

## V. Chinese nuclear forces

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China maintains an estimated total stockpile of about 260 nuclear warheads, a number which has remained relatively stable but is slowly increasing.<sup>1</sup> It is widely believed that in peacetime China stores its nuclear warheads in storage facilities separate from their delivery vehicles and that they are not ready for immediate launch. Of its planned triad of land, air and maritime nuclear forces, only the land-based ballistic missiles and nuclear-configured aircraft are currently considered operational. About 190 warheads are assigned to these forces. The remaining warheads are assigned to non-operational forces, including new systems that are under development, operational systems that may increase in number in the future and reserves (see table 11.6).

The Second Artillery of the People's Liberation Army (PLA) maintains control over China's nuclear warheads and land-based missiles through a centralized management system. Missile units appear to be organized in geographically dispersed basing areas and a central storage facility.<sup>2</sup> The Second Artillery reports directly to the Chinese Government's Central Military Commission (CMC), which is chaired by the president.<sup>3</sup>

China is estimated to possess the smallest inventories of military highly enriched uranium (HEU) and plutonium of the five legally recognized nuclear weapon states (see section X below). Although China has never officially declared a formal moratorium on the production of fissile material for military purposes, it is believed to have ceased military HEU production at some time between 1987 and 1989 and military plutonium

<sup>1</sup> This estimate is in line with US Government estimates. In 2012 the Commander of US Strategic Command, Gen. Robert Kehler, stated that 'the Chinese arsenal is in the range of several hundred' nuclear warheads. Kristensen, H. M., 'STRATCOM Commander rejects high estimates for Chinese nuclear arsenal', FAS Strategic Security Blog, Federation of American Scientists, 22 Aug. 2012, <<http://fas.org/blogs/security/2012/08/china-nukes/>>. The US Central Intelligence Agency (CIA) estimated the size of the Chinese stockpile at 200–250 warheads in 1993. US Central Intelligence Agency, Directorate of Intelligence, Office of Scientific and Weapons Research, 'China's nuclear weapons testing: facing prospects for a comprehensive test ban', Intelligence memorandum, 30 Sep. 1993, <[http://www.foia.cia.gov/sites/default/files/document\\_conversions/89801/DOC\\_0000996367.pdf](http://www.foia.cia.gov/sites/default/files/document_conversions/89801/DOC_0000996367.pdf)>, p. 3.

<sup>2</sup> See e.g. Stokes, M. A., *China's Nuclear Warhead Storage and Handling System* (Project 2049 Institute: Arlington, VA, 12 Mar. 2010), p. 7; and Zhang, H., 'China', ed. R. Acheson, *Assuring Destruction Forever: Nuclear Weapon Modernization Around the World* (Reaching Critical Will: New York, 2012), p. 17.

<sup>3</sup> Gill, B. and Medeiros, E. S., 'China', eds H. Born, B. Gill and H. Hänggi, SIPRI, *Governing the Bomb: Civilian Control and Democratic Accountability of Nuclear Weapons* (Oxford University Press: Oxford, 2010), p. 147.

**Table 11.6.** Chinese nuclear forces, January 2015

Type/Chinese designation (US designation)	Launchers deployed	Year first deployed	Range (km) <sup>d</sup>	Warhead loading	No. of warheads
<i>Land-based missiles<sup>b</sup></i>	~160 <sup>c</sup>				~163
DF-3A (CSS-2) <sup>d</sup>	(-)	1971	3 000	1 x 3.3 Mt	(-)
DF-4 (CSS-3)	-10	1980	5 500	1 x 3.3 Mt	(-10)
DF-5A (CSS-4 Mod 2)	10	1981	>13 000	1 x 4–5 Mt	10
DF-5A (CSS-4 Mod 3)	10	2014	~13 000	3 x 200–300 kt	30
DF-15 (CSS-6 Mod 1)	..	1994	600	(1 x 10–50 kt)	..
DF-21 (CSS-5 Mods 1/2)	<100	1991	2 100 <sup>e</sup>	1 x 200–300 kt	~80
DF-31 (CSS-10 Mod 1)	-8	2006	>7 200	(1 x 200–300 kt)	~8
DF-31A (CSS-10 Mod 2)	~25	2007	>11 200	(1 x 200–300 kt)	~25
DF-41 (CSS-X-20)	..	..	..	..	..
<i>SLBMs</i>	(48)				(48)
JL-1 (CSS-N-3)	..	1986	>1 700	1 x 200–300 kt	..
JL-2 (CSS-NX-14)	(48)	(2015)	>7 000	(1 x 200–300 kt)	(48)
<i>Aircraft<sup>f</sup></i>	~20				(~20)
H-6 (B-6)	~20	1965	3 100	1 x bomb	(~20)
Attack (. .)	..	1972–..	..	1 x bomb	..
<i>Cruise missiles</i>	150–350				..
DH-10 GLCM	150–350	2007	>1 500	1 x ..	.. <sup>g</sup>
(CJ-20 ALCM)	..	(2014)	>1 500	1 x ..	.. <sup>h</sup>
<b>Total</b>					<b>(~260)<sup>i</sup></b>

.. = not available or not applicable; - = zero; () = uncertain figure; ALCM = air-launched cruise missile; GLCM = ground-launched cruise missile; 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> Some launchers might have one or more reloads of missiles.

