

## V. Chinese nuclear forces

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China is gradually expanding its nuclear arsenal as part of a long-term modernization programme aimed at developing a more survivable force and strengthening its nuclear retaliatory capabilities. China's nuclear forces have long been the least transparent among the legally recognized nuclear weapon states. China is estimated to have an arsenal of approximately 200 operational nuclear weapons for delivery mainly by ballistic missiles (see table 7.6). A small number of gravity bombs are believed to be available for delivery by aircraft. Additional warheads may be in reserve, giving a total stockpile of about 240 warheads.

The Chinese Communist Party's Central Military Commission (CMC) maintains strict control over China's operational nuclear warheads through a centralized system managed by the Second Artillery of the People's Liberation Army (PLA). The Second Artillery's missile units appear to be organized into six geographically dispersed bases and one central storage facility.<sup>1</sup> It is believed that China stores its nuclear warheads in storage facilities separate from their delivery vehicles and not ready for immediate launch.<sup>2</sup>

In March 2011 the Chinese Government released the latest of its biennial defence white papers.<sup>3</sup> The document reiterated China's commitment to the policy of no-first-use of nuclear weapons and its intention to limit its nuclear capabilities to the minimum level required for national security. However, the white paper provided no information about the size or structure of China's nuclear forces.

China is estimated to possess the smallest inventories of military highly enriched uranium (HEU) and plutonium of the legally recognized nuclear weapon states (see section X below). Although China has never officially declared a formal moratorium on fissile material production for weapon purposes, it is believed to have ceased military HEU production at some time between 1987 and 1989 and military plutonium production in 1991. The current inventories mean that China could not significantly expand its nuclear warhead stockpile without restarting military plutonium production. There are no credible reports indicating that the size of the Chinese nuclear weapon stockpile has changed significantly in recent years.<sup>4</sup>

<sup>1</sup> Stokes, M. A., *China's Nuclear Warhead Storage and Handling System* (Project 2049 Institute: Arlington, VA, 12 Mar. 2010), p. 7.

<sup>2</sup> Lewis, J., *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age* (MIT University Press: Cambridge, MA, 2007), pp. 111–35.

<sup>3</sup> Chinese State Council, *China's National Defense in 2010* (Information Office of the Chinese State Council: Beijing, Mar. 2011).

<sup>4</sup> In 2011 one US academic speculated that China's nuclear arsenal could be much larger than previously estimated because it may have hidden warheads and missiles in underground facilities. See

**Table 7.6.** Chinese nuclear forces, January 2012

| Type/Chinese designation<br>(US designation) | No.<br>deployed | Year first<br>deployed | Range<br>(km) <sup>d</sup> | Warhead<br>loading          | No. of<br>warheads        |
|--|-----------------|------------------------|----------------------------|-----------------------------|---------------------------|
| <i>Land-based missiles<sup>b</sup></i>       | ~130            |                        |                            |                             | ~130                      |
| DF-3A (CSS-2)                                | ~16             | 1971                   | 3 100 <sup>c</sup>         | 1 x 3.3 Mt                  | ~16                       |
| DF-4 (CSS-3)                                 | ~12             | 1980                   | 5 500                      | 1 x 3.3 Mt                  | ~12                       |
| DF-5A (CSS-4)                                | 20              | 1981                   | 13 000                     | 1 x 4–5 Mt                  | 20                        |
| DF-21 (CSS-5)                                | ~60             | 1991                   | 2 100 <sup>d</sup>         | 1 x 200–300 kt <sup>e</sup> | ~60                       |
| DF-31 (CSS-10 Mod 1)                         | 10–20           | 2006                   | >7 200                     | 1 x 200–300 kt <sup>e</sup> | 10–20                     |
| DF-31A (CSS-10 Mod 2)                        | 10–20           | 2007                   | >11 200                    | 1 x 200–300 kt <sup>e</sup> | 10–20                     |
| <i>SLBMs</i>                                 | (48)            |                        |                            |                             | (48)                      |
| JL-1 (CSS-N-3)                               | (12)            | 1986                   | >1 770                     | 1 x 200–300 kt              | (12)                      |
| JL-2 (CSS-NX-14) <sup>f</sup>                | (36)            | ..                     | >7 400                     | 1 x 200–300 kt <sup>e</sup> | (36)                      |
| <i>Aircraft<sup>g</sup></i>                  | >20             |                        |                            |                             | (40)                      |
| H-6 (B-6)                                    | ~20             | 1965                   | 3 100                      | 1 x bomb                    | (~20)                     |
| <i>Cruise missiles</i>                       | 150–350         |                        |                            |                             | ..                        |
| DH-10  | 150–350         | 2007                   | >1 500                     | 1 x ..                      | .. <sup>h</sup>           |
| <b>Total</b>                                 |                 |                        |                            |                             | <b>(~240)<sup>i</sup></b> |

.. = not available or not applicable; ( ) = uncertain figure; kt = kiloton; Mt = Megaton; SLBM = submarine-launched ballistic missile.

