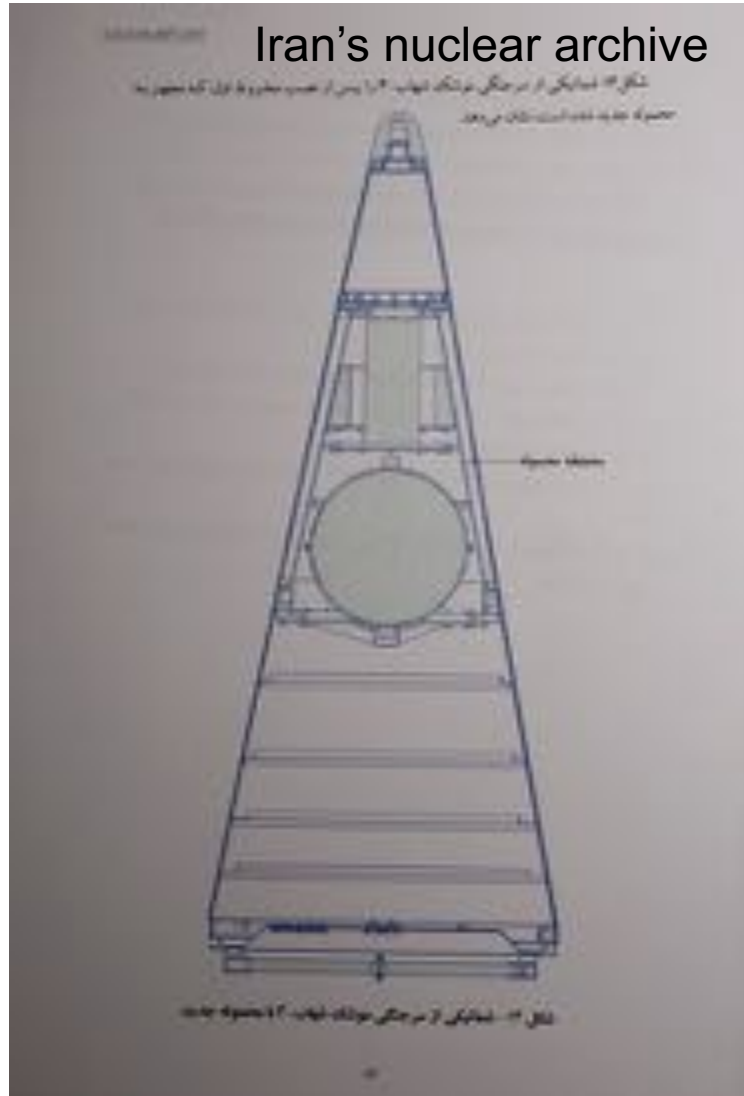
Ghadr 1H
1,650 km



Ghadr 1F
1,950 km



Iran's nuclear archive



Iran was working on integration of nuclear warhead to missiles – towards a nuclear arsenal

Iran was planning for a nuclear arsenal

Governs size of
arsenal

Governs sophistication
of arsenal

Governs threat
arsenal poses

**Bomb-grade
Pu or HEU**

Weaponization

Delivery system

- Most difficult part
- Reactors (**Pu**) or enrichment (**HEU**)

Hydrogen bombs

- Tritium
- Deuterium
- Li-6D

- Physics, computers
- High explosives
- Detonators
- Initiators
- Machining
- Assembly
- Explosives tests
- Arming, fuzing, firing

- Plane
- Boat
- Van
- Missile

Generally not appreciated how much work Iran did toward integration.
Iran nuclear archive requires a revised approach to nuclear issues.

Looking ahead

For now – both sides have backed off

Trump: “Iran will never be allowed to have a nuclear weapon”

“Iran appears to be standing down, which is a good thing for all parties concerned and a very good thing for the world”

Iran: "If the sanctions are lifted and Iran benefits from the JCPOA interests, the Islamic Republic of Iran is ready to return to its JCPOA obligations.”

