ENTER THE PLA ROCKET FORCE: ASSESSING CHINA'S MISSILE CAPABILITIES

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INTRODUCTION

China celebrated the 70th anniversary of its victory over Japan in World War II with a grand military parade in Beijing on September 3, 2015. Normally, China holds military parades every ten years to commemorate the Communist takeover of power in China in 1949. But, apparently, President Xi Jinping did not want to wait for another four years to display China's military might and send a signal to Japan, the USA and regional countries. The massive parade comprised 12,000 troops, 500 pieces of military equipment and 200 aircraft of different types. In addition, almost 1,000 troops from 17 foreign countries, including Pakistan, participated in the parade. India did not send any delegation of marching troops but was represented at the celebrations by Minister of State for External Affairs Gen VK Singh (Retd).

The Chinese announced that almost 84 percent of the military hardware on display was being shown to the public for the first time.[1] On display were China's most advanced indigenously produced weapons, including

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1. Xinhuanet, "Highlights of China's Military Parade to Mark End of WWII," http://news.xinhuanet.com/english/2015-09/03/c_134584176.htm, September 3, 2015. Accessed on June 12, 2016.

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fighter aircraft like the J-10, J-11, J-15 and KJ-2000 AWACS (Airborne Warning and Control System). Also on display was a wide array of missiles: the DF-26 Intermediate Range Ballistic Missile (IRBM) with anti-ship capabilities, DF-21D medium range Anti-Ship Ballistic Missile (ASBM) claimed to be a "carrier killer", DF-15B Short Range Ballistic Missile (SRBM), DF-16 Medium Range Ballistic Missile (MRBM), DF-5B liquid fuelled Intercontinental Ballistic Missile (ICBM), and the road mobile solid fuel ICBM DF-31A. This was the first time that the Chinese had displayed two ASBMs, the DF-21D, with a range of 1, 550 km[2], and DF-26, with ranges of 3,000-4,000 km.[3]

On December 31, 2015, as part of its military reforms, China upgraded its second artillery as an independent new Service like the army, air force and navy and renamed it the People's Liberation Army (PLA) Rocket Force. Earlier, the Second Artillery Force (SAF) was only an independent arm of the PLA. Speaking at the inauguration ceremony of the PLA Rocket Force, President Xi Jinping heralded the entry of China's new armed service by emphasising the importance of the PLA Rocket Force as China's core instrument for strategic nuclear deterrence and long/medium range precision strike with conventional missiles.[4]

This article assesses the capabilities of the PLA Rocket Force and the implications for India.

CHINA'S RELIANCE ON MISSILES

China's defence strategy has always been to concentrate on development and deployment of unmanned ballistic/cruise missiles as its main long range

2. Range figures are from *IHS Jane's Weapons: Strategic 2013-2014*.
3. Range figures are from Eric Tegler,"China's New Ballistic Missile Puts Guam in the Crosshairs," http://www.popularmechanics.com/military/weapons/a17182/chinas-missile-df-26/ September 2, 2015. Accessed on September 2, 2015.
4. Ministry of National Defence, People's Republic of China, "China Establishes Rocket Force and Strategic Support Force", January 1, 2016, http://eng.mod.gov.cn/ArmedForces/second.htm. Accessed on February 2, 2015.

strike weapon. This policy has been there since the days of Mao, in the 1960s, when China developed nuclear weapons and long range missiles for nuclear weapon delivery. While missiles are an effective option for nuclear warhead delivery, China has also deployed them with conventional warheads. China has achieved considerable success in missile development which has been referred to as a "pocket of excellence" by the Federation of American Scientists.[5] China's DF-21D missile, developed in 2010, is the world's first anti-ship ballistic missile with a range of more than 1,500 km. This missile, that has been called the "aircraft carrier killer," is aimed at deterring US aircraft carrier battle groups from entering the East China Sea in case of any Chinese invasion of Taiwan. China's decision to use ballistic missiles for targeting ships shows the growing capabilities of its missile industry to develop such advanced weapons.

