Chinese Strategic Nuclear Force Posture: Current and Future 2035

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Outline

• Current WH Level’s & Influencing Factors
• Problem/Purpose of Study
• China as an Evolving Strategic Nuclear Threat
• Strategic Nuclear Force (SNF) Overview
• China’s Fissile Fuel Stockpile Overview
• Forecast Strategic Nuclear Force Levels
• Issues affecting Chinese Nuclear Force Levels
• Conclusions
Current Nuclear WH’s and Influencing Factors

These factors indicate we should not have confidence in China’s WH numbers

Nuclear Warheads
- Strategic
  - 140-170 WH
- Total Inventory
  — 240-280

Unfavorable Geostrategic Position

BMD
- US
- Russia
- India

MIRV

Unprecedented Modernization
- ICBM
- SLBM
- Bomber

Can Afford Guns And Butter

5,000+ km of tunnels

Policy & Doctrine Requirements

Nuclear Industry Capabilities

Tactical Nuclear Weapons?
- 100’s dual capable systems

1. China Global Interests
2. US Main Enemy

Nuclear Technology Developments
- Low Yield
- Precision
- Tailored Yields

Growing body of evidence indicates China has a larger nuclear force than assessed

All Wrapped in secrecy, deception, and Sun Tzu’s stratagems
Problem Facing the US

- Number of Chinese nuclear weapons is a closely guarded secret...“no direct evidence exists”
  - Persistent lack of transparency
  - Denial and deception are integral components of Chinese nuclear organizations
- Authoritative Chinese sources, statements, writings on the structure, role, and mission of Chinese strategic forces is very limited
- Chinese nuclear power rapidly growing → significant shift in China’s capabilities and intentions
  - Rapid growth in strategic systems types & numbers
  - Qualitative improvements in capabilities and upgrades
  - Survivability measures: mobility, hardening, BMD
- Military build-up that is growing faster than any nation in the world
- Past predictions by the Intelligence Community have proven to be highly inaccurate, due to collection priorities and very limited success in collection against China
- “Current estimates of China’s fissile material stockpile suffers from a large margin of error.”
- PRC has stolen US nuclear weapon design information that helped it fabricate and successfully test a new generation of nuclear warheads--Every currently deployed US strategic warhead (incl Neutron WH technology) (Cox Report)
- China’s definition of deterrence includes the capability to coerce, to achieve China’s political objectives and is based on the capability to wage real war
- In addition to passive defenses, China is cooperating with Russia to develop missile defenses.
- US is regarded as the main enemy
- Aggressive deployment of MIRV’s by the PRC would permit the deployment of >1000 thermonuclear warheads on ICBM/SLBM by 2025 and 3000-5000 by 2035 using conservative assumptions

What are the implications of this rapid growth in Chinese nuclear force capabilities?
Purpose of Study

• Provide an overview of developments in Chinese strategic nuclear forces which “Remain central to China’s military plans and intentions” (1)

• Used current open source data and based estimates on technologies, production capabilities and probably force developments, to provide a forecast of possible Chinese SNF force structures out to 2035

• This study takes the position that the modernization of China’s strategic nuclear force is not in the service of stability and maintaining the status-quo in the strategic military realm as they claim, but China’s SNF is the key to enhance “Comprehensive National Power” so China can effectively threaten/coerce to achieve national interests and if necessary, prevail in future conflicts, employing China’s concept of war control.

• Forecast will illustrate the force structure China is developing will be sized and capable of conducting nuclear warfare by “carrying out a number of waves of nuclear military strikes…to achieve strategic goals”

(1) In China’s concept of “Integrated Strategic Deterrence” strategic nuclear forces would be integrated with cyberwar, psyops/influence operations, strategic conventional, space and other elements of national power to achieve a dominant “Comprehensive National Power” position. Fits with China’s views on future system-of-systems warfare “System Confrontation and System Destruction Warfare”.
The 2015 Chinese WP “China’s Military Strategy”, issued by China’s State Council Information Office, states: “It is a Chinese Dream to achieve the Great Rejuvenation of the Chinese nation. The Chinese dream is to make the country strong…without a strong military, a country can neither be safe nor strong”.

China is …expanding its interests around the world…insistent on having a greater voice in global interactions, which at times may be antithetical to US interests

China’s military rise is well planned, and Chinese leaders are following a strategy they believe will lead to greater power and influence both regionally and globally…enable them to impose its will in the region. [JRH: China needs a strong SNF to deter US intervention in conflicts with countries which US has treaty commitments with, and to coerce.]

DIA’s most concerning conclusion— China “…Increasingly arrogant…has reached a critical point of confidence where they now feel that in combat, the PLA can match competitors”.

Acting Sec Def Shanahan first staff meeting emphasized the Pentagon’s focus must remain on “China, China, China”—and this hasn’t changed with Sec Def Esper.

