China’s Nuclear Weapons Modernization

Hans M. Kristensen
Director, Nuclear Information Project
Federation of American Scientists
hkrystensen@fas.org
https://fas.org/issues/nuclear-weapons/

Briefing to seminar on China’s Nuclear Modernization and Implications for India
Institute of Chinese Studies
New Delhi (virtual)
March 9, 2022
Brief overview

- Federation of American Scientists background
- China’s evolving nuclear posture
- Land-based missile developments
- Sea-based missile developments
- Bomber developments
- Force projections
FAS Nuclear Information Project

Empower public debate about status and future of nuclear weapons by providing informative, factual, free resources:

- Track global nuclear force developments
- Status of World Nuclear Forces
- Nuclear Notebook
- SIPRI Yearbook

https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/
Evolving Chinese nuclear posture

Then:
• Minimum deterrent
• Small arsenal (compared with US/Russia)
• Will not participate in nuclear arms race
• Slow and modest nuclear modernization
• MONAD of land-based missiles/bombers
• No alert, warheads in storage
• Simple retaliation strategy
• No-first-use policy
• No threat/attack against non-nuclear states/NWZ

Now/future:
• Medium deterrent (officially still minimum)
• Growing arsenal (still smaller than US/Russia)
• Active role in increasing nuclear competition
• Rapid and broad modernization
• Emerging TRIAD
• Increasing alert level, evolving launch-on-warning
• Counterattack strategy (escalation steps?)
• No-first-use policy
• No threat/attack against non-nuclear states/NWZ

“Among the nuclear-weapon states, China... possesses the smallest nuclear arsenal.”

Chinese Ministry of Foreign Affairs fact sheet 2004
Chinese nuclear discoveries

Silo discovery was not an accident but build on years of previous monitoring and reporting on Chinese nuclear sites:

Discovery of first Chinese Jin-class SSBN
Discovery of extensive missile training area in central China
Most recently of missile silo construction
Current arsenal

- Estimated stockpile of 350 warheads
- Growing ICBM force (mobile and silo)
- ~330 silos under construction (DF-31A, DF-41?)
- Growing MRBM/IRBM force (DF-21E, DF-26)
- Growing SSBN fleet (Type 094/096)
- Emerging bomber force (some old capability)
- Increasing MRV/MIRV (DF-3B, DF-41, JL-3)

<table>
<thead>
<tr>
<th>Type/Chinese designation (US designation)</th>
<th>No. of</th>
<th>Year first deployed</th>
<th>Range (km)</th>
<th>Warheads x yield</th>
<th>No. of warheads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft</td>
<td>20^*</td>
<td>2009</td>
<td>3,100</td>
<td>1 x bomb</td>
<td>20</td>
</tr>
<tr>
<td>H-6K (B-6)</td>
<td>10</td>
<td>2009</td>
<td>3,100</td>
<td>1 x bomb</td>
<td>10</td>
</tr>
<tr>
<td>H-6N (B-6N)</td>
<td>10</td>
<td>2021</td>
<td>3,100+</td>
<td>1 x ALBM</td>
<td>10</td>
</tr>
<tr>
<td>H-20 (B-20)</td>
<td>–</td>
<td>[2023+]</td>
<td>..</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Land-based missiles</td>
<td>280</td>
<td></td>
<td></td>
<td></td>
<td>250</td>
</tr>
<tr>
<td>DF-4 (CSS-3)</td>
<td>6^†</td>
<td>1980</td>
<td>5,500</td>
<td>1 x 3,300</td>
<td>6</td>
</tr>
<tr>
<td>DF-5A (CSS-4 Mod 2)</td>
<td>10</td>
<td>1981</td>
<td>12,000</td>
<td>1 x 4,000-5,000</td>
<td>10</td>
</tr>
<tr>
<td>DF-5B (CSS-4 Mod 3)</td>
<td>10</td>
<td>2015</td>
<td>13,000</td>
<td>5 x 200-300</td>
<td>50</td>
</tr>
<tr>
<td>DF-5C (CSS-4 Mod 4)</td>
<td>..</td>
<td>[2020a]</td>
<td>13,000</td>
<td>[MIRV]</td>
<td>..</td>
</tr>
<tr>
<td>DF-15 (CSS-6)</td>
<td>..</td>
<td>1990</td>
<td>600</td>
<td>1 x N</td>
<td>..</td>
</tr>
<tr>
<td>DF-17 (CSS-22)</td>
<td>36^†</td>
<td>2020</td>
<td>&gt;1,000</td>
<td>1 x HGV</td>
<td>..</td>
</tr>
<tr>
<td>DF-21A/E (CSS-5 Mod 2/6)</td>
<td>40^†</td>
<td>2000/2016</td>
<td>&gt;2,100</td>
<td>1 x 200-300</td>
<td>40^†</td>
</tr>
<tr>
<td>DF-26 (CSS-18)</td>
<td>200</td>
<td>2016</td>
<td>4,000</td>
<td>1 x 200-300</td>
<td>20^*</td>
</tr>
<tr>
<td>DF-31 (CSS-10 Mod 1)</td>
<td>6</td>
<td>2006</td>
<td>7,200</td>
<td>1 x 200-300</td>
<td>6</td>
</tr>
<tr>
<td>DF-31A/AG (CSS-10 Mod 2)^†</td>
<td>72</td>
<td>2007/2018</td>
<td>11,300</td>
<td>1 x 200-300</td>
<td>72</td>
</tr>
<tr>
<td>DF-31A/AG (CSS-10 Mod 2) silo</td>
<td>..</td>
<td>[2025+]</td>
<td>11,300</td>
<td>1 x 200-300</td>
<td>..</td>
</tr>
<tr>
<td>DF-41 (mobile version) (CSS-20)</td>
<td>18^‡</td>
<td>2020</td>
<td>12,000</td>
<td>3 x 200-300</td>
<td>54</td>
</tr>
<tr>
<td>DF-41 (CSS-X-20A) silo</td>
<td>..</td>
<td>[2025+]</td>
<td>12,000</td>
<td>[8 x 200-300]</td>
<td>..</td>
</tr>
<tr>
<td>Sea-based missiles</td>
<td>6/72^‡</td>
<td></td>
<td></td>
<td></td>
<td>72</td>
</tr>
<tr>
<td>JL-2 (CSS-N-14)</td>
<td>72</td>
<td>2016</td>
<td>&gt;7,000</td>
<td>1 x 200-300</td>
<td>72</td>
</tr>
<tr>
<td>JL-3 (CSS-NX-?)</td>
<td>..</td>
<td>[2020a]</td>
<td>&gt;9,000</td>
<td>[MIRV]</td>
<td>..</td>
</tr>
<tr>
<td>Total</td>
<td>390</td>
<td></td>
<td></td>
<td></td>
<td>350^*</td>
</tr>
</tbody>
</table>