A glimmer of hope for a path forward

No World War III

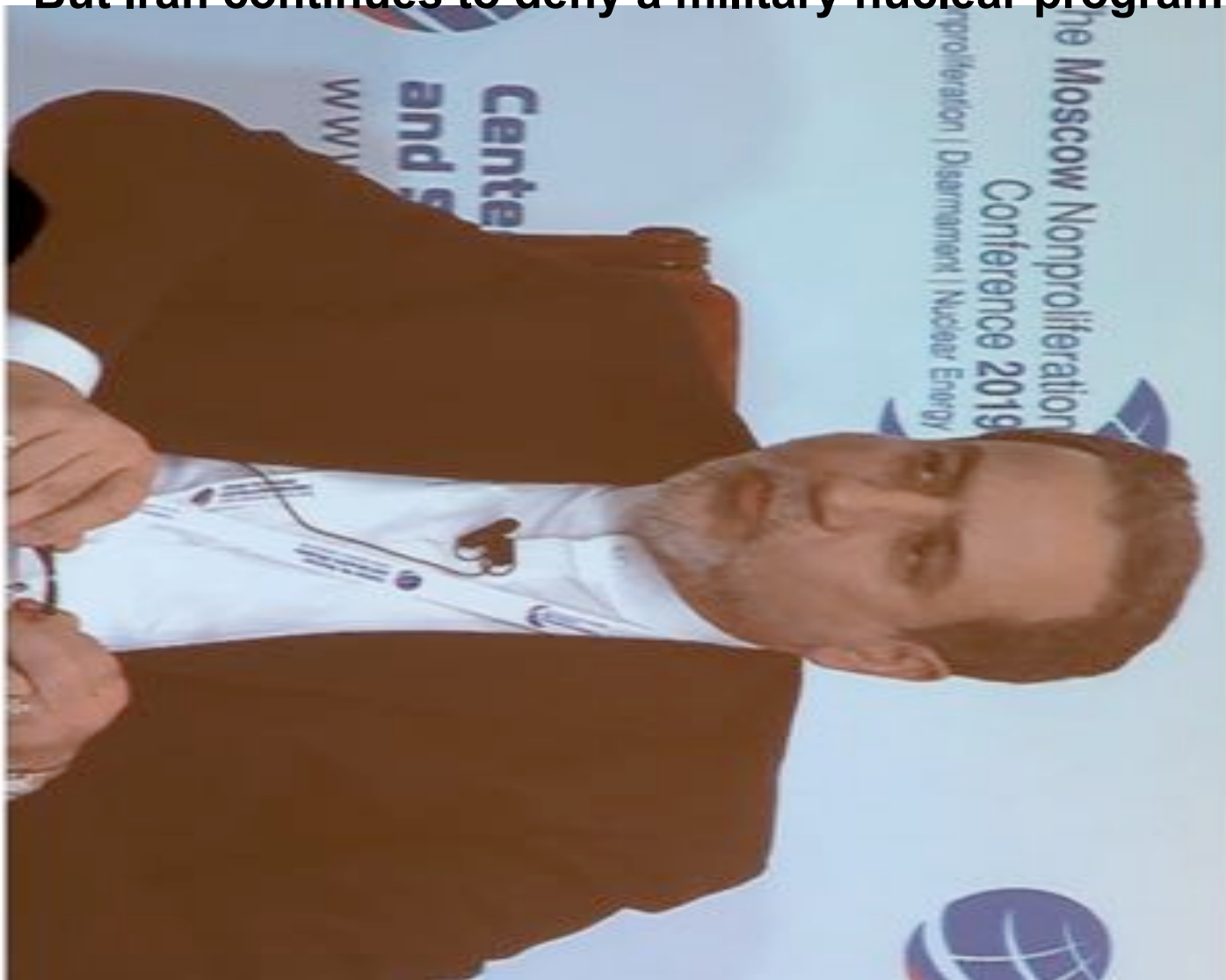
No crash effort to the bomb

Separate nuclear and regional issues

Return to JCPOA

But, Iran must clear nuclear archive concerns

But Iran continues to deny a military nuclear program



Iranian Vice Minister of Foreign Affairs, Abbas Araghchi, claims Israel Fabricated archives – IAEA has cleared us of possible military dimensions



An external enemy helps to unite population against an unpopular, brutal regime

What about North Korea?