China’s 2019 NWDP “China’s National Defense in a New Era” called for establishing a “Community of common destiny” …”emergence as a great power with global influence”…”reform the system of global governance & create new security architecture”..”powerful military essential” to achieve Xi’s global dream.
Excerpts from China’s Military Strategy, May 2015—Reinforced by China’s 2019 NDWP

- The nuclear force is a strategic cornerstone for safeguarding national sovereignty and security.
- Need to be able to deter US actions in areas of Chinese interest (e.g. SCS, ECS and Taiwan)
- President Xi: Called for accelerating the Peoples Liberation Army Rocket Force (PLARF) pace of development and breakthroughs in...strategic deterrence capability. (Includes compellence)
- China will optimize its nuclear force structure; improve strategic early warning, command and control, missile penetration, rapid reaction, and survivability and protection and deter other countries from using or threatening to use nuclear weapons against China.
- Recent military strategy documents highlight a requirement to secure expanding Chinese global influence and national interests overseas—growing civil/military base network to protect markets, resources, LOC’s developed under Belt and road initiative [JRH: will bring China into conflict w/US]
- China’s leaders view the 21st century first two decades as a “period of strategic opportunity”—will facilitate domestic development and expansion of Chinese “Comprehensive National Power”.
- President Xi’s “China Dream of National Rejuvenation” encapsulates the long-standing national aspiration to establish a powerful and prosperous China—“Strong Military Dream” foundation
- Doctrinal references to “Forward edge defense”...potential conflicts far from China’s territory suggest PLA strategists envision an increasingly global role.

President Xi (19th Party Congress, 18 Oct 2017) “By the year 2020 mechanization will be achieved [JRH—Did not]...the modernization of the national defense and armed forces should be completed by 2035...build China’s armed forces into “world class forces” by 2050...will be able to fight and win”.

President Xi (29 Oct 2018 & 5 Jan 2019) Told Southern Command to “Concentrate preparation for fighting a war”, as tensions increased over disputed South China Sea and Taiwan.
Overview of China’s Strategic Nuclear Forces

Background

• 31 Dec 2015 PLA Rocket Force (PLARF) established as a full service—China’s core force for strategic deterrence and symbol of China’s Great Power Status

• 2017 Xi—”Accelerate PLARF pace of developments and breakthroughs in strategic deterrence capability”

• 2018 Nuclear Posture Review-- “China is modernizing and expanding its nuclear forces...pursuing entirely new nuclear capabilities tailored to achieve particular national security objectives…”

• 2019 Missile Defense Review—"China has developed the worlds most active ballistic missile development program and is developing HGV’s”
Chinese Nuclear Systems Have Global Coverage

7 systems can now attack US

DF-41 >14,000 km
JL-3 > 14,000 km
**DF-5 (CSS-4) ICBM**

- Designed by Chinese Academy of Launch Vehicle Technology (CALT) (Under CASC)
  - 30-40 space launch vehicles/year produced
- IOC: 1981; DF-5B 2015; DF-5C 2018?
- Specifications:
  - Weight: 182 t
  - Length: 35.6 m
  - Diameter: 3.35 m
  - Throw-weight: 5,000 kg
  - Propulsion: Two stage liquid (storable)
  - Range: 12-15,000 km (7500-9300 mi)
  - CEP: DF-5/5A ~800 m (2600 ft); DF-5B ~300 m; DF-5C ?
- Warhead:
  - DF-5/5A: 1 X 4-5 MT
  - DF-5B: 3-8 X 200-300 kt—(may be back fitted to DF-5A)
  - DF-5C: 10 X 20, 90, 150 or 250 kt yield ?
- Number deployed: Storage unknown—Come off LM-2C production line—do we really know how many were produced or are deployed? 3 bases known.
  - DF-5B: 10? (Sept 2015)
  - DF-5C: TBD (Jan 2017) (Why w/DF-41?)
- Launcher: Deployed in silo’s. China has constructed a large number of decoy silos.
- Launch preparation time: 30-60 min.
**DF-31 (CSS-10)**

- Manufactured by Academy of Rocket Motors
- Specifications:
  - Weight: 42 t (38,000 kg; 84,000 lb.)
  - Length: 13 m
  - Diameter: 2.25 m
  - Throw-weight: 700 kg (1540 lb.)
  - Propulsion: Three stage solid
  - Range: DF-31: 7200-8000km; DF-31A: 11,200 km
  - CEP: 100 m (silo); 150 m (road mobile) w/Astro-inertial & Beidou. MaRV’s <10 m w/Beidou
- Warhead: (Can also carry MaRV’s)
  - DF-31: 1 X 1 MT w/decoys
  - DF-31A: 1 X 1 MT or 1-3 X 20, 90 or 150 kt
  - DF-31AG: 1-3 X 20, 90 or 150 kt
- Number deployed:
  - DF-31: One ICBM Bde w/8
  - DF-31A: 24
  - DF-31AG: 24
- Launcher: DF-31/31A Road mobile TEL; DF-31AG Off road TEL
- Launch preparation time: <5 min?
- Re-loads: May have one or more reloads
**DF-41 (CSS-20)**