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China's strategy to heavily rely on unmanned ballistic and cruise missile for long range precision strikes is in contrast to force projection by deployment of manned platforms like aircraft and ships by most other countries, including the USA and UK. A missile is a single use weapon for delivery of ordinance whereas aircraft and ships can be employed for multiple roles, and once they return safely to the base,they can be launched for the next mission. However, China has a number of reasons to be adopting a missile-based strategy. The most important reason is that China has been very successful in the space and missiles industries. Whereas it has not been able to produce world class combat aircraft and naval ships to compete with those of the USA and other advanced countries. China's defence industry has been having problems in producing high performance aero-engines for the J-10 and J-20 stealth jet fighters and, consequently, it has had to buy a large number of engines from Russia. On the other hand, China has successfully produced rocket motors and even small turbofan engines for Unmanned Aerial Vehicles (UAVs).

5. Lora Horta "The Dragon's Spear: China's Asymmetric Strategy" Yale Global Online, October 17, 2013, http://yaleglobal.yale.edu/content/dragon%E2%80%99s-spear-china%E2%80%99s-asymmetric-strategy. Accessed on December 20, 2013.

China also realises that the state of training of its air force and navy is inferior to that of the American forces. The Americans have combat experience due to their extensive involvement in recent conflicts. On the other hand, the PLA Air Force (PLAAF) lacks actual combat experience. The last major war in which the PLAAF was involved was the Korean War in the early 1950s. In the war against Vietnam in 1979, the PLAAF was employed in a very limited way. The Chinese forces also suffer due to the inherent flaws in the Communist system of subjecting career officers to long years of political indoctrination, thus, discouraging high calibre professionalism.

The second reason for China opting for a missile-based strategy is that in the Taiwan theatre, Chinese long range missiles can threaten US naval ships, carrier battle groups and air bases from their missile sites on the mainland. The Chinese can shoot and scoot, taking advantage of the geographical depth, whereas the Americans will be exposed in the Western Pacific. The US Air Force and naval aircraft carriers can, of course, operate from long distances from the battle zone but will suffer due to increased travel time resulting in reduced sortie generation rates. In any high intensity conflict, combat aircraft should be ideally within 200 to 300 km of the battle zone. If the American combat aircraft have to operate from longer distances, then the reduced sortie rates will impinge on their ability to achieve air superiority.

Another reason for China relying heavily on missiles is that it can produce a large number of these weapons at cheap rates due to the lower labour costs and reduced Research and Development (R&D) costs compared to the Western countries. In the West, a lot of money has been spent on R&D for advanced weapons but the Chinese do not need to spend so much on this because they have been able to procure classified technology illegally through their agents in the West.[6]

China's missile strategy is also based on the fact that "gaps exist in the international law that can be exploited in China's favour".[7] The most

6. US DoD Annual Report to Congress "Military and Security Developments Involving the People's Republic of China 2013", www.defense.gov/pubs/2013_China_Report_FINAL.pdf. Accessed on September 21, 2015, pp.11-13.
7. This part draws from Ian Easton, "China's Military Strategy in the Asia –Pacific: Implications for Regional Stability", Project 2049 Institute, September 26, 2013.

important gap in the international law which China has taken advantage of is the Intermediate Nuclear Forces (INF) Treaty of 1987 which bans all ground launched nuclear and conventional ballistic and cruise missiles with ranges from 500–5,500 km. The five countries which are signatories to this treaty are the USA, Russia, Ukraine, Belarus, and Kazhakstan. China is not a signatory to this treaty and can, therefore, continue to increase its arsenal of missiles in this range.

PLA ROCKET FORCE MISSILE CAPABILITIES

The PLA Rocket Force is equipped with both ballistic and cruise missiles armed with nuclear or conventional warheads. In the last two decades, China has greatly improved its nuclear and conventional ballistic missile capabilities. While the ICBMs are nuclear armed, the SRBMs, MRBMs and DF-26 IRBMs can be nuclear or conventionally armed. The force structure of the PLA Rocket Force, with strength and type of missiles, is shown in Table 1 below.