<sup>d</sup> The DF-3A may have been completely replaced by the DF-21.

<sup>e</sup> The range of the nuclear DF-21 variants (CSS-5 Mods 1 and 2) is thought to be greater than the 1750 km normally reported.

<sup>f</sup> Figures for aircraft are for nuclear-configured versions only. The nuclear role of aircraft is uncertain and, if it exists, would only be a secondary mission.

<sup>g</sup> US Air Force, National Air and Space Intelligence Center lists the DH-10 as 'conventional or nuclear', the same designation used for the Russian nuclear-capable AS-4.

<sup>h</sup> US Air Force Global Strike Command lists the CJ-20 as nuclear-capable; NASIC does not.

<sup>i</sup> In addition to warheads assigned to fielded missiles and bombers, the stockpile is thought to include a small number of additional warheads for spares and warheads from recently retired missiles (JL-1 and DF-3A) awaiting dismantlement. The total stockpile is estimated to consist of c. 260 warheads and is slowly increasing.

*Sources:* US Department of Defense, *Military and Security Developments Involving the People's Republic of China*, various years; US Department of Defense, *Military Power of the People's Republic of China*, various years; US Air Force, National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat*, various years; US Air Force Global Strike Command, various documents; US Central Intelligence Agency, various documents; Kristensen, H. M., Norris, R. S. and McKinzie, M. G., *Chinese Nuclear Forces and US 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.

production in 1991. The current inventories mean that China could not significantly expand its nuclear warhead stockpile without restarting production of military fissile material.

### Land-based ballistic missiles

China's nuclear-capable land-based ballistic missile arsenal consists of approximately 160 missiles of seven types. China is modernizing this arsenal as part of a long-term programme aimed at developing a more survivable and robust nuclear retaliatory force in response to the new ballistic missile defence and medium-range precision-guided conventional strike systems being fielded by the United States and other countries. In accordance with its self-declared minimum deterrence strategy, China has focused on making qualitative improvements to nuclear forces, in particular replacing ageing silo-based, liquid-fuelled missiles with newer road-mobile and solid-fuelled models, rather than on increasing the number of missile delivery systems.<sup>4</sup>

The US Department of Defense (DOD) estimates that China currently deploys 50–60 intercontinental ballistic missiles (ICBMs).<sup>5</sup> The silo-based, liquid-fuelled, two-stage, 13 000+ kilometre-range DF-5A and the road-mobile, solid-fuelled, three-stage, 11 200 km-range DF-31A are China's furthest-reaching operational ICBMs. The shorter range DF-31 ICBM is replacing the ageing liquid-fuelled, two-stage DF-4 ballistic missile but the programme appears to have levelled out at approximately eight missiles. It remains unclear whether the Second Artillery will replace the ageing DF-5A, which has undergone several upgrades, with the DF-31A or maintain both missile systems.

According to the US DOD, China has converted a portion of its DF-5s to carry multiple independently targetable re-entry vehicles (MIRVs), and is 'developing a new road-mobile ICBM, the CSS-X-20 (DF-41), possibly capable of carrying MIRVs.'<sup>6</sup> According to one report, a rumoured DF-41

<sup>4</sup> Hu, S., 'The Road toward China's nuclear weapons', *Global Science*, no. 12 (2007) (in Chinese), cited in Zhang, H., 'China's nuclear weapons modernization: intentions, drivers, and trends', Presentation to the Institute for Nuclear Materials Management 53rd Annual Meeting, Orlando, FLA, 15 July 2012, <[http://belfercenter.ksg.harvard.edu/publication/22292/chinas\\_nuclear\\_weapons\\_modernization.html](http://belfercenter.ksg.harvard.edu/publication/22292/chinas_nuclear_weapons_modernization.html)>.

<sup>5</sup> Stewart, V. R. (Lt Gen.), Director, Defense Intelligence Agency, 'Statement for the record: worldwide threat assessment', US Senate, Armed Services Committee, 26 Feb. 2015, p. 11, <[http://www.armed-services.senate.gov/imo/media/doc/Stewart\\_02-26-15.pdf](http://www.armed-services.senate.gov/imo/media/doc/Stewart_02-26-15.pdf)>.

<sup>6</sup> US Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2015*, Annual Report to Congress (DOD: Washington, DC, May 2015), p. 8.

flight test in December 2014 carried multiple payloads.<sup>7</sup> China has been conducting research and development on MIRVs for decades and appears to be adding the capability to some of its ICBMs in response to growing US missile defence capabilities in the Pacific region.

In parallel with efforts to develop road-mobile ballistic missiles, the Second Artillery has invested in new command, control and communication capabilities for its nuclear forces. The development of improved communications links gives China's ICBM units better access to battlefield information and uninterrupted communications connecting all command echelons. The upgraded links help to ensure the integrity of command and control arrangements for a larger, more dispersed mobile ICBM force.<sup>8</sup>

### **Ballistic missile submarines**

China has encountered considerable difficulties in developing a sea-based nuclear deterrent.<sup>9</sup> The PLA Navy (PLAN) has built a single Type 092 nuclear-powered ballistic missile submarines (SSBN) equipped to carry 12 solid-fuelled, two-stage Ju Lang-1 (JL-1) submarine-launched ballistic missiles (SLBMs). The submarine has never conducted a deterrent patrol and is not thought to be fully operational, despite several refits.