- Manufactured by China Academy of Launch Vehicle Technology. Production rate TBD.
- IOC: July 2012 first flight (10 flight tests) - Enter into service 2018
- Specifications:
  - Weight: ~ 80,000 kg
  - Length: 21 m (69 ft)
  - Diameter: 2.25 m (7 ft 5 in)
  - Throw-weight: 2,500 kg
  - Propulsion: Three stage solid
  - Range: ~14,000-15,000 km (8700-9300 mi)
  - CEP: 100 – 500 m. Guidance Inertial w/stellar updates and Beidou. MaRV’s w/<10 m CEP
- Warhead: 6-10 MIRV w/yields of 20, 90, 150 or 250 kt.
- Reloads: One or more reloads/launcher?
- Number deployed: 18 (April 2019)
- Launcher: Off road TEL and rail in development. Rail mobile test Dec 2015. 5,000 km tunnel complex has rail lines. Silo basing mentioned, and Test silo constructed 2019.
- Launch preparation time: <5 min?
China Type 094 SSBN

- Louder than 1970’s era Russian Delta III
- Launched July 2004 and entered into service 2006. 4<sup>th</sup> Jin commissioned 2011, and 5<sup>th</sup> in 2018 and 6<sup>th</sup> (094A?) in 2019. In 2015 Adm. Locklear said there could be 8 Type 094’s deployed. Approximately 3-4 years to build each SSBN—e.g. China build Yuan SSK’s at ~ 4/yr.).
- First deterrence patrol in 2015—Not clear if they are armed with their nuclear WH. Payload: 12 JL-2 SLBM (CSS-N-14) Number deployed: 6, based at Yulin Naval Base on Hainan Island.
- NOTE: Two Type 094’s at Bohai shipyard for maintenance and repairs, one for some time indicating Type 094 has maintenance and repair issues.
Type 096 SSBN

- Manufactured by Bohai Shipyard, Huludao, China
  Unknown number planned, but likely 5-8.
  -- Can lay-down 1-2/year in new facility—modular construction. 3-5 years for construction & 1-2 years for sea trials
- Type 096 SSBN will reportedly carry 24 JL-3 SLBM, each JL-3 missile will reportedly carry 6-10 WH
- IOC: ~2025 reported
- Will have substantially reduced acoustic signature—may use Integrated Electrical Propulsion System (IEPS) (Rim-driven pump jet)
- Type 096 will operate with the Type 094 SSBN fleet. Type 094’s will stay in protected waters in the South China Sea, and if the Type 096 is quiet enough, it may execute deterrent patrols in the Western Pacific, or stay in protected SCS waters.
- Number deployed: likely 5-8 -- will be based at Yulin Naval Base on Hainan Island.

President Xi, June 2018 “As a nations ultimate instrument, submarines shall see great developments…our seaborne nuclear forces need to advance by leaps and bounds”. (Why?)
JL-2/3 SLBM

**JL-2**
- Manufactured by Academy of Rocket Motors (ARMT). JL-2 Sea based variant of DF-31
- IOC: JL-2 ~2009?
- JL-2 Specifications:
  - Weight: 42,000 kg (93,000 lb.)
  - Length: 13 m (43 ft)
  - Diameter: ~78 in?
  - Throw-weight: 700 kg
  - Propulsion: Two stage solid
  - Range: 7,400 km (5,000 mi) Has to exit the First Island chain to target the US—Will likely focus on Eurasian targets.
  - CEP: < 100 m ~ 300 m? Utilizes advanced precision guidance technology w/anti-jam capabilities providing high accuracy. MaRV < 10 M?
- Warhead:
  - 1 250-1000 kT or 3 - 90 kT WH
  - Defense penetration features: Variable trajectory; stealth WH; Fast burn booster; Reduced heat signatures.
- Number JL-2 deployed: 6 SSBN X 12 SLBM = 72 with 72-216 + WH; If 8 SSBN X 12 = 96

**JL-3**
- First flight 24 Nov 2018 and two more in 2019 (Rapid dev.)
- 22 Dec 2019 test from Jin class indicates back-fit option into Type 094A and maybe Type 094
- Capabilities comparable to Trident and Bulava?
- Range: 12-14,000 km (7456-8700 mi)
- Derived from DF-41, uses DF-41 technologies
- MIRV—up to 10 RV’s
Xian H-6K & H-6N Bomber