Table 1: China's Missile Force[8]

System	Missiles	Launchers	Estimated Range
Ballistic Missiles			
ICBM (DF-4, DF-5A, DF-5B, DF-31, DF-31A)	50 -75	50 - 75	5,500 + km
IRBM DF-3A[9]	5 - 20	5 - 20	3,000 – 5,500 km
MRBM DF-21	75 - 100	75 - 100	1,000 – 3,000 km
SRBM (DF-11= 700-750); (DF-15=350-400); (DF-16=12[10])	1,000 - 1,200	200 - 250	<1,000 km
Cruise Missiles			
GLCM (DH-10/CJ-10) Note: This missile has been renamed as **DF-10**.	200 - 500	40 - 55	1,500 + km
ALCM (YJ-63)	Not known	Not known	200 km

8. US DoD. "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2012", http://www.defense.gov/pubs/pdfs/2012_cmpr_final.pdf. Accessed on September 4, 2014.
9. *Military Balance 2015* gives a figure of only 6 DF-3As in China's inventory.
10. DF-16 figures are from *Military Balance 2015.*

Inter-Continental Ballistic Missiles (ICBMs): China's nuclear armed ICBM force consists of newer models of the DF-5A missiles and DF-31 missiles. The older model, Dong Feng-4 (DF-4), is also nuclear armed but it is in the category of an IRBM, due to its less range of 4,750 km. The DF-4 is a liquid fuelled missile which entered service in 1980 and is reported to have an accuracy of 1,500 m Circular Error Probable (CEP); it is likely to be phased out soon. The PLA Rocket Force has only about 10 of these missiles in service and they are deployed in Delingha, Tongdao and Sundian.[11] The DF-4 will be replaced by the DF-31 missiles. As with the rest of the missile force, ICBMs have also been modernised with better technology. New solid fuelled ICBMs like the DF-31, JL-2 (SLBM), and the in development DF-41, are strengthening China's nuclear deterrence with more survivable road mobile capability. The DF-31 has a range of 8,000 km and accuracy of 100-300 m CEP,[12] and can reach targets in Europe, Asia, parts of Canada and northwestern USA. China has about 12 of these missiles in its inventory and another 24 of the improved model, the DF-31A. In the recent Victory Parade, the ICBMs on display were the DF-31A and DF-5B. The DF-31A is an improved version of the DF-31 with an increased range of 10,000 to 14,000 km and can be nuclear armed with 3-4 Multiple Independently Targetable Vehicle (MIRV) warheads with selectable explosive yields of 20, 90 or 150 kilotons (KT) each. The DF-31A is capable of targeting the entire USA.[13]

The other ICBM displayed was the new liquid fuelled DF-5B, which is reported to be capable of hitting any target on earth with a range of 13,000 to 15,000 km.[14] The renewed interest in deploying a new liquid fuelled missile is perhaps because of its longer range and increased payload carrying capacity. The DF-5B has an improved engine and better accuracy compared to the DF-5A. It has also been reported that the DF-5B is China's first MIRV capable ICBM and is probably capable of carrying five nuclear warheads.[15] It is likely

11. *IHS Jane's Weapons: Strategic 2013-2014*, p. 6.
12. Ibid., p.16.
13. Ibid.
14. Staff Reporter, "PLA's new DF-5B Liquid-Fuel ICBM 'Can Hit any Target on Earth,'" *Want ChinaTimes*, August 16, 2015, http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20150816000155&cid=1101. Accessed on September 14,2015.
15. Wendell Minnick, "China's Parade Puts US Navy on Notice", *Defense News*, September 3, 2015, http://www.defensenews.com/story/defense/naval/2015/09/03/chinas-parade-puts-us-navy-notice/71632918/. Accessed on September 14, 2015.

that the DF-5B has been deployed for an interim period till the time the road mobile DF-41, with a range of 12,000 to 15,000 km becomes operational.

China's ICBM force is small with just 50-75 ICBMs but this number is likely to increase to 100 ICBMs in the next 15 years.[16] One hundred ICBMs, with many of them having MIRV payloads, will pose quite a serious threat to the USA.