Hecker



Kim Jong-un charts new direction for DPRK









- At Party Plenum, Kim Jong-un prepares his people for the long, difficult road ahead
- **Negotiations with U.S. have been fruitless**
 - **No longer feels bound by halt in nuclear and long-range missile testing**

2017 was a very bad year for DPRK – U.S. relations



North Korea Nuclear Program

3 shades of green (dark best), 3 shades of red (dark worst)

Year	US Diplomacy	DPRK Diplomacy	Yongbyong Presence	Plutonium	Uranium enrichment	Tritium/Li6	Weaponize Design/build/test	Nukes (Summary)	Missiles
1992 Bush I	G1	G1	G1	G2	G1	G1	R1	R1	R1
1993 Clinton	G2	G2	G1	G2	G1	G1	R1	R1	R1
1994	G3	G3	G1	G2	G1	G1	R1	R1	R1
1995	G3	G3	G3	G3	G1	G1	R1	G3	R1
1996	G3	G3	G3	G3	G1	G1	R1	G3	R1
1997	G2	G2	G3	G3	R1	G1	R1	G3	R1
1998	G2	G2	G3	G3	R1	G1	R1	G3	R1
1999	G3	G3	G3	G3	R1	G1	R1	G3	G1
2000	G3	G3	G3	G3	R1	G1	R1	G3	G1
2001 Bush II	R2	G2	G3	G3	R1	G1	R1	G3	G1
2002	R3	G2	G3	G3	R1	G1	R1	G3	G1
2003	R2	R2	R3	R3	R1	R1	R2	R2	G1
2004	R2	R1	R3	R3	R1	R1	R2	R2	G1
2005	R1	R1	R3	R3	R1	R1	R2	R2	R1
2006	R1	R2	R3	R3	R1	R1	R2	R2 	R1
2007	G2	G1	G3	G1	R1	R1	R1	R1	R1
2008	G2	G1	G3	G1	R1	R1	R1	R1	R1
2009 Obama	R1	R1	R2	R1	R2	R2	R2	R2 	R1
2010	G1	R1	R3	R1	R2	R2	R2	R2	R1
2011	G1	G1	R3	R1	R2	R2	R2	R2	R1
2012	R1	R1	R3	R1	R2	R2	R2	R2	R1
2013	R2	R1	R3	R2	R2	R2	R2	R2 	R1
2014	R2	R1	R3	R2	R3	R3	R2	R2	R1
2015	R1	G1	R3	R3	R3	R3	R2	R2	R2
2016	R1	R3	R3	R3	R3	R3	R3	R3  	R2
2017 Trump	R3	R3	R3	R3	R3	R3	R3	R3 	R3



**2018 was a very good year
PyeongChang 2018 Winter Olympics**



Kim, Moon Pledge Denuclearization Of Peninsula And End To Korean War

April 27, 2018 · 12:39 AM ET



(Reuters)



(Korea Summit Press Pool/AP)

(Korea Summit Press Pool/AP)



(Korea Summit Press Pool/AP)



(KCNA)

June 12, 2018 Singapore Summit



Normalization and denuclearization
A huge step in the right direction

At a historic moment of N-S reconciliation?



HANKYOREH MEDIA

**Sept. 17, 2018
Pyongyang Summit**



AP/Associated Press



AFP or licensors



With a symbolic visit to Mt. Paektu

Pyeongyang Press Corps/Pool via Reuters



January 1, 2019



- Neither make or test nuclear weapons any longer.
- Not use or proliferate them.
- With President Moon, turn the Korean Peninsula into a land of peace free of nuclear weapons and nuclear threats.



January 1, 2019

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- With President Moon, turn the Korean Peninsula into a land of peace free of nuclear weapons and nuclear threats.

But he warned the U.S. not to test his country's patience. Or we'll have to find another way to guarantee peace on the peninsula.



**Hanoi Summit
Feb. 27 & 28, 2019**



**Hanoi Summit
Feb. 27 & 28, 2019**

**Trump Challenge:
GO BIG!**





**Hanoi Summit
Feb. 27 & 28, 2019**



**Choe and Ri:
We did – give up all
of Yongbyon**



ELEPHANTS IN THE ROOM

Trump Was Right to Walk Away

In resisting the temptation to make a bad deal, he avoided failure at the Hanoi summit.