- Manufactured by Xi’an Aircraft Industrial Corporation
- Number deployed: ~120, with ~20-25 H-6K -- ~15 deployed by 2015 and production of 2-3/yr. assumed for forecast, although up to 8/year has been reported.
  - H-6N w/ASBM (DF-21 & DF-26) Number TBD
- First Flight 5 Jan 2007 and entered into service Oct 2009
- H-6K/N Specifications:
  - Crew: 4
  - Cruise speed: M 0.75 (656 mph)
  - Range: 6000 km (3200 mi) and combat radius 1800 km (1100 mi)
  - Service ceiling: 12,800 m (42,000 ft)
  - New engines, avionics & In-flight refueling capable
- Armament:
  - 6 CJ-20 ALCM
  - 6 YJ-12 ASCM
  - H-6N: 2 DF-21D (CH-AS-X-13) or 1 DF-26 ASBM (DIA—China developing two new ALBM’s to be carried by H-6N variant with a 3700 mile range w/aerial refueling.
Cruise missile are rapidly growing in importance in Chinese thinking—far more cost effective than ballistic missiles if they can penetrate defenses.

- **HN-2000 stealthy CM with supersonic terminal phase** LACM/ASCM is under development. CEP 1-3 m, range 4000 km; guidance MWR, IR, Laser radar, Beidou & SAR.
- **Two Intercontinental CM concepts w/range of 5-8,000 km and >8,000 km** under consideration by CASIC and Third Academy.

**CJ-20 (DH-10)(HN-2) ALCM**

- **Manufacturer:** China Aerospace Science and Industry Corp. (CASIC) and China Haiying Electro-mechanical Technology Academy.
- **IOC:** 2004
- **Based on Russian Kh-55 (purchased from Ukraine ~1999-2001) and recovered tomahawk missiles fired by US. A complete production facility was transferred to Shanghai in 1995.**
- **Specifications:**
  - Weight: 1400 kg
  - Length: 7.2 m
  - Dia: 0.7 m
  - Range: 1500 km (930 mi)
  - WH: 500 kg (1100 lb.) conv or nuc (20-90 kT)
  - Speed: M 0.7-0.9
  - Propulsion: Turbofan
  - Guidance: TERCOM/Inertial/TV/Imaging IR
  - CEP: <5 m
- **Launcher:** H-6 bomber w/6 CJ-20
- **Production:** 2008—50-250 missiles reported and 2009 200-500 missiles reported. 2020#?

CJ-20 is a Chinese cruise missile developed by China Aerospace Science and Industry Corp. (CASIC) and China Haiying Electro-mechanical Technology Academy. It is based on the Russian Kh-55 cruise missile, which was purchased from Ukraine in the late 1990s. The CJ-20 has been in production since 2008 and has a range of 1500 km (930 miles) with a warhead of 500 kg (1100 pounds) of conventional or nuclear explosives. It can be launched from a H-6 bomber with a range of 6 missiles per launch. The CJ-20 is designed to be more cost-effective than ballistic missiles and is being developed further with potential for longer ranges and improved guidance systems.
CH-AS-X-13 ALBM (Variant of DF-21)

H-6N w/CH-AS-X-13 ALBM
- H-6N range 6000 km
- CH-AS-X-13 range: 3000 km
- IOC: DF-21 operational, DF-26 ~2025

Primary targets:
- US carrier battle groups,
- defense suppression targets,
- other targets in the second and third island chains (Hawaii)

Chinese planners emphasize the shock effects of combined ballistic and cruise missile attacks against enemy sea and land targets, especially in air/missile defense suppression.
- However, PLA capability to execute a joint campaign has not yet been demonstrated.

DF-21
- Manufacturer: CASTC. ALBM believed to be based on DF-21 and carried by H-6N, variant of H-6K
- DF-21 Entry into service: 1991
- Specifications (DF-21):
  - Length: 10.7 m (35 ft)
  - Dia: 1.4 m (4.6 ft)
  - Weight: 14, 700 kg
  - Warhead: 600 kg conventional and nuclear
  - Propulsion: Two stage solid
  - Speed: M 10
  - Guidance: Inertial and terminal active radar.
  - Accuracy: 10-50 m
  - Range: 1500 km
- Number deployed: DF-21A—200; DF-21C—100; DF-21D ASBM—50

DF-26
- Range: 3000-5471 km
- Accuracy: 10 m
- Number deployed: 80 (2019)
- IOC: 2013
- Warhead: 1200-1800 kg; or nuclear 200, 300, 500 kt WH
**H-20 Bomber**

- PLA AF officially confirmed development of new generation of long range bomber (1 sept 2016). “Should be capable of striking targets beyond the second island chain without aerial refueling while carrying a payload of at least 10 metric tons”.
- Manufactured by Xi’an Aircraft Industrial Corp.
- Expected to be a stealth flying wing design
- Roll-out in 2019 (no) and first flight expected ~2020, with expected entry into service ~2025
- Range; 5000 mi (minimum) ~12,000 desired
- Payload: “at least 10 ton” (NOTE: 12 CJ-20 weigh ~18 ton, so payload likely higher)