Intermediate Range Ballistic Missiles (IRBMs): Another missile which was displayed for the first time in the parade was the **DF-26** IRBM which has a range of about 3,000 to 4,000 km.[17] The Chinese have announced that the DF-26 is an Anti-Ship Ballistic Missile (ASBM) and can strike at large and medium ships. This means that from China's east coast, the DF-26 is capable of threatening US Navy ships in the Western Pacific Ocean right up to Guam, and from Kunming, it can cover Southeast Asia, India and the Bay of Bengal. The long nose of the DF-26 clearly indicates that the design caters for a manoeuvrable warhead in the terminal phase. The DF-26 is a derivative of the DF-21D ASBM (range 1,550 km[18]) which was labelled as an "aircraft carrier killer" for possible use against American aircraft carriers if they were to intervene in a Taiwan contingency. For a ballistic missile to manoeuvre in the terminal stage and home onto a moving ship requires real time Intelligence, Surveillance, Reconnaissance (ISR) data from satellites, unmanned reconnaissance platforms or surveillance ships in that area. This is a challenging task, firstly, to acquire the data and, secondly, to feed it into the missile in the very short terminal phase. It is not clear whether China really has these capabilities or they are still in the development phase. There are no reports of the Chinese having carried out any trials of the DF-26 or the DF-21D on a moving target at sea. The United States has been aware of the existence of the DF-26 since 2007[19] and the US Department of Defence (DoD) annual report of 2015 on China's military capabilities does mention the development of a "new advanced IRBM with the capability to strike targets at ranges up to 4,000 km but the number of these missiles in the Chinese inventory has not been given."[20]

16 National Air and Space Intelligence Centre, *Ballistic and Cruise Missile Threat* (Wright-Patterson Air Force Base, Ohio, 2013).
17 Tegler, n. 3.
18. Range figures from n. 11.
19. Tegler, n. 3.
20. U.S. DoD. "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2015" http://www.defense.gov/pubs/pdfs/2012_cmpr_final.pdf. Accessed on September 14, 2015.

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Therefore, the US may have surely found ways to counter the missile.

In addition to the DF-26, China has a small number of about six missiles of the DF-3A[21] class of IRBMs with a range of 3,000 km. The DF-3A is an improved version of the older liquid fuelled DF-3 missiles. The DF-3A is a solid fuelled missile and is likely to be replaced with the DF-21 Medium Range Ballistic Missiles (MRBMs). China has nuclear armed the DF-3A for nuclear deterrence against regional countries.

Medium Range Ballistic Missiles (MRBMs): China's MRBM force consists of about 75-100 missiles of the DF-21 class. According to one report, the DF-21 is deployed in Delingha which is about 1,500 km from the Indian border.[22] From Delingha, these missiles, with a range of about 1,750 to 2,150 km, can cover parts of northern, central and eastern India. China has also deployed the conventionally armed DF-21C for long range precision strikes on military targets, airfields and ports. As has been mentioned earlier, the DF-21D ASBM was displayed in the parade. The showcasing of two ASBMs – DF-21D and DF-26 – at the parade indicates perhaps to the US Navy and other regional navies to beware of Chinese capabilities. But, as mentioned earlier, these missiles need to be tested against ships at sea. Another point to note is that these missiles are available only in small numbers and depending upon accuracy and other factors, more than just one missile will be required against one target. These missiles are road mobile, and in any future war, China's opponents will have to plan for real time persistent ISR to locate and target these missile sites.

21. n. 10.
22. Hans M. Kristensen "DF-21C Missile Deploys to Central China", September 28, 2010, http://fas.org/blogs/security/2010/09/df21c/. Accessed on September 4, 2014.