The PLAN has developed a successor SSBN, the Type 094, which is designated the Jin class by the North Atlantic Treaty Organization (NATO). According to the US DOD, four Type 094 SSBNs are currently operational, and one more boat may be added to the fleet.<sup>10</sup> One or two Type 094 SSBN are often seen in the vicinity of the North Sea Fleet's Jianggezhuang submarine base near Qingdao or the Xiaopingdao refit base near Dalian, but US naval intelligence suggests that all four operational Type 094 SSBNs have Longpo submarine base on Hainan Island as their home port.<sup>11</sup>

The Type 094 SSBN will eventually be armed with up to 12 three-stage, solid-fuelled JL-2 SLBMs. The JL-2 is a sea-based variant of the DF-31 ICBM. The JL-2 programme has encountered delays due to technical difficulties and the missile has not yet entered operational service. There has been considerable speculation about when the Type 094/JL-2 weapon system will conduct an initial deterrent patrol. During the past few years

<sup>7</sup> Gertz, B., 'Chinese military confirms DF-41 flight test', Washington Free Beacon, 26 Dec. 2014, <<http://freebeacon.com/national-security/chinese-military-confirms-df-41-flight-test/>>.

<sup>8</sup> US Department of Defense (note 6), p. 30.

<sup>9</sup> For a comprehensive overview of China's submarine bases and facilities see Kristensen, H. M., 'China SSBN Fleet getting ready: but for what?', FAS Strategic Security Blog, Federation of American Scientists, 25 Apr. 2014, <<http://fas.org/blogs/security/2014/04/chinassbnfleet/>>.

<sup>10</sup> US Department of Defense (note 6), p. 30.

<sup>11</sup> US Navy, Office of Naval Intelligence (ONI), *The PLA Navy: New Capabilities and Missions for the 21st Century* (ONI: Washington, DC, 2015), p. 14.

the US DOD has issued numerous predictions that the commencement of patrols was imminent but so far the Type 094 SSBN has remained close to Chinese shores.

Whether China will send SSBNs to sea with nuclear warheads installed on the JL-2 SLBMs remains to be seen. China's CMC has traditionally been reluctant to hand over nuclear warheads to the military services in peacetime. Although the future roles and missions of China's SSBN fleet remain uncertain, the US DOD has reiterated its concern that the progress made with China's sea-based nuclear forces will pose challenges for the PLAN's existing command and control structures, as it has no operational experience of managing SSBNs on patrol.<sup>12</sup>

### Aircraft and cruise missiles

The PLA Air Force (PLAAF) is believed to maintain a small number of nuclear gravity bombs to be delivered by the H-6 medium-range bomber (and potentially also a shorter-range combat aircraft). Nevertheless, the PLAAF is not believed to have units whose primary mission is to deliver nuclear bombs.<sup>13</sup>

The PLA deploys several types of cruise missile. However, only the ground-launched Donghai-10 (DH-10, also designated Changjian-10, CJ-10) has been reported as being possibly nuclear capable.<sup>14</sup> Sea-launched and air-launched versions, which some sources refer to as derivatives of the DH-10, also appear to be under development.<sup>15</sup> Media reports associate the CJ-20 air-launched cruise missile with an upgraded version of the H-6 aircraft.<sup>16</sup> A command briefing published by US Air Force Global Strike Command in 2013 listed the CJ-20 as nuclear-capable, but the US Air Force National Air and Space Intelligence Center does not list the missile in its 2013 report.<sup>17</sup>

<sup>12</sup> US Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2013*, Annual Report to Congress (DOD: Washington, DC, May 2013), p. 30.

<sup>13</sup> US National Security Council, 'Report to Congress on the 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>14</sup> The US Air Force refers to the DH-10 as 'conventional or nuclear', the same designation as the Russian AS-4 and Pakistani Babur and Ra'ad, which are known to be dual-capable. US Air Force, National Air and Space Intelligence Center (NASIC), *Ballistic and Cruise Missile Threat*, NASIC-1031-0985-13 (NASIC: Wright-Patterson Air Force Base, OH, July 2013), p. 29.

<sup>15</sup> Minnick, W., 'Glimpse of China's new fighter fuels rumors', *Defense News*, 5 Aug. 2012.

<sup>16</sup> 'Military might: China develops its strategic missile systems', *Jane's Intelligence Review*, 1 Aug. 2013.

<sup>17</sup> Kowalski, J. M. (Lt. Gen.), Commander, US Air Force Global Strike Command, 'Air Force Global Strike Command', Presentation, Barksdale Air Force Base, 7 May 2013, <<http://fas.org/programs/ssp/nukes/nuclearweapons/AFGSC-CommandBrief-May2013.pdf>>; and US Air Force, National Air and Space Intelligence Center (note 14).