

the M51.1 missile had been successfully flight-tested three times. After launches in 2006 and 2007, on 13 November 2008 an unarmed M51.1 missile was fired from a submerged launch platform at the Landes Missile Launch Test Centre at Biscarosse, Aquitaine. The first underwater launch is planned for 2010.⁷⁷

In 2008 the air component of the French nuclear forces consisted of approximately 60 Mirage 2000N aircraft, equipping three squadrons; and about 24 Super Étendard aircraft deployed on the aircraft carrier *Charles de Gaulle*. The number of Mirage 2000N aircraft having a nuclear role will be reduced following the July 2008 statements of Nicolas Sarkozy. Both types of aircraft carry the Air-Sol Moyenne Portée (ASMP, medium-range air to surface missile) cruise missile. A total of 90 ASMP missiles were produced, along with 80 TN81 300-kt warheads for them.⁷⁸ A follow-on cruise missile, the ASMP-Améliorée (improved ASMP), is expected to enter service in 2009 as a replacement for the ASMP.⁷⁹

VI. Chinese nuclear forces

China is estimated to have an arsenal of approximately 186 operational nuclear weapons for delivery mainly by ballistic missiles and aircraft (see table 8.6). Additional warheads may be in reserve, giving a total stockpile of about 240 warheads.⁸⁰ The Chinese Foreign Ministry stated in 2004 that China possessed ‘the smallest nuclear arsenal’ among the nuclear weapon states, but China is now thought to have more nuclear weapons than France and the United Kingdom.⁸¹

In January 2009 the Chinese Government released the latest of its biennial Defence White Papers. It reiterates China’s commitment to the policy of no-first-use of nuclear weapons what the Chinese military strategy ‘calls for the building of a lean and effective deterrent force and the flexible use of different means of deterrence’.⁸²

⁷⁷ EADS Astrium, ‘Successful first submarine launch of M51’, Press release, 14 Nov. 2008, <<http://www.astrium.eads.net/en/press-center/press-releases/2008/successful-first-submarine-launch-of-m51>>.

⁷⁸ Fiszler, M. and Gruszczynski, J., ‘French MoD to develop nuclear missile’, *Journal of Electronic Defense*, vol. 26, no. 12 (Dec. 2003).

⁷⁹ Norris, R. S., and Kristensen, H. M., ‘Nuclear notebook: nuclear cruise missiles’, *Bulletin of the Atomic Scientists*, vol. 63, no. 6 (Nov./Dec. 2007), p. 61.

⁸⁰ US Department of Defense (DOD), *Military Power of the People’s Republic of China 2009*, Annual Report to Congress (DOD: Washington, DC, 25 Mar. 2009), p. 66; and US National Intelligence Council, *Foreign Missile Developments and the Ballistic Missile Threat Through 2015*, Unclassified summary of a National Intelligence Estimate (Director of Central Intelligence: Dec. 2001), pp. 3, 8.

⁸¹ Chinese Ministry of Foreign Affairs, ‘China: nuclear disarmament and reduction of [sic]’, Fact sheet, 27 Apr. 2004, <<http://www.fmprc.gov.cn/eng/wjwb/zzjg/jks/cjkk/2622/t93539.htm>>.

⁸² Chinese State Council, *China’s National Defense in 2008* (Information Office of the State Council of the People’s Republic of China: Beijing, Jan. 2009).

The White Paper explains that the Second Artillery Corps (SAC), the division of the People's Liberation Army that controls China's strategic missiles, has three levels of combat readiness. First, in peacetime, Chinese nuclear missiles 'are not aimed at any country'. This statement might refer to the fact that Chinese nuclear warheads are not 'mated with' their missiles under normal circumstances.⁸³ Second, under a threat of nuclear attack, the SAC 'will go into a state of alert, and get ready for a nuclear counterattack to deter the enemy'. This description is interpreted as combat deployment and aiming of strategic missiles. Finally, if China comes under a nuclear attack, the SAC will launch a counterattack 'either independently or together with the nuclear forces of [the Navy and the Air Force]'.⁸⁴