### Comparison of J-20 and potential H-20 development Timeline

<table>
<thead>
<tr>
<th>Development milestone</th>
<th>XAC Y-20</th>
<th>XAC H-X (estimated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-scale mock-up completed (digital/metal)</td>
<td>early 2008 / 2010</td>
<td>late 2013</td>
</tr>
<tr>
<td>Rumors that the #01 prototype was under construction</td>
<td>mid-2009</td>
<td>late 2015 / early 2016</td>
</tr>
<tr>
<td>Three prototypes (#01 – #03) finished, #02 static test</td>
<td>mid 2012</td>
<td>late 2018 / early 2019</td>
</tr>
<tr>
<td>Roll out &amp; first low speed taxiing</td>
<td>late 2012</td>
<td>late 2019</td>
</tr>
<tr>
<td>First flight</td>
<td>early 2013</td>
<td>early 2020</td>
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</tbody>
</table>
Chinese ICBMs/SLBMs Have the Throw-weight for Significant MIRVing

- For a MIRV’ed missile system, approximately 35-45% of the throw-weight is the Post Boost Vehicle (PBV) that dispenses the RV’s and 55-65% of the throw-weight are the RV’s, although for large missiles it can be as low as 35% for the PBV (e.g. PK). Rough rule of thumb usually used is 50-50.

- If we assume the assessed WH carriage on the DF-31 of 3 RV’s is correct, and the DF-41 can carry up to 10 RV’s, then that means each RV weighs ~ 116 KG (FYI—The Russian Bulava RV weighs ~ 90 kg w/ 100-150 kT yield)

- Chinese IC/SL force will likely carry a mix of large, medium and small RV’s

- Postulated Chinese ICBMs/SLBMs Throw-weight & Payload & Number of RV’s

<table>
<thead>
<tr>
<th>System</th>
<th>Throw-weight (Kg)</th>
<th>50% Payload RVs</th>
<th>Number of 100-150 kT RV’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF-5B/C</td>
<td>5,000</td>
<td>2500 kg ÷ 116 kg =</td>
<td>~21</td>
</tr>
<tr>
<td>DF-31A</td>
<td>700</td>
<td>350 kg ÷ 116 kg =</td>
<td>3</td>
</tr>
<tr>
<td>DF-41</td>
<td>2500</td>
<td>1250 kg ÷ 116 kg =</td>
<td>~10</td>
</tr>
<tr>
<td>JL-2</td>
<td>700</td>
<td>350 kg ÷ 116 kg =</td>
<td>3</td>
</tr>
<tr>
<td>JL-3</td>
<td>2500?</td>
<td>1250 kg ÷ 116 kg =</td>
<td>~10</td>
</tr>
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</table>

MIRVing Chinese ICBM/SLBM systems will rapidly grow China’s SNF WH’s
Chinese Nuclear Infrastructure is Substantial, Employing Ten’s of Thousands of Personnel and Could Support Major Force Build Up …

Mines: ~12
Uranium Production: 8
Plutonium Processing: 4
Tritium, L6, Bor: 3
Design & Fabrication: 3
R&D: 12
Support: 4

...And China Only has a Few Hundred Warheads?
Chinese Nuclear Weapon Research

• China is developing an arsenal of accurate, low-yield “useable” next generation nuclear weapons.
  -- Conducting average of 5 tests/month to simulate nuclear blasts—explosive containment chambers
  -- Between Sept 2014 and Dec 2017 China conducted over 200 laboratory experiments as reported by China Academy of Engineering Physics (~50-60/yr.) as compared to US (~10/yr.).
  -- US conducted >1000 nuclear tests and China only 45. Quote “We are in a hurry to catch up”.
  -- Tests provide data China needs to develop smaller, more advanced nuclear weapons with tailored effects, e.g. EMP, neutron, X-ray, Gamma ray. Tests inconsistent with CTBT

NOTE: From 1982-1996 China initiated a test series indicating it was developing a number of new small thermonuclear warheads with higher yield-to-weight ratio—10 tests were 10-20 kT and 14 were under 10 kT with 6 in the 1-3 kT range. In Jun/Jul/Nov 2001 China conducted a further 4 tests-none produced a "detectable nuclear yield or blast", and no detectable emissions.

• “…Chinese technological capability in the field of nuclear weapons has reached par with the US”

• China reportedly had at least six different early nuclear warheads.
  1) 15-40 kT fission bomb
  2) 20 kT missile WH
  3) 3 MT missile WH
  4) 3 MT gravity bomb
  5) 4-5 MT missile WH
  6) 200-300 kT missile WH

• Chinese new small WH from Chinese “Report of the Defense Education Propaganda” (Fisher PPT)
  -- DF-41: 1 X 1,600 kg 5.5 MT
    6 X 250 kg, 650 kT
    10 X 165 kg, 150 kT

  Given the DF-41 reported throw-weight of 2500 kg, this means ~1250 kg payload, which the MIRV force loadings exceed by ~ 400 kg, or the throw-weight is incorrect, or the PBV or WH assessment is inaccurate.
China’s Fissile Fuel Stockpile Sufficient

- The International Panel on Fissile Material (IFPM) in Jan 2018 estimated that China had 14+/−3 tons of Highly enriched uranium (HEU) and 2.9 +/- 0.6 tons of weapon grade plutonium (Pu).