Short Range Ballistic Missiles (SRBMs): In the SRBM category, China displayed the DF-15B and DF-16 missiles at the parade. The 800 km range[23] DF-15B SRBM is a more accurate version of the DF-15A with a CEP of 5-10 m compared to 30-45 m CEP of the DF-15A. It has also been reported that the DF-15 has a more advanced terminal guidance system with active radar seeker and laser range finder. The reentry vehicle of the missile has four control fins for guidance control in the terminal phase. The first flight of the DF-15 was conducted in June 1988 and it entered service in 1990. The DF-15A was inducted in service in 1996 and the DF-15B entered service in 2006.[24] While the DF-15 was displayed at the parade in Beijing in 2009, the DF-16 is a new SRBM [North Atlantic Treaty Organisation (NATO) code name CSS-11 Mod1] which was paraded for the first time in the September 3, Victory Parade. The DF-16 is a solid fuelled, road mobile missile with an improved range of 800–1,000 km.[25]

Since the turn of the century, China has increased and improved its conventional ballistic missile capabilities. In 2000, the PLA Rocket Force had only one brigade of conventional SRBM missiles. By the year 2010, the number of conventionally armed SRBM brigades increased to seven. China has deployed a very large inventory of modern solid fuelled mobile SRBMs opposite Taiwan in the mainland. These SRBMs can be nuclear armed or with conventional warheads. China today has the largest and most devastating short range ballistic missile force in the world.[26] As Table 1 above shows, China has about 1,000 – 1,200 SRBMs. These are mostly deployed against Taiwan but all of them are solid fuelled road mobile systems and can easily be moved opposite India. According to the US DoD, China's SRBM force has now stabilised at a strength of about 1,000-1,200 missiles.[27] While the number seems to have stabilised, China continues to induct new advanced variants with better accuracy to replace older models. There could be several reasons for the missile numbers to have happened. One of them probably is

23. n. 11.
24. Ibid.
25. Ibid.
26. "2014 Report to Congress of the US-China Economic Review Commission", http://library.uoregon.edu/ec/e-asia/readа/annual_report_full_10.pdf. Accessed on September 14, 2015.
27. US DoD "Annual Report to Congress, Military and Security Developments Involving the People's Republic of China, 2011".

that cross-strait relations with Taiwan have improved since 2008 when the Kuomintang Party came to power in Taiwan and the Chinese don't feel any urgency to further increase their SRBM inventory. Another reason possibly is that induction of the new DF-10 Land Attack Cruise Missiles (LACMs), MRBMs and longer range more accurate variants of the SRBMs has made it unnecessary to add more to PLA Rocket Force's inventory.[28]

Cruise Missiles: Apart from ballistic missiles, the second artillery also has land attack Ground-Launched Cruise Missiles (GLCMs) in its inventory. The main GLCM in the second artillery's inventory is the DF-10. This missile was earlier called Dong Hai-10/DH-10 – Dong Hai in Chinese means East Sea. It was also referred to as Chang Jian-10/CJ-10, which means Long Sword in Chinese. It seems that the name has now been officially changed to DF-10 with markings in English on the missiles in the Victory Parade. The DF-10 has a range of 1,500 km+ and the missile uses the inertial navigation system with GPS (Global Positioning System) updates and TERCOM (Terrain Contour Matching)/DSMAC (Digital Scene Matching Area Correlation) for terminal guidance. With this type of navigation facility, the missile probably has a CEP of 10 m.[29] There has been speculation in the foreign press that the DF-10 may have derived its technology from the Russian Kh-55 Air Launched Cruise Missile (ALCM) which China purchased from Ukraine in the 1990s.[30]

Another cruise missile in China's fleet is the subsonic YJ-63 land attack ALCM (the KD-88 is a derivative of the YJ-63). This missile has been fitted in modified H-6K bombers. The PLAAF's long range bomber fleet consists of H-6 variants which are a Chinese copy of the Soviet era TU-16 aircraft. The H-6 fleet has been upgraded with new avionics and better engines. The most important improvement is in the H-6K which carries the YJ-63 ALCM with a range of 200km, accuracy of 10-15 m and a payload of 500 kg.[31] The YJ-63