As of early 2009 China had four types of deployed ICBMs: the solid-fuel mobile DF-31 and DF-31A; the silo-based, liquid fuel DF-5A; and the smaller liquid-fuel DF-4.⁸⁵ China deploys one type of medium-range ballistic missile (MRBM)—the solid-fuel, road-mobile DF-21—and one type of intermediate-range ballistic missile (IRBM)—the liquid-fuel DF-3A.⁸⁶ The DF-21 and DF-31 will probably replace the DF-3A and the DF-4. Satellite imagery analysis published in 2008 suggests that the first unit of the SAC to be equipped with the DF-31 may be stationed near Nanyang, Henan, approximately 850 km south east of Beijing.⁸⁷

China operates a single Type 092 (Xia Class) SSBN armed with 12 intermediate-range solid-fuel, single-warhead JL-1 SLBMs. The submarine has never conducted a deterrent patrol and is not thought to be fully operational.⁸⁸ China is developing the Type 094 (Jin Class) SSBN, which will carry 12 JL-2 SLBMs with a range of more than 7200 km. The first unit is now in service and may reach 'initial operational capability' with the JL-2 in 2009–10.⁸⁹ As of 2008 four Jin Class SSBNs were reportedly in various stages of construction, but only three have been identified on commercial

⁸³ See e.g. Kristensen, H. M., 'China Defense White Paper describes nuclear escalation', FAS Strategic Security Blog, Federation of American Scientists, 23 Jan. 2008, <<http://www.fas.org/blog/ssp/2009/01/chinapaper.php>>;

⁸⁴ Chinese State Council (note 82), chapter VII.

⁸⁵ US Department of Defense (note 80), pp. 3, 5, 23, 24–27, 30, 56.

⁸⁶ 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. See 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), p. 218.

⁸⁷ Richardson, D., 'Six possible launch sites for China's DF-31 mobile ICBM tracked down to Nanyang', *Jane's Missiles & Rockets*, vol. 12, no. 6 (June 2008).

⁸⁸ Kristensen, Norris and McKinzie (note 86), pp. 77–80.

⁸⁹ Kristensen, H. M., 'New Chinese SSBN deploys to Hainan Island', FAS Strategic Security Blog, Federation of American Scientists, 24 Apr. 2008, <<http://www.fas.org/blog/ssp/2008/04/new-chinese-ssbn-deploys-to-hainan-island-naval-base.php>>; and US Department of Defense (note 80), p. 3.

Table 8.6. Chinese nuclear forces, January 2009

Type/Chinese designation (US designation)	No. deployed	Year first deployed	Range (km) ^a	Warheads x yield	No. of warheads
Strategic weapons					(186)
<i>Land-based missiles^b</i>	134				134
DF-3A (CSS-2)	17	1971	3 100 ^c	1 x 3.3 Mt	17
DF-4 (CSS-3)	17	1980	5 500	1 x 3.3 Mt	17
DF-5A (CSS-4)	20	1981	13 000	1 x 4–5 Mt	20
DF-21 (CSS-5)	60	1991	2 100 ^c	1 x 200–300 kt	60
DF-31 (CSS-X-10)	~10	2007	>7 200	1 x ?	10
DF-31A (?)	~10	(2008–10)	>11 200	1 x ?	10
<i>SLBMs</i>	(12)				12
JL-1 (CSS-N-3)	(12)	1986	>1 770	1 x 200–300 kt	(12)
JL-2 (CSS-NX-5)	(36)	(2009–10)	>7 200	1 x ?	(36)
<i>Aircraft^d</i>	>20				(40)
H-6 (B-6)	20	1965	3 100	1 x bomb	(20)
Attack (?)	?	1972–?	?	1 x bomb	(20)
Non-strategic weapons^e					
Cruise missiles (DH-10)	150–350	2007	>1500	1 x ?	? ^f
Short-range ballistic missiles (DF-15 and DF-11)					?
Total					(186)^g

() = uncertain figure; SLBM = submarine-launched ballistic missile.

^a Aircraft range is for illustrative purposes only; actual mission range will vary.