<sup>a</sup> Aircraft range is for illustrative purposes only; actual mission range will vary.

<sup>b</sup> China defines missile ranges as short-range (<1000 km), medium-range (1000–3000 km), long-range (3000–8000 km) and intercontinental range (>8000 km).

<sup>c</sup> The range of the DF-3A may be greater than is normally reported.

<sup>d</sup> The DF-21A (CSS-5 Mod 2) variant is believed to have a range of up to 2500 km.

<sup>e</sup> The DF-31 and DF-31A intercontinental ballistic missiles and the JL-2 SLBM may use the same warhead design as the DF-21, although this has not been confirmed.

<sup>f</sup> A US Defense Intelligence Agency report projected in Feb. 2012 that the JL-2 would reach initial operational capability around 2014.

<sup>g</sup> Figures for aircraft are for nuclear-configured versions only.

<sup>h</sup> There are conflicting US Government reports about whether the DH-10 has a nuclear capability.

<sup>i</sup> Additional warheads are thought to be in storage to arm future DF-31, DF-31A and JL-2 missiles. The total stockpile is believed to comprise c. 240 warheads.

Sources: US Department of Defense, *Military Power of the People's Republic of China*, various years; US Air Force, National Air and Space Intelligence Center (NASIC), various documents; US Central Intelligence Agency, various documents; Kristensen, H. M., Norris, R. S. and McKinzie, M. G., *Chinese Nuclear Forces and U.S. Nuclear War Planning* (Federation of American Scientists/Natural Resources Defense Council: Washington, DC, Nov. 2006); Norris, R. S. et al., *Nuclear Weapons Databook*, vol. 5, *British, French, and Chinese Nuclear Weapons* (Westview: Boulder, CO, 1994); 'Nuclear notebook', *Bulletin of the Atomic Scientists*, various issues; Google Earth; and authors' estimates.

## Land-based ballistic missiles

The Second Artillery, which operates China's land-based ballistic missiles, is modernizing its missile force. This involves replacing ageing liquid-fuelled missiles with newer solid-fuelled models. In recent years the Second Artillery has also prioritized deploying mobile medium- and long-range ballistic missile systems, which are more able to survive an attack than silo-based missiles. This has become an increasingly important consideration for Chinese planners in assuring the credibility of the country's nuclear retaliatory capabilities.<sup>5</sup>

China's nuclear-capable ballistic missile arsenal consists of approximately 130 missiles.<sup>6</sup> The road-mobile, solid-fuelled, two-stage DF-21 medium-range ballistic missile is replacing China's oldest missile, the liquid-fuelled, single stage DF-3A intermediate-range ballistic missile and acts as a regional nuclear deterrent. Additionally, China fields the liquid-fuelled, two-stage DF-4 intercontinental ballistic missiles (ICBM), which is being gradually replaced by the solid-fuelled, three-stage, road-mobile DF-31 ICBM, which is capable of targeting the western USA, Russia and Europe.

Only the liquid-fuelled, two-stage, silo-based DF-5A and the solid-fuelled, three-stage, road-mobile DF-31/DF-31A ICBMs have a true intercontinental range of over 5500 kilometres. It remains unclear whether the Second Artillery will replace the ageing DF-5A with the DF-31A or maintain both missile systems.<sup>7</sup>

Both the DF-31 and the longer-range DF-31A have shortened launch preparation times compared to previous generations of long-range missiles. This reflects the Second Artillery's emphasis on increasing the survivability of the new missiles by prioritizing mobility over the silo-based DF-5A's greater range and warhead loading.<sup>8</sup> However, the Second Artillery has relatively limited experience in managing mobile missile patrols. According to the US Department of Defense (DOD), this could pose serious challenges for China's current command and control structures.<sup>9</sup>

Wan, W., 'Georgetown students shed light on China's tunnel system for nuclear weapons,' *Washington Post*, 30 Nov. 2011; and Kristensen, H. M., 'No, China does not have 3,000 nuclear weapons', FAS Strategic Security Blog, Federation of American Scientists, 3 Dec. 2011, <<http://www.fas.org/blog/ssp/2011/12/chinanukes.php>>.

<sup>5</sup> Li Bin, 'Tracking Chinese strategic mobile missiles,' *Science & Global Security*, vol. 15, no. 1 (2007), pp. 4–5.

<sup>6</sup> Although China has its own system for defining missile ranges, the US DOD definitions are used here: short range = <1100 km; medium range = 1100–2750 km; intermediate range = 2750–5500 km; and intercontinental range = >5500 km.

<sup>7</sup> Kristensen, H. M. and Norris, R. S., 'Chinese nuclear forces 2011', *Bulletin of the Atomic Scientists*, vol. 67, no. 6 (Nov./Dec. 2011), p. 82.

<sup>8</sup> Li Bin (note 5), p. 26.

<sup>9</sup> US Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2011*, Annual Report to Congress (DOD: Washington, DC, Aug. 2011) p. 34.