BY PETER FEAYER | FEBRUARY 28, 2019, 9:48 PM



U.S. President Donald Trump departs his summit with North Korean leader Kim Jong Un in Hanoi on Feb. 28. (SeulLimbi/AP/Daily Images)

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U.S. President Donald Trump departs his summit with North Korean leader Kim Jong Un in Hanoi on Feb. 28. (Seul/Ansa/AP/Daily Images)

But was he, really? I think not. It was a hinge point. Kim felt humiliated. Gave U.S. Jan. 1, 2020 deadline.

U.S. conflicting agendas

Non-hostile relations

+

Maximum pressure



Trump and Kim at DMZ

June 30, 2019



DPRK response to match

Non-hostile relations

+

Military readiness



DPRK returned to missile and rocket launcher testing – May through December



DPRK response to match

Non-hostile relations

+

Military readiness



DPRK returned to missile and rocket launcher testing – May through December








Deal with humiliation of Hanoi



Kim Jong-un chose not to answer his phone the rest of the year

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2011	G1	G1	R3	R1	R2	R2	R2	R2	R1
2012	R1	R1	R3	R1	R2	R2	R2	R2	R1
2013	R2	R1	R3	R2	R2	R2	R2	R2 	R1
2014	R2	R1	R3	R2	R3	R3	R2	R2	R1
2015	R1	G1	R3	R3	R3	R3	R2	R2	R2
2016	R1	R3	R3	R3	R3	R3	R3	R3 	R2
2017 Trump	R3	R3	R3	R3	R3	R3	R3	R3 	R3

Looking ahead





Kim Jong-un at the Workers' Party central committee meeting end of 2019. The promised Christmas gift did not arrive – but kept media busy.

Kim Jong-un at Party Plenum

- **Complete strategic policy reorientation.**
- **The dialogue with the US is over.**
- **Prepare the economy and the people for a long-term confrontation with the US.**
- **Confronting Americans with a military reality to compel them to change their fundamental approach to the DPRK.**
- **Will face international sanctions, so we will need to “tighten our belts.”**

Kim Jong-un at Party Plenum

- **Develop a stronger and more threatening nuclear force.**
- **Keep nuclear forces operationally deployed and ready.**
- **Witness a new strategic weapon to be possessed in the near future.**
- **Scope and depth of bolstering our deterrent will depend on U.S. future attitude to the DPRK**

Estimated North Korean nuclear arsenal

Nuclear Capability	December 2019 (Rough estimates)
Plutonium	25 - 48 kg
HEU (highly uncertain)	~500 - 750 kg
Tritium	Very limited
Nuclear devices (sufficient material)	~38 (20 to 60)
Nuclear device deliverable by SCUD & Nodong missiles. Reach ROK and Japan?	Yes
Nuclear device deliverable by IRBMs & ICBMs Submarine-launched BMs	Hwasong-12, 14, 15 Not yet military useful. Need more tests Need lots of work

Estimated North Korean nuclear arsenal

Nuclear Capability	December 2019 (Rough estimates)	What's next
Plutonium	25 - 48 kg	Restart 5 MWe reactor Operate ELWR
HEU (highly uncertain)	~500 - 750 kg	Continue centrifuge operations
Tritium	Very limited	Produce in reactors
Nuclear devices (sufficient material)	~38 (20 to 60)	Add 6 to 7/year
Nuclear device deliverable by SCUD & Nodong missiles. Reach ROK and Japan?	Yes	Yes Change to solid rocket motors
Nuclear device deliverable by IRBMs & ICBMs Submarine-launched BMs	Hwasong-12, 14, 15 Not yet military useful. Need more tests Need lots of work	Return to ICBM and nuclear testing??



But, what's to be gained by military buildup?