Hans M. Kristensen, Federation of American Scientists, 2022 | Slide 6
Land-based missile developments: mobile

- DF-41 ICBM being fielded (2+ brigades?)
- DF-31AG ICBM replacing DF-31A, more brigades
- DF-26 IRBM in significant numbers (dual-capable)
- DF-21E MRBM replacing DF-21A
- DF-4 liquid-fuel ICBM phasing out

Possible DF-41 TELs under tents at integration brigade (644) base at Hanzhong in Shaanxi (33.1321, 106.9361).

Image: September 13, 2021, © Maxar Technologies
Land-based missile developments: mobile

- DF-26 IRBMs fielded in large numbers

Possible DF-26 launch units at 611 Brigade near Qingyang in Anhui (30.6903, 117.9011). Upgrade from DF-21A?

Image: Airbus 2021/2022 via Google Earth

DF-26 launchers at 646 Brigade in Korla in Xinjiang (41.6946, 86.1734).

Image: October 14, 2021, © Maxar Technologies
Land-based missile developments: silos

FAS disclosed second missile silo field under construction near Hami

Across China we monitor construction of ~330 apparent silos

Land-based missile developments: silos

Three large new missile silo fields in northern/central China

Location and numbers very different from China's current missile silo force

Further inland potentially to project silos from conventional weapons

Large numbers indicate retaliatory capability is seen as being vulnerable to attack

Land-based missile developments: silos

Unique underground facility construction at Hami and Ordos missile fields

Land-based missile developments: training areas

In particular, the structures that made the discovery of the Chinese silos possible were first documented in the new PLARF training area near Jilantai in central China.
At Jilantai we could observe new missile launchers training and compare dimensions with launchers seen on other photos. Although most focus on silos right now, these road-mobile launchers make up most of China’s nuclear force today.
We could also geo-locate individual missile test launches of new missiles, such as this DF-26 IRBM, by matching landscape features seen on video with those seen on satellite images.
Jilantai is where we first discovered China’s work on new types of missile silos. Our report from 2019 was included in the Pentagon’s 2020 China report.
Land-based missile developments: silos

Jilantai is also where we first observed the unique bubbles or inflatable tents that China used to protect and conceal silos details. It was these bubbles that made the discoveries of the large missile silo fields possible: their grid-pattern was easy to see with 3-meter resolution satellite images.
Land-based missile developments: silos

And, yes, they’re silos. Not windmills. When bubble comes down, it shows silo hatch and other features.
Submarine developments

- After first experimental Xin-class (Type 092) SSBN, fleet of 6 Jin-class (Type 094) SSBNs is now in service
- Each can carry up to 12 JL-2 SLBMs; possibly upgrading to JL-3 SLBM
- New class (Type 096) in development; will carry JL-3 SLBM with MRV/MIRV

4 Jin-class (Type 094) SSBNs and 2 Chang-class (Type 095) SSNs at Hainan base.
Image: February 20, 2021 (Maxar via Google Earth)
Bomber developments

- Bomber force has been reassigned nuclear role
- H-6N with ALBM operational
- Possible first base Neixiang Air Base in Henan (32.9737, 111.8850)

First reported by Roderick Lee

Hans M. Kristensen, Federation of American Scientists, 2022
Force projections

We’re monitoring more than 330 silos under construction
If all are loaded with ICBMs, China could exceed Russian ICBMs and approach US ICBMs by 2030s
US military projects 700 warheads by 2027 and more than 1,000 by 2030
Projection depends on new plutonium and warheads production
It is unknown how China plans to arm the new silos: all, some?
What missile? DF-31A and/or DF-41?
QUESTIONS?