Countering China’s Nuclear Weapons Build-up
Questions to Be Examined

1. How stable have US estimates of China’s nuclear weapons force been over the last three decades?

2. Why have US projections of China’s likely nuclear arsenal by 2030 increased so dramatically recently?

3. What should the United States do to counter China’s projected nuclear weapons buildup?
Short Answers

• Stable and relatively low

• Revelations about China’s missile and plutonium production activities

• Rather than compete quantitatively with China’s nuclear weapons buildup, Washington should
  • Compete qualitatively to make US nuclear systems more difficult to target
  • Increase US and allied comparative advantages space control capabilities
  • Call for a time out on “civil” plutonium production in the US, PRC, Japan and RoK
1. How stable have US estimates of China’s nuclear weapons force been over the last three decades?
1985-2021: US Repeatedly Estimated PRC Had Roughly 200 to 300 Warheads
2. Why have US projections of China’s likely nuclear arsenal by 2030 increased so dramatically recently?
2010: DoD Confirms PRC Has 3,000 Miles of Missile Tunnels
2015: DoD Confirms PRC Has Multiple Independently Targetable Warheaded (MIRVed) Missiles

DF-41

DF-31
2021: Commercial Imagery Reveals PRC Is Building 350 New Missile Silos

1st PRC 200 tHM/yr plant under construction to be on line by 2025

2nd PRC 200 tHM/yr reprocessing plant to be on line before 2030

PRC 50 tHM/yr Pilot plant: ~100 bombs worth of plutonium/yr

China Experimental Fast Reactor, 20 Mwe

Fast Reactors under construction, first 600 Mwe reactor to begin operation in 2023, second plant to begin operation in 2026
### PRC’s Plutonium - Fast Reactor Program Geared to Produce Weapons Plutonium Soon

<table>
<thead>
<tr>
<th>Project</th>
<th>Construction Began</th>
<th>Operation Began / Expected</th>
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<tbody>
<tr>
<td>50 Mthm Pilot reprocessing plant at Jiuquan, Gansu</td>
<td>2006</td>
<td>2010</td>
</tr>
<tr>
<td>Experimental fast breeder reactor, 20 Mwe near Beijing</td>
<td>2004</td>
<td>2010</td>
</tr>
<tr>
<td>1st 200 Mthm reprocessing plant near Jinta Gansu</td>
<td>2015</td>
<td>2025</td>
</tr>
<tr>
<td>2nd 200 Mthm reprocessing plant near Jinta Gansu</td>
<td>Late 2020 or early 2021</td>
<td>Before 2030</td>
</tr>
<tr>
<td>1st 600 MWe fast breeder reactor at Xiapu, Fujian</td>
<td>December 2017</td>
<td>2023</td>
</tr>
<tr>
<td>2nd 600 MWe fast breeder reactor at Xiapu, Fujian</td>
<td>December 2020</td>
<td>2026</td>
</tr>
</tbody>
</table>
Fast Reactors Use PU or Medium Enriched U Cores & Make More Plutonium/MWe, Much of It Super Weapons-Grade

Sodium, lead, molten salt are used to transfer heat from the fast reactions. These heat transfer agents do not slow down the fast neutrons reactions.
2-stage Nuclear Weapons Primaries Prefer Plutonium

FIGURE 42
Two-Stage fusion weapon
Early in 2021, NPEC Projects PRC 2-stage Weapons Numbers

<table>
<thead>
<tr>
<th>EXISTING PRC WGPu STOCKS 2021</th>
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<tbody>
<tr>
<td>WGPu in kgs</td>
<td>Current number of warheads, assuming 3.5 kgs of WGPu/warhead primary</td>
<td>Additional warheads PRC could make with stockpiled WGPu assuming 3.5 kgs of WGPu/warhead primary</td>
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<tr>
<td>2,900</td>
<td>350</td>
<td>480</td>
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</table>

<table>
<thead>
<tr>
<th>ADDITION “PEACEFUL” PRC WGPu STOCKS BY 2030</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>WGPu in kgs</td>
<td>Additional warheads, assuming 3.5 kgs of WGPu/warhead primary</td>
<td>Total number of warheads by 2030, assuming 3.5 kgs of WGPu/warhead primary</td>
</tr>
<tr>
<td>1,550</td>
<td>440</td>
<td>1,270 (+/-275)</td>
</tr>
</tbody>
</table>
November 2021: DoD Projects PRC Will Acquire “at least 1,000” Nuclear Warheads by 2030, Indirectly Cites NPEC

“The PRC is constructing the infrastructure necessary to support this force expansion, including increasing its capacity to produce and separate plutonium by constructing fast breeder reactors and reprocessing facilities...the PRC likely intends to use some of this infrastructure to produce plutonium for its expanding nuclear weapons program. A Western think tank publication indicated that the PRC could field more than 1,000 nuclear warheads by the end of the decade, judging from the amount of plutonium that could be produced from reactors under construction.”