- The total of ~3878 WH was based on IFPM (2012) estimates of Chinese fissile fuel. However, in the case of China, estimating warheads is still largely a matter of guesswork.

- China keeps nearly all information about its stocks of fissile fuel material and nuclear weapons secret. There is little official information about China’s nuclear arsenal.

- Without knowledge of the operating history and power of China’s Pu production reactors and the capacities of its uranium enrichment, any estimates of China’s fissile material stocks will necessarily have great uncertainties. What information there is “has to be assembled, verified, and evaluated from many different independent sources”. “Current estimates of China's fissile material stockpile suffers from a large margin of error.”

**IFPM (2012)**

Number of 20 kT WH of Advanced Design
- HEU: 3,000 WH
- Pu: 878 WH
Total 3,878 WH

**NOTE:** Could be boosted to 60-200 kT w/D-T

<table>
<thead>
<tr>
<th>Yield (kt)</th>
<th>Technical Capability</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
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<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>6</td>
</tr>
</tbody>
</table>
China Reactor Construction leads the World
--China Could Rapidly Add Fissile Fuel--

- China will have ~51 nuclear power reactors in operation by 2020 providing 58 GWe with another 30 GWe under construction by 2020 (delays?)
- Many more reactors are under consideration for construction to meet China’s energy needs and reduce massive fossil fuel pollution. (But may be Thorium = no fissile fuel)
- To supply these reactors China needs 9 Million SWU/year and will have a total estimated enrichment capacity of 12 Million SWU/year by 2020, (which is 1/4 more than its domestic industry is expected to require) and may have the ability to add 1 million SWU/year of additional capacity each year.
- The development of China’s enrichment capacity has gone far beyond the government stated policy of “self sufficiency”.

If 4 million SWU’s are available for HEU production, and it takes 232 SWU’s to produce one kg of HEU, then in one year 17,241 kg of HEU could be produced. Based on the prior chart, China could produce 1077 20 kT low technical capability design and 3448 high technical capability design 20 kT nuclear weapons per year, providing ample fissile fuel to grow its nuclear forces with militarily useful nuclear warhead designs.

If China succeeds in building and operating its planned two Pu reprocessing plants at their design capacities, (~2 and 8 tons of Pu/yr.)—this would provide an additional ~ 606 and 2424 (Total 3030 WH) 20 Kt weapons/year, which could be boosted w/D-T to 60-200+ kT/WH
Given the Growth in Chinese Strategic Nuclear Delivery Systems, and their MIRV capability, What is Wrong with this Picture?

- Due to the emphasis that China has placed on concealment of its nuclear weapons capabilities, together with the 1) geographically remote, 2) mountainous/densely forested area, and 3) massive underground construction program, it is doubtful that the US has identified all of China’s nuclear weapons related facilities.

- Declassified documents indicate it was very difficult to collect against China. Also, until recently, collection and analysis against China was not a priority, this is exacerbated by the lack of technically trained analysts with the necessary language skills, as well as Chinese knowledge of US “National Technical Means” and how to deceive them.

Who is winning the battle between the US intelligence and Chinese deception?
• DIA Director Lt. Gen Robert Ashley May 2019 “Over the next decade, China is likely to at least double the size of its nuclear stockpile…”
• Unofficial US & foreign estimates range from 1600 -- >3,000 nuclear weapons
• Bradley Hahn, US Naval officer (Intel?) stationed in Hong Kong early 1980’s estimated China had 1250 nuclear weapons (50 ICBM and 1200 theater)
• Col Gen (Ret.) Victor Yesin 30 April 2012 estimated China had 1800 nuclear warheads (strategic and theater)
• However, the accepted open source estimate of Chinese nuclear warheads has been ~ 180-260 for over 30 years
The impact of new SNDV deployments and MIRV’ing is finally starting to show.
Chinese SNF has Reached an Inflection Point …
And will rapidly grow—but how much is enough?