Kim Jong-un proven himself good at diplomacy



It is a much likelier path to a secure future than nuclear buildup.
Besides, he needs to improve the lives of his people

January 11, 2020

- Kim Kye-gwan acknowledges Trump's birthday card for Kim Jong-un.
- States that Kim Jong Un has a good personal feelings about President Trump, they are, in the true sense of the word, "personal".
- But the affairs of state take precedent over personal feelings.
- We know well about the way we should go and will go on our way.

LIVELIHOOD OF ITS PEOPLE IS NORTH KOREA'S BIGGEST CHALLENGE



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Kim Jong-un needed the "Treasured Sword" to provide security
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Kim Jong-un needed the "Treasured Sword" to provide security
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But, the "Treasured Sword" has become a heavy burden on his people.
Economic development will be Kim's biggest challenge.
He needs the international community.

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But, the "Treasured Sword" has become a heavy burden on his people.
Economic development will be Kim's biggest challenge.
He needs the international community.
AFTER 70 YEARS OF HARDSHIP HIS PEOPLE DESERVE NO LESS.

Iranian Armed Forces

The Islamic Revolutionary Guard Corps (IRGC) operates parallel to the conventional military.

CONVENTIONAL MILITARY



ISLAMIC REVOLUTIONARY GUARD CORPS



Source: International Institute for Strategic Studies

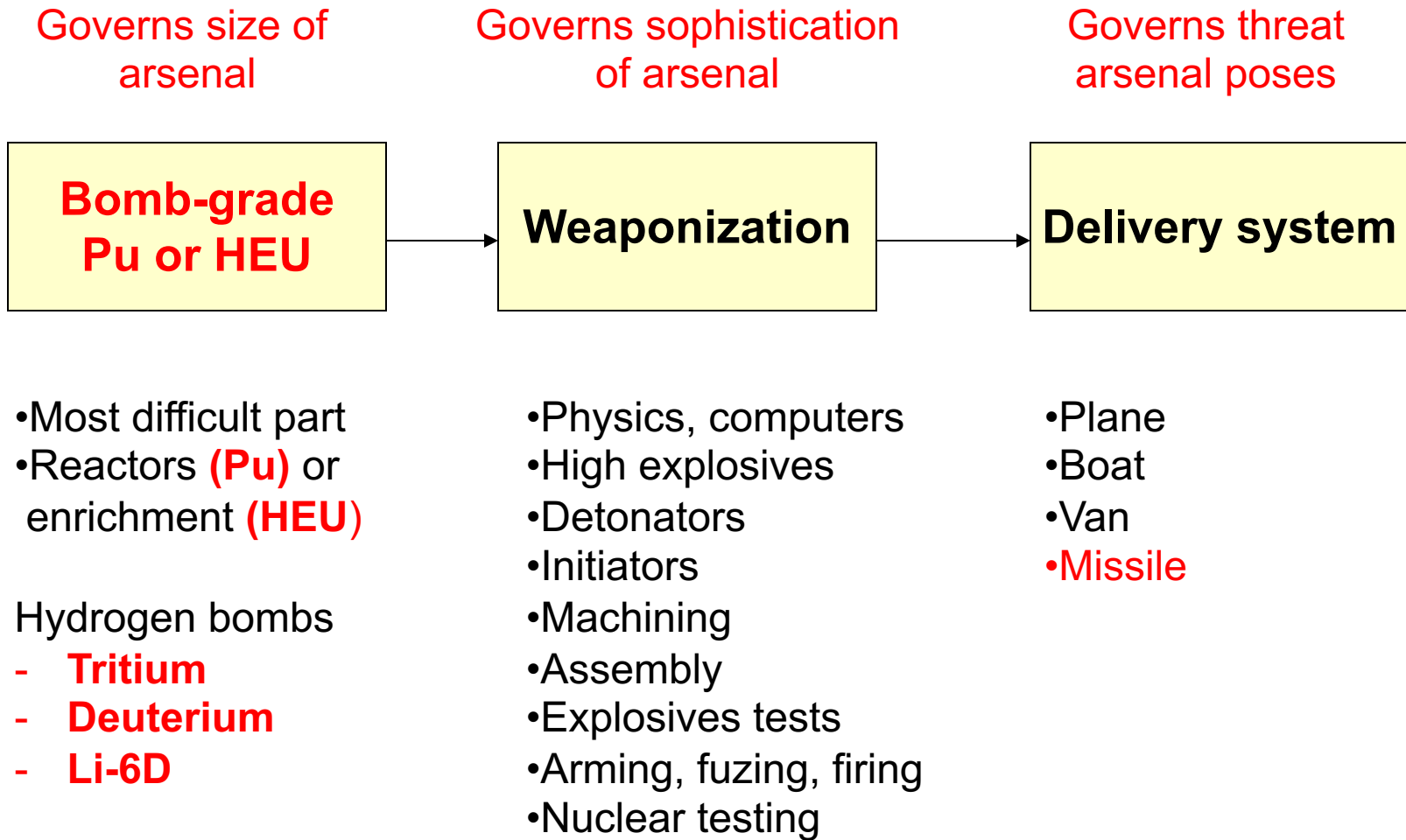
COUNCIL ON
FOREIGN
RELATIONS

Trump Administration demands from Iran (White House Briefing)

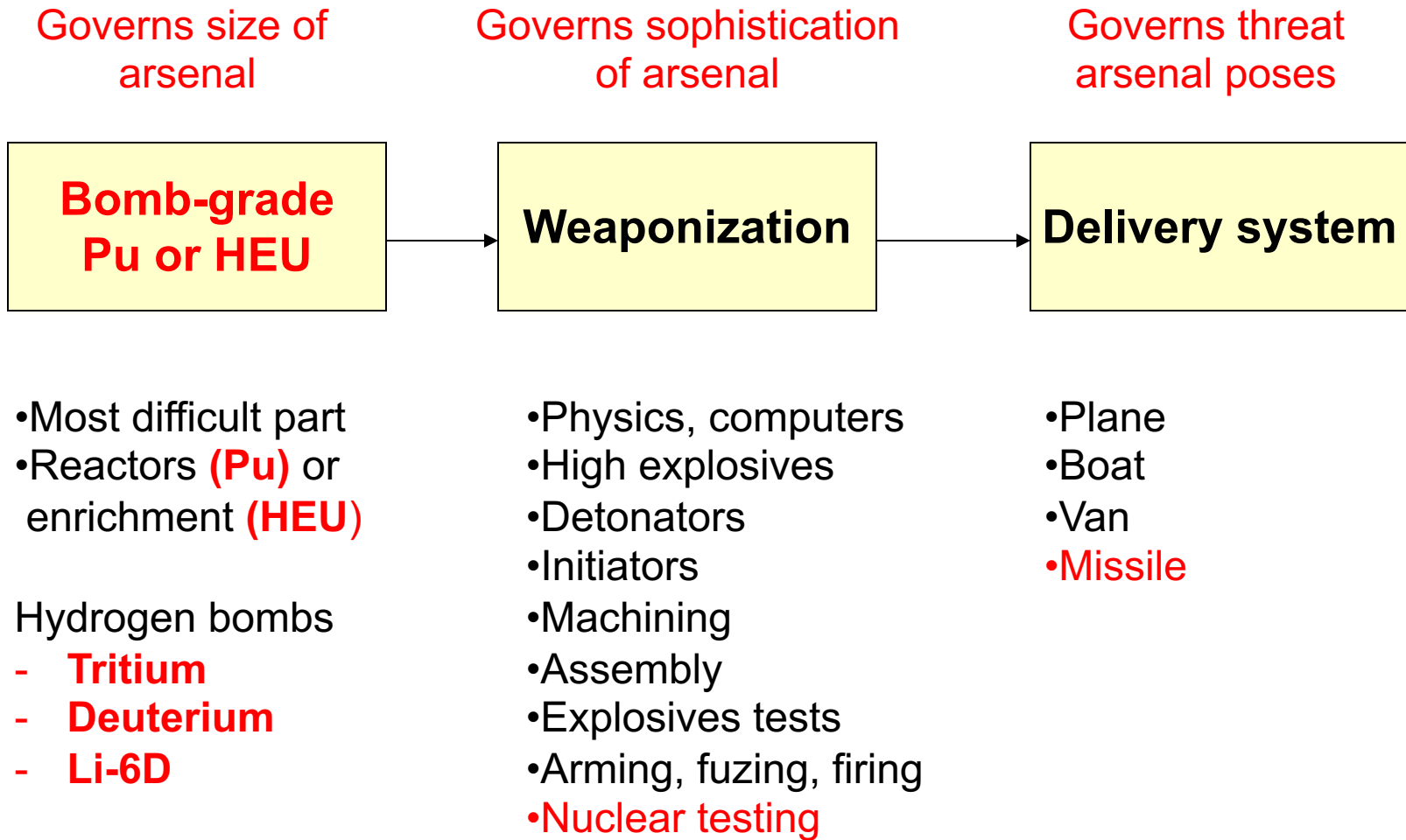
- Never have an ICBM, cease developing any nuclear-capable missiles, and stop proliferating ballistic missiles to others.
- Cease its support for terrorists, extremists, and regional proxies, such as Hizballah, Hamas, the Taliban, and al-Qa'ida.
- End its publicly declared quest to destroy Israel.
- Stop its threats to freedom of navigation, especially in the Persian Gulf and Red Sea.
- Cease escalating the Yemen conflict and destabilizing the region by proliferating weapons to the Houthis.
- End its cyber-attacks against the United States and our allies, including Israel.
- Stop its grievous human rights abuses, shown most recently in the regime's crackdown against widespread protests by Iranian citizens.
- Stop its unjust detention of foreigners, including United States citizens.