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https://media.defense.gov/2021/Nov/03/2002885874/-1/-1/0/2021-CMPR-FINAL.PDF
3. What should the United States do to counter China’s projected nuclear weapons buildup?
Energy Department Admits Efforts Just to Replace Aging Warheads Are Slipping

US plutonium pit production at Los Alamos 30 pits/year by 2026

Planned Pit production plant at Savannah River, Georgia 50 pits/year by 2035
Meanwhile, Sole Sourcing of New US ICBMs Will Be Costly and Slow

Ground based strategic deterrent, 400 missiles with 50 spares, $100 B to acquire, $264 B for full lifetime cost, to enter service by 2029 and be fully operational by 2036
Rather than Proliferate Nuclear Weapons, Increase Their Possible Locations

Versus

Boeing 777

Rotary missile launcher

Missile in silo

Mobile ICBM Concepts
Rather than Seek Nuclear Superiority, Secure US-Allied Space Control
Russia and China Are Challenging US-Allied Space Control

China’s SJ-12 & SJ-06F also Aolong-1

Russia’s Olimp-K

PRC ground – based laser blinding satellite

Russian Peresvet mobile laser system

Russian Tirada S-2 ground-based satellite EW jammer command unit
US Developing Distributed Military and Commercial Satellite Constellations that Could Cope

US DARPA’s Blackjack demonstration Program

Elon Musk’s Starlink Internet, 4408 satellites

Keiper, Amazon 3,236 satellites
“Peaceful” Rendezvous Satellites Could Serve as Bodyguards

- NASA’s proposed Restore-L
- ESA’s e.Deorbit
- Japan’s KIKU-7 “Chaser” & “Target”
- Japanese Sky Perfect JSAT Corp
- MEV (Mission Extension Vehicle)
- Japanese Astroscale Satellite
Cheap, Reusable, Quick Relaunchable Heavy Lift Could Assure US-Allied Control of Space
Rather than Match PRC Plutonium Programs, US, ROK, and Japan Should Pause Theirs if PRC Does the Same

South Korea's proposed pyroprocessing and fast reactor plants

Oklo reactor in Idaho

Natrium reactor in Wyoming

Reprocessing plant to open in 2023 in Rokkasho, Japan
1. The news suggests a quantitative nuclear arms race is under way.

Because China has deployed decoy silos previously for its DF-5 missiles, it’s unclear how many of the new 119 silos will host missiles or when. It also unclear how many of the silos will host China’s largest missile, the DF - 41, which could conceivably be armed with up to 10 warheads each, or the DF-31, which could also be MIRVed to carry up to 3-5 warheads. So, we do not know how many missiles and how many warheads China’s new silos will host. That said, there is a distinct possibility that all 119 silos will eventually host the DF 41 missiles carrying up to 10 warheads each. That could increase China’s nuclear offensive arsenal by 1190 warheads beyond its current reputed 200 to 350 nuclear weapons arsenal (which at least one officially anointed CCP commentator https://www.globaltimes.cn/content/1187766.shtml has already said China needs to acquire quickly (i.e., 1000 additional warheads) along with 100 additional DF-41s). This would ramp China up to nuclear parity with the US, which has roughly 1,400 warheads mounted on its strategic missiles. How soon could China make an additional 1,200 or so. warheads? That too is unclear. We don’t know precisely how much surplus plutonium and highly enriched uranium China has but the best public figures suggest China may have enough plutonium and highly enriched uranium stockpiled to make roughly 1,400 single stage weapons or roughly 500 two-stage thermonuclear devices. By NPEC’s most recent analysis http://npolicy.org/article.php?aid=1548&rtid=2, it would take another nine years for China to make roughly 1,200 two-stage devices. Again, there are many uncertainties but the probability of the worst, is roughly bounded by these estimates. Finally, whatever the uncertainties might be regarding the number of missiles and warheads these silos might host and when, one thing is quite clear: China construction of the silos is a clear signal it might launch on warning, under attack, if not first. The reason why is simple: the silos themselves are vulnerable to being knocked out.(a point even the Chinese admit to https://news.abs-cbn.com/overseas/07/03/21/is-china-building-a-vast-network-of-nuclear-missile-silos ).
2. Why such a Chinese nuclear ramp up would matter.