<table>
<thead>
<tr>
<th>Rapid increase in Types of SNDV’s</th>
<th>Key Recent IOC’s &lt; 5 Y</th>
<th>MIRV WH Capabilities</th>
<th>Production Rate/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>• DF-5A</td>
<td></td>
<td>1</td>
<td>1-2?</td>
</tr>
<tr>
<td>• DF-5B</td>
<td>2015</td>
<td>3-8</td>
<td>1-2?</td>
</tr>
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<td>• DF-5C</td>
<td>2020?</td>
<td>10</td>
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<td>• DF-31</td>
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<td>• DF-31A</td>
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<td>3-6</td>
</tr>
<tr>
<td>• DF-31AG</td>
<td>2017</td>
<td>1-3</td>
<td>3-6</td>
</tr>
<tr>
<td>• DF-41</td>
<td>2018</td>
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<td>• Jin Type 094 SSBN</td>
<td></td>
<td></td>
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<tr>
<td>o JL-2</td>
<td>2015</td>
<td>1-3</td>
<td>~6</td>
</tr>
<tr>
<td>o JL-3 (Type 094A)</td>
<td>2020?</td>
<td>6-10</td>
<td>~6</td>
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<tr>
<td>o JL-3</td>
<td>2025?</td>
<td>6-10</td>
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<tr>
<td>• H-6 Bomber</td>
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<td>o H-6</td>
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<td>2016</td>
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<td>o H-6N ALBM</td>
<td>2018</td>
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<tr>
<td>• H-20 Stealth Bomber</td>
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This is where China was until ~ 2010/15

China “will never enter into a nuclear arms race with any other country”...What is this?
Forecast of Chinese Deployed SNF Warheads 2015-2035

Key Unknowns:
- How many SNDV will China deploy?
- At what rate? Deployed & OT&E?
- With what capabilities?
  -- Nuclear and non-nuclear
  -- High yield vs accurate, sub-kt, “clean” and tailored effects WH?
- Potential re-loads not counted

Used NASIC 2015 and FAS 2019 Forecast as baselines

- Used highly conservative ICBM production rates
- SLBM production sized to meet SSBN production—also conservative
- Assumed MIRV loadings based on current open source system reports
# Forecast of Chinese Deployed SNF 2015-2035

<table>
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<tr>
<th>ICBM (1)</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
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<td>20</td>
<td>10</td>
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<td>72</td>
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<td>Bomber</td>
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<td>15</td>
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<td>15</td>
<td>30</td>
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<td>- CJ-20</td>
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<td>12</td>
<td>180</td>
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<tr>
<td>Subtotal</td>
<td>15</td>
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<td>210-324</td>
<td>211</td>
<td>598-1037</td>
<td>367</td>
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</tbody>
</table>

(1) Reloads: Each mobile missile likely has at least one reload, adding 836-1596 WH. Bombers can be reloaded (660-690 WH) and SSBN can be reloaded also (1548-2460 WH).
Forecast of Chinese Deployed SNF 2015-2035 Assumptions (1)

ICBMs
- DF-5A: 10 SNDVs and converted to 3 WH in 2020
- DF-5B: 10 SNDVs and converted to 3-8 WH in 2015
- DF-5C: 20 SNDVs and carry 10 WH
- DF-31AG: 1-3 WH reported and production rate of 6 missiles/year assumed and allocated as shown
- DF-41: IOC 2017 and assumed 4-6/year production. China could produce at a faster rate.

SSBN/SLBM
- Type 094: 5 produced by 2018 (~ 1/18 mos.), Five expected to be produced, followed by type 094A
- Type 094A: 3 expected to be produced and assumed to carry JL-3. IOC ~2019/2020.
- Type 096: Eight expected to be produced starting in early 2020s at rate of 1/year. (China could produce at faster rate. China builds Yuan SSK at 4/year, and world leader in ship building) IOC ~ 2025
- JL-2: 12/Type 094
- JL-3: 12/Type 094A and 24/Type 096

Bombers
- H-6N carries 2 DF-21 or 1 DF-26 ALBM

Fissile Fuel
- Sufficient Fissile fuel available for number of WH forecast based on current acknowledged fissile stocks. China likely has greater amounts of fissile fuel than currently estimated and can certainly produce additional fissile fuels.

(1) Based on published reports.
Nuclear Weapons and Warfare are not Immune to the March of Technology, and Technology Changes Will Fundamentally Change Nuclear Warfare Policy, Doctrine, Strategy and Forces

- V. Mikhaylov, Minister of Atomic Energy, and First Deputy Minister, “We have no means of defending the country today except nuclear weapons” and proposed creating a force of 10,000, Low yield, “clean”, highly accurate nuclear weapons to change the situation – confirmed by CIA June 2000

  - Yeltsin reportedly signed presidential decree authorizing development 29 Apr 99 – V.Putin was Secretary (NOTE: Yields discussed 10’s-100’s TON’s; Clean <3 % fission fraction)

  - Goal is “…make the threat realistic”…“make nuclear weapons an instrument of policy” …” provide usable military force”

  - A force of 10,000 nuclear weapons is NOT a demonstration force—it is a warfighting force

  - According to Gen Hyten, Russia intends to win


- Col-Gen Muravyev, Dep CINC of the RVSN -- [Strategic missile systems should be capable of conducting 'surgical' strikes… using both highly accurate, super-low yield nuclear weapons, as well as conventional ones…” and requires the highest accuracy’…”...groupings of non-nuclear MBR (ICBM’s) and BRPL (SLBM’s) may appear…” ] Moscow Armeyskiy Sbornik, 1 Dec 1999. Russia reportedly has deployed precision nuclear WH w/50-200 ton yields on SLBM’s.