^b China defines missile ranges as: short-range, <1000 km; medium-range, 1000–3000 km; long-range, 3000–8000 km; and intercontinental range, >8000 km.

^c The range of the DF-3A and the DF-21A may be longer than is normally reported.

^d Figures for aircraft are for nuclear-configured versions only.

^e The existence of tactical warheads is uncertain, although the testing series in the 1990s reportedly included tactical warhead designs.

^f The DH-10 is thought to be conventional but may also have a nuclear capability. The weapon apparently is employable from H-6 bombers and ground-based launchers.

^g 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 (DOD), Office of the Secretary 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; US DOD, Office of the Secretary of Defense, 'Proliferation: threat and response', Washington, DC, Jan. 2001, <<http://www.defenselink.mil/pubs/ptr20010110.pdf>>; Kristensen, H. M., Norris, R. S. and McKinzie, M. G., *Chinese Nuclear Forces and U.S. Nuclear War Planning* (Federation of American Scientists and Natural Resources Defense Council: Washington, DC, Nov. 2006), <<http://www.fas.org/nuke/guide/china/Book2006.pdf>>; 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.

satellite images.⁹⁰ The US intelligence community estimates that China might be building ‘up to five JIN-class SSBNs’.⁹¹

VII. Indian nuclear forces

The conservative estimate presented here is that India has an arsenal of about 60–70 operational nuclear weapons. The figure is based on calculations of India’s inventory of weapon-grade plutonium as well as the number of operational nuclear-capable weapon systems.⁹² Most published estimates of the number of Indian nuclear weapons are based on calculations of the total amount of weapon-grade plutonium that India has produced. Numerous media and government reports suggest that India has not manufactured as many nuclear weapons as it otherwise could owing to material constraints. It is not publicly known whether India has produced highly enriched uranium (HEU) for weapon purposes, in particular for thermonuclear devices.

India’s nuclear doctrine, which was published as a draft document in 1999, is ‘based on the principle of a minimum credible deterrent and no-first-use’.⁹³ However, India published additional guidelines in January 2003 stating that it would use nuclear weapons to deter or retaliate against the use of chemical or biological weapons.⁹⁴ There has been no official statement specifying the size of the arsenal required for ‘minimum credible deterrence’ but, according to the Indian MOD, it involves ‘a mix of land-based, maritime and air capabilities’.⁹⁵

Strike aircraft

At present, aircraft constitute the most mature component of India’s nuclear strike capabilities (see table 8.7).⁹⁶ The Indian Air Force (IAF) has reportedly certified the Mirage 2000H Vajra (‘Divine Thunder’) multi-role aircraft for delivery of nuclear gravity bombs. The IAF deploys two squadrons of Mirage 2000H aircraft at the Gwalior Air Force Station in north-central India. In addition to the Mirage 2000H, some of the IAF’s four

⁹⁰ Saunders, S. (ed.), *Jane’s Fighting Ships 2008–2009*, 11th edn (Jane’s Information Group: Coulsdon, 2008), p. 120.

⁹¹ US Department of Defense (note 80), p. 48.

⁹² On India’s stocks of fissile materials see appendix 8A.

⁹³ Indian Ministry of Defence (MOD), *Annual Report 2004–05* (MOD: New Delhi, 2005), p. 14; and Indian Ministry of External Affairs, ‘Draft report of National Security Advisory Board on Indian nuclear doctrine’, 17 Aug. 1999, <<http://meaindia.nic.in/disarmament/dm17Aug99.htm>>.

⁹⁴ Indian Ministry of External Affairs, ‘The Cabinet Committee on Security reviews operationalization of India’s nuclear doctrine’, Press release, 4 Jan. 2003, <<http://meaindia.nic.in/pressrelease/2003/01/04pr01.htm>>.

⁹⁵ Indian Ministry of Defence (note 93), p. 15.

⁹⁶ Norris, R. S. and Kristensen, H. M., ‘Nuclear notebook: India’s nuclear forces’, *Bulletin of the Atomic Scientists*, vol. 64, no. 5 (Nov./Dec. 2008).