- The size and growth of China's nuclear arsenal is a worrisome, pacing event in America's military competition with Beijing. It, along with Russia's nuclear modernization, would greatly limit what forms of arms control, if any, the US and its allies could pursue for the next decade or more. At a minimum, Washington would have to triangulate all of its nuclear control initiatives to take in both Russia and China, a difficult task that the US would be quantitatively disadvantaged at mastering. If it became clear that Chinese nuclear weapons numbers might approach or exceed what the United States has currently deployed or that China was in a position to sprint quickly to such parity, American policy and military officials would be forced to respond. Such developments would, at the very least, prompt our (jittery) allies to demand Washington step up its nuclear game: If China has or could easily get X, our allies would likely insist that the United States get y times X more. Given how mature nuclear weapons technology now is, though, (it's three quarters of century old), and how expensive and slow US nuclear weapons production has become, engaging in a quantitative nuclear competition with Beijing will be less than leveraged to America's advantage. China certainly will be able to make more nuclear weapons and missile delivery systems far more cheaply and more quickly than the United States and will be able to exploit its "civilian" sectors far easier than America can. Keeping up with China in nuclear weapons, then, will come at a significant military opportunity cost. In specific, it will come at the cost of Washington making needed alternative military investments where it may still be able to seize the high ground over Beijing and Russia — e.g., in space-related technologies (cf. https://warontherocks.com/2021/05/a-starcrucer-for-space-force-thinking-through-the-imminent-transformation-of-spacepower/). Finally, while the United States cannot let its nuclear forces go to seed, relying on them as America's sole and permanently prime deterrent may be imprudent. With precision weapons, autonomous drones, cyber weapons, space technologies, possible designer diseases etc., there will be new more discriminate (Fifth Generational Warfare) ways to "kill a nation" than threatening (a la the air war theories of the 1920s) to pulverize an adversary's population, industrial centers or military forces with nuclear weapons. Think of inflicting scalpel-like frontal lobotomies to an adversary's command, control, communication, and intelligence systems (on the ground and in space); threatening their top leaders, disrupting key commercial, energy, and communications nodes, etc., all can be accomplished without threatening to use nuclear arms.
3. What should be done.

- First, US nuclear modernization should not attempt to go toe-to-toe with the Chinese warhead for warhead but instead focus much more than it has to date on increasing the number of aim points the Chinese would have to consider. Instead of placing our new ICBMs in existing (upgraded) silos, why not have decoy silos of our own, deploy our missiles in tunnels, or make them mobile? In the 1970s, Scoop Jackson suggested placing a rotary missile launcher on a civilian airliner to force the Soviets to have to worry about every civilian airliner. Missile launcher boxes for very long range missiles might be placed on commercial US container ships. The idea here’s would be not to try to catch up or stay ahead of the Chinese, but to make the Chinese have to race and proliferate to cover mostly empty US and allied aim points that might not be empty. The added benefit of China racing to get more missiles and nuclear weapons for this feckless task is that at some point their increased missile and warhead deployments may make it currently friendly nuclear neighbor, Russia, think twice about forever getting closer to Beijing. Second, propose a freeze in plutonium production for both “peaceful” and military purposes. We and the Chinese have plenty plutonium already; allowing more to be produced and weaponized would be bad commercially and militarily for both sides. Commercially, plutonium has negative commercial value. Not producing it would save money. Also, China has far more to lose if its neighbors go nuclear than the United States. Yes, if our allies go nuclear, it would likely strain alliance relations (possibly to a breaking point). But it would be even more worrisome to the Chinese. So, if Washington proposes to freeze plutonium production, it might also suggest the freeze should cover both Japan and South Korea as well as the United States and China. Given the pause in Japan’s and South Korea’s fast reactor programs and that America’s have yet to get underway in earnest, now is a good time to push such a freeze. Dialing Japan and South Korea should be leverage enough to appeal to any “reasonable” Chinese diplomat to strike a deal. But, given China fears US missile defenses (even though they don’t yet work all that well), these defenses (despite some pundits and some Chinese have argued) should not be bargained away to get such a moratorium. Third, the US should develop new weapons and targets set to deter the Chinese without using nuclear arms (or at least much, much latter in any war with Beijing). These would include space technologies; accelerating accurate cheaper drone and missiles, underwater drones, the AI to allow these systems to operate autonomously, etc. America’s new targets also should focus less on massive military, industrial and population destruction and more on precision disruption of specific nodes Beijing needs to control to maintain power over its own provinces, many of which are interested in enjoying greater political and economic autonomy. These include key nodes of communication, transnational electrical grid systems, surveillance cameras, key government computer servers, etc. Once the United States gains these capabilities, it is quite likely that the Chinese will be much more interested in bargaining in earnest for greater arms control and restraint — something they currently have no appetite for.