- US NIC 2012--“Nuclear ambitions in the US and Russia over the last 20 years have evolved in opposite directions. Reducing the role of nuclear weapons in US security strategy is a US objective, while Russia is pursuing new concepts and capabilities for expanding the role of nuclear weapons in its security strategy”

- US 2018 NPR-- “Russian …Doctrine emphasizes the coercive and military value of nuclear weapons” …” deployed a variety of low-yield nuclear capabilities”

Russia has a very different view of nuclear war than the US. Russia is developing new concepts and capabilities and also developing the policy/doctrine-strategy/forces to implement—and China is likely to follow

1) Declassified CIA documents
Factors Enabling and Driving China’s SNF Growth
Historic Economic Miracle Enables China to Afford Both Guns and Butter…

Defense budget as % of GDP

China’s military spending vs. the US

Enabling an unprecedented depth and breadth of military modernization

…but time is not on China’s side— Adverse trends in demographics, economy and social cohesion
China’s “Peaceful Rise” increasingly at odds with China’s Assertive Actions (1)

China’s assertive actions are a deliberate strategy and require sufficient conventional/nuclear forces and resolve to enforce China’s interests and deter US intervention.

China’s leadership wishes to maintain current beneficial world economic/political conditions for as long as possible. They are a principal beneficiary of the US maintaining the current world order, and now want a “New Type Major Power Relationship” with US—on China’s terms. What are their intentions? What capabilities will they developing?

- Military Exercises
- Space & missile defense cooperation w/Russia
- China Naval Bases
  - Burma (Listening post)
  - Pakistan
  - Djibouti
- “Far Sea Defense”
  - Protect China Global interests—e.g. Belt and Road Initiative—42 ports in 34 countries
- Claim South China Sea (core national interest)
- Claim Senkakou Islands
  - China protest US Air/Sea patrols & exercises
  - China Protests US Alliances & partnerships
- Unfavorable geostrategic position

(1) China’s leadership wishes to maintain current beneficial world economic/political conditions for as long as possible. They are a principal beneficiary of the US maintaining the current world order, and now want a “New Type Major Power Relationship” with US—on China’s terms. What are their intentions? What capabilities will they developing?
China’s Belt & Road Initiative will Change the World Order and Bring China into Conflict With the US

PLA has been tasked with securing the Belt & Road Initiative—China’s SNF is the foundation

But how successful will China’s BRI be?

Source: Mercator Institute for China Studies.

C. Inton, 23/04/2018
China’s Nuclear Neighborhood is Dangerous

The current/future nuclear threats China faces are not consistent with an arsenal of only a few hundred warheads – or securing China’s status as a great power.

Russia: Strategic – 1550 (New START)
Tactical – 2000-3500+

India: 120-140 WH?

Pakistan: “Will eat grass”
- WH/Technology provided by China
- 140-150 WH?

N.K.: 13-60?

US Nuclear Umbrella in Asia

Note: Many of the same factors driving potential rapid increase in China’s nuclear arsenal will also drive India and Pakistan to larger WH numbers.

Japan can go nuclear very rapidly (3-6 mos?) – 2000+ WH potential
Both S. Korea and Taiwan have the capability to go nuclear
China Constructed Over 5,000 km of Tunnels to Protect Nuclear Forces--Road/Rail Mobile ICBM’s
Other weapon systems?
- Torpedoes
- Mines
- Surface to Air missiles
- Artillery (Neutron WH developed)
- Bombs, ASM, ASCM

DIA (2007) could produce 75-120/year

If there are no nuclear WH for them, why are they dual capable?
Conclusions

- China's economic growth will fuel the rise of Chinese power “…establishing itself as the preponderant power in Eurasia and a global power second to none”
- China’s nuclear missile forces will grow in number and capability to support China’s national interests and global objectives—Regional hegemon and exert global influence
  - Nuclear policy/strategy/doctrine is changing to encompass coercion, counter-force and nuclear warfighting
- China’s warheads will significantly grow in number by 2035—But nuclear/conventional mix?
  - Rapid growth in strategic nuclear delivery systems
  - Missiles are being MIRV’ed
  - Sufficient fissile material exists to support growth
  - Accurate warheads can be lower in yield, smaller/lighter = more/missile
- Technology developments in advanced nuclear warheads will fundamentally change nuclear warfare and force requirements
  -- Accurate, low-yield, “clean” and tailored effects (EMP, Neutron, X-Ray, penetrator, etc) nuclear weapons are pol/mil useful—Employed consistent w/conflict objectives
- Due to planned US/Russian nuclear force reductions, China can match projected US/Russian force levels by 2025 of ~1550 strategic WH—IF Russia and US remain in New Start and China will far exceed Russia/US by 2035.

China’s shifting the balance of nuclear power supports China’s drive to regional and global hegemony