28. Michael S. Chase and Andrew Erickson, "The Conventional Missile Capabilities of China's Second Artillery Force:Cornerstone of Deterrence and Warfighting, *Asian Security*,8:2 (Routledge 2012), pp. 115-137.
29. Dennis M. Gormley, Andrew S. Erickson, and Jingdong Yuan, *A Low-Visibility Force Multiplier* (Washington, D.C.: NDU Press, 2014), p. 30
30. Indian Defence Research Wing, "PLA to Display DF Series Missiles at V-J Parade: Report," August 25, 2015. Accessed on September 14, 2015.
31. Gormley, et al., n. 29, p. xix.

guidance system comprises inertial navigation and an electro-optical television for the terminal phase. With the electro-optical system, the YJ-63 can be guided onto the target with the man in the loop by getting target images via the data link between the missile and launch aircraft. In the Victory Parade, China also displayed its new supersonic anti-ship ALCM, the YJ-12. The H-6K that carries six ALCMs (YJ-63/YJ-12), has been fitted with new turbofan engines to extend its range. The YJ-12 has a maximum speed of Mach 4, maximum range of 400 km, and has a warhead of 400-500 kg.[32] At present, the YJ-12 is air-launched but the Chinese have plans to develop variants for launch from ships and submarines. Modifying the H-6K to carry cruise missiles has given the PLAAF the capability to carry out long range standoff precision strikes.

The PLA Navy also has its own anti-ship cruise missiles fitted on ship platforms and submarines. While China has the capability to arm cruise missiles with nuclear warheads, there is no evidence to suggest that this has been done.

China has developed its cruise missiles with heavy dependence on Russian arms and technical skills. The Chinese also received help from Israel, Ukraine and Belarus. In 1989, after the Tiananmen Square incident, the West imposed sanctions and stopped arms sales to China. The collapse of the Soviet Union in the early 1990s led to Russia looking for new buyers for its arms and the Chinese found an opportunity to procure advanced Russian arms technology. In 1993, the Chinese signed a five-year agreement with Russia for military technology and skilled technical specialists. The Chinese also asked the Russians to send at least one team of cruise missile scientists. The Chinese recruited about 1,500 to 2,000 surplus Russian engineers and technical specialists and moved them to a factory in Shanghai where they started work with Chinese technicians to develop a land attack cruise missile.

China is also developing two new ALCMs with a range of 1,500 km and accuracy of 10 m.[33] These are probably the KD-20 air-launched version of the

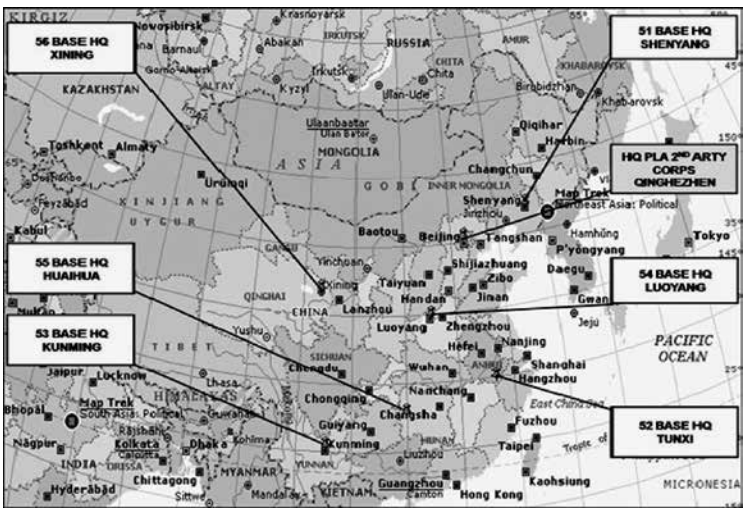
32 China Military Online, "China's Anti-Ship Missiles YJ-12 and YJ-100 Revealed," February 4, 2015, http://english.chinamil.com.cn/news-channels/china-military-news/2015-02/04/content_6340222.htm. Accessed on September 14, 2015.