Not clear how this will end

What next for DPRK's nuclear arsenal?



How do we know what DPRK has?



What is confidence level?

Source: DigitalGlobe

4 NOV 2010

Commercial overhead imagery

28 MAY 2011

Source: GeoEye

26 JAN 2012

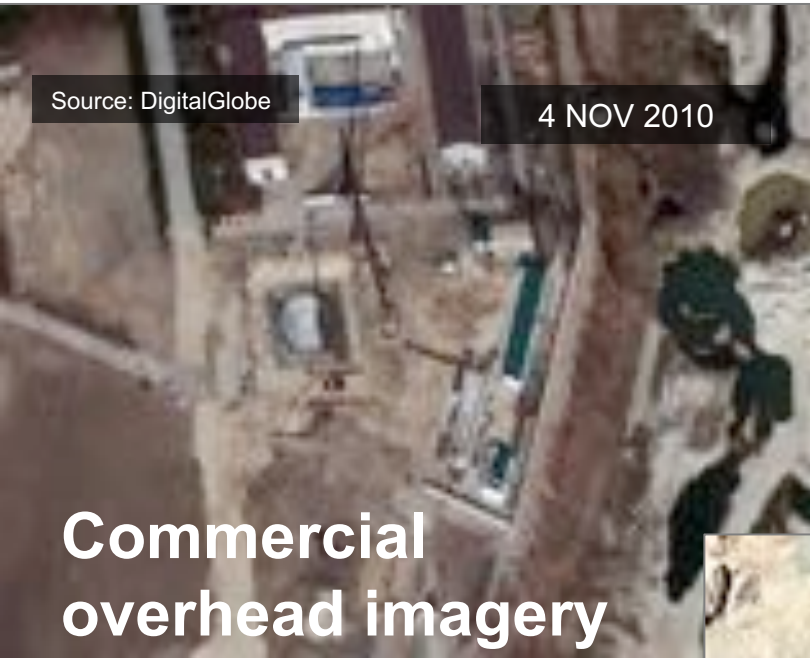
Source: DigitalGlobe

24 JUN 2012

Source: GeoEye

12 DEC 2013

Source: DigitalGlobe/ Google Earth



Looking from the inside



Hecker

KCNA Publicity – what they show us



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Tritium	Very limited
Nuclear devices (sufficient material)	~38 (20 to 60)
Nuclear device deliverable by SCUD & Nodong missiles Progress on solid-fueled missiles (KN-23, KN-24 and PK-3)	Yes Likely can reach all of ROK and most of Japan
Nuclear device deliverable by IRBMs & ICBMs	Hwasong-12, 14, 15 Not yet military useful. Need more tests