### Ballistic missile submarines

China has had difficulty in developing a sea-based nuclear deterrent. China's 2011 Defence White Paper reiterated the PLA Navy's possession of a nuclear capability stating that 'the PLA Navy . . . enhances its capabilities in strategic deterrence and counterattack'.<sup>10</sup> However, the status and envisioned strategy of its current and future nuclear-powered ballistic missile submarines (SSBNs), once they become operational, remain unclear.<sup>11</sup>

China built a single Xia class (Type 092) SSBN armed with 12 solid-fuelled, two-stage JL-1 (Ju Lang, or Great Wave) submarine-launched ballistic missiles (SLBMs). The submarine has never conducted a deterrent patrol and is thought not to be fully operational, despite several refits.

The PLA Navy has developed a successor SSBN, the Jin class (Type 094) submarine. Conflicting reports exist as to the number of submarines that have been constructed.<sup>12</sup> According to the US DOD, the first Jin class SSBN appears to be ready for deployment.<sup>13</sup> A second submarine may be at a similar stage of readiness, while the status of a third submarine under construction remains unclear.<sup>14</sup> There is also uncertainty about the total number of submarines that China plans to build.<sup>15</sup> The US DOD had previously estimated that China would be likely to require five Jin class SSBNs in order to maintain one or two boats on deterrence patrols; however, no such estimate was made in its latest report.<sup>16</sup>

Each Jin class SSBN will carry 12 three-stage, solid-fuelled SLBMs, the JL-2, which is a sea-based derivative of the DF-31 ICBM. The JL-2 programme has encountered several setbacks due to technical difficulties. It remains uncertain when the combination of Jin class SSBNs and JL-2 SLBMs will be fully operational. The US DOD reported in 2011 that the date when the JL-2 would reach initial operational capability remained uncertain but that the missile is likely to continue flight tests.<sup>17</sup> According to press reports, the PLA Navy conducted a series of six JL-2 flight tests in late December 2011 or early January 2012.<sup>18</sup>

<sup>10</sup> Chinese State Council (note 3).

<sup>11</sup> Wu Riqiang, 'Survivability of China's sea-based nuclear forces,' *Science & Global Security*, vol. 19, no. 2 (2011), pp. 94–96.

<sup>12</sup> Kristensen, H. M., 'Chinese Jin-SSBNs getting ready?', FAS Strategic Security Blog, Federation of American Scientists, 2 June 2011, <<http://www.fas.org/blog/ssp/2011/06/jin2011.php>>.

<sup>13</sup> US Department of Defense (note 9), p. 34.

<sup>14</sup> Kristensen (note 12).

<sup>15</sup> Kristensen and Norris (note 7), p. 84.

<sup>16</sup> US Department of Defense (note 9).

<sup>17</sup> US Department of Defense (note 9), p. 34.

<sup>18</sup> Richardson, D., 'Chinese navy conducts series of Julang-2 SLBM firings,' *Jane's Missiles and Rockets*, vol. 16, no. 3 (Mar. 2012), p. 10.

## Aircraft and cruise missiles

The PLA Air Force is believed to maintain a small number of gravity bombs to be delivered by the H-6 fighter-bomber and possibly a more modern combat aircraft. The PLA Air Force is not believed to have units whose primary mission is to deliver nuclear bombs.<sup>19</sup>

The US DOD stated in 2011 that China is deploying several new types of cruise missile.<sup>20</sup> Only one type, the DH-10 (Donghai-10 or East Sea 10), also designated CJ-10 (Changjian-10 or Long Sword 10), has been reported as being possibly nuclear capable. Relatively little is publicly known about the DH-10's technical characteristics, and claims about the missile's derivation and classification are inconsistent.<sup>21</sup> The US Air Force listed the DH-10 as 'conventional or nuclear', which is the same designation it uses for other dual-capable cruise missiles such as the Russian AS-4. The US DOD, however, lists the DH-10 as part of China's 'conventional precision strike' capabilities.<sup>22</sup> China is also developing an air-launched version of the DH-10, possibly for delivery by an upgraded version of the H-6 aircraft.

<sup>19</sup> US National Security Council, 'Report to Congress on status of China, India and Pakistan nuclear and ballistic missile programs', 28 July 1993, obtained under the US Freedom of Information Act by the Federation of American Scientists, <<http://fas.org/irp/threat/930728-wmd.htm>>.

<sup>20</sup> In 2009 the US DOD estimated that 150–300 DH-10 cruise missiles had been deployed, increasing its assessment to 200–500 in 2010. US Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2010*, Annual Report to Congress (DOD: Washington, DC, 2010), pp. 2, 66.

<sup>21</sup> Easton, I., 'The assassin under the radar, China's DH-10 cruise missile program', Futuregram no. 09-005, Project 2049 Institute, 1 Oct. 2009, <<http://project2049.net/publications.html>>.

<sup>22</sup> US Department of Defense (note 9), p. 30.