33. Gormley, et al., n.29, p. 56.

DF-10, which are carried by the H-6K.[34] The PLA Navy also has its own anti-ship cruise missiles fitted on ship platforms and submarines. While China has the capability to arm cruise missiles with nuclear warheads, there is no evidence to suggest that this has been done.[35] Therefore, China's cruise missiles are likely to be armed with conventional warheads only.

MISSILE BASES

Map 1: PLA Rocket Force Missile Bases[36]



The PLA Rocket Force is organised in six operational missile bases and one central storage complex. Storage of nuclear warheads is done centrally in Taibai county, deep inside underground facilities in the Qinling mountains of Shaanxi province.[37]

34. Jeffrey Ling and P.W. Singer, "China Shows off its Deadly New Cruise Missiles," *Popular Science*, March 10, 2015, http://www.popsci.com/china-shows-its-deadly-new-cruise-missiles. Accessed on September 14, 2015.
35. Gormley, et al., n.29, pp. 74-75.
36. Missile base locations adapted from Mark Stokes and L.C. Russell Hsiao, "Spotlight on New Second Artillery ICBM Base Leadership," *Asia Eye*, the official blog of the Project 2049 Institute. (August 2, 2011), http://blog.project2049.net/2011/08/spotlight-on-new-second-artillery-icbm.html. Accessed on September 14, 2015.
37. Mark A. Stokes, "The Second Artillery Force and the Future of Long Range Precision Strike", in Ashley J. Tellis and Travis Tanner, eds. *Strategic Asia 2012-2013 China's Military Challenge*, (Seattle and Washington, D.C. NBR 2012).

The operational missile bases are roughly of the status of a division and are commanded by an officer of major general rank and each base has three or more launch brigades under it. Each brigade consists of six launch battalions and two companies.[38] The number of launchers in each company depends on the type of missiles held in the battalion. The location of the missile bases is given in Map 1.

The forces deployed with each of the six missile bases are given below:

Base 51: This base has its Headquarters (HQ) in Shenyang, Liaoning province, in northeastern China. The base has more than four brigades under it: 806, 810, 816, and 822 Brigades. These brigades are located in the provinces of Liaoning, Shaanxi, Jilin and Shandong. 51 Base has one DF-21 brigade with conventional capabilities and one ICBM brigade with DF-31/DF31A missiles. The other brigades include the DF-3A, DF-15 and probably one more DF-21 brigade.[39]

Base 52: This Base HQ is located at Tunxi in Anshui province, in southeastern China. The base has 7-9 brigades under it and these are located in the provinces of Anhui, Jiangxi, Fujian, Zhejiang, and Guangdong. The base is equipped with conventional missiles of two or more DF-21 brigades, two or more DF-15/ DF-16 brigades and two DF-11 brigades. In addition, there are two nuclear armed DF-21 brigades. This is the largest and most powerful missile base deployed opposite Taiwan.

Base 53: This Base HQ is at Kunming, Yunan province, in south China. The base has 4-5 brigades located in the provinces of Yunan, Guizhou, Guangxi and Guangdong. This base is equipped with diverse types of equipment like LACMs and different types of ballistic missiles. The conventional brigades under this base include one DF-10 LACM, one brigade probably with the DF-21D ASBM and one more conventional brigade, probably of the DF-21. In addition, Base 53 has two nuclear brigades. One of these brigades is equipped with the DF-21 and one is equipped with the DF-31. This base covers Southeast Asia and India.

Base 54: This base is in eastern China with its HQ at Luoyang in Henan province. This base has three ICBM brigades, with one of them equipped with DF-5 silo-based nuclear missiles and the other two probably equipped with DF-31 nuclear missiles.

38. Ibid.
39. Kristensen, n. 22, and Sean O' Connor in *Air Power Australia*, December 2007.

Base 55: This base has its HQ in Huaihua in Hunan province and is located in southern China. The base consists of two ICBM brigades, with one of them equipped with the DF-5/5A and one with DF-31 nuclear missiles. In addition, it has one brigade probably of conventional armed LACMs.

Base 56: Base 56 has its HQ at Xining in north-central China. The base consists of three brigades located at Gansu, Qinghai, and Xinjiang provinces. This is the main base which caters for any conventional contingency against India. This base probably has one or two brigades equipped with conventionally armed DF-21C missiles and, in addition, has one ICBM brigade equipped with DF-31A nuclear missiles. A small number of old DF-4 missiles are also deployed at this base but they are likely to be replaced with the DF-31. The location of the brigades for a contingency against India is likely to be near Korla in Xinjiang province.[40]

ANALYSIS

The PLA Rocket Force, in its more than four decades history, has grown from being a mainly strategic nuclear force to a strategic nuclear and conventional missiles force with the capability to carry out long range precision ballistic and cruise missile strikes. China's nuclear missiles can not only threaten the USA, Russia and Europe but also regional countries, including India. China has modernised its missile force with advanced technology. The major emphasis has been on improved accuracy, use of solid fuelled rockets and increased survivability, with road mobile capability. This has made it into a potent force for nuclear deterrence and regional coercion. While the PLA Rocket Force has been modernising its nuclear missiles to provide a credible minimum deterrent against the USA and Russia, its conventional strike capability is the one which will come to the fore in regional conflicts. Since the 1990s, China has been developing its conventional missile capabilities and has been able to improve their accuracy with advances in information technology.

China's Missile Base 53 at Kunming, and Missile Base 56 at Xining are the ones which are of concern to India due to their location and capability of striking at India. Indian targets in the north, east and central India are within reach of China's DF-21 ballistic missiles and DF-10 land attack cruise

40. Kristensen, n. 22.

missiles. The DF-26, with its 3,000-4,000 km range, can cover all of India. No missile brigade has been observed to be permanently located in Tibet but MRBMs, SRBMs and cruise missiles are mobile systems and can be moved to Tibet if required. The missile brigades at Delingha and Da Qaidam near Golmud are connected to Tibet by the Qinghai-Tibet Railway (QTR) line and the road network to Lhasa. They can easily be moved up to Tibet to enhance their reach into India.

China's Missile Base 53 at Kunming, and Missile Base 56 at Xining are the ones which are of concern to India due to their location and capability of striking at India.

The missiles which will carry out the role for conventional long range attacks will be the MRBMs DF-26 and DF-21; SRBMs DF-16, DF-15 and DF-11; the DF-10 (earlier it was called the DH-10/CJ-10) and YJ-63 cruise missiles. The PLAAF is also developing two new air launched LACMs (Land Attack Cruise Missiles) with 1,500 km range and 10 m accuracy.[41] The Chinese armed forces are in the process of some organisational changes. Under the reorganisation taking place, the PLA Army is in the process of receiving conventional SRBMs. All SRBMs of less than 300 km range are being transferred to the PLA Army for direct firepower support of the land battle. The PLA Rocket Force will retain all SRBMs above 300 km range.

In any future conflict against India, the PLA Rocket Force will use its conventional missiles in preemptive strikes, as part of the PLA's "anti-access strategy", in an attempt to degrade Indian Air Force (IAF) forward airfields, military bases and vital targets. China's ballistic and cruise missiles will be a major threat to the IAF. To counter this threat, the IAF needs to upgrade its terminal air defences. Long range Surface-to-Air Missiles (SAMs) (as and when they are inducted), will provide some ABM (Anti-Ballistic Missile) capability against China's ballistic missiles. Cruise missiles fly at low levels and to counter them, the first requirement is detection. The IAF needs to consider development of low cost aerostat radars to pick up cruise missiles. To destroy cruise missiles, deployment of CIWS (Close in Weapon Systems) of the Phalanx class needs to be considered. These CIWS guns coupled with modern SAMs and interceptor

41. n. 11.

The PLA Rocket Force suggests a security challenge for India. This is a challenge which India must accept, and build up its capabilities appropriately to withstand attempts at coercion by China, either on its own or in collusion with its "iron brother" Pakistan.

aircraft having "look down shoot down" capability will strengthen air defences against cruise missiles. The IAF also needs to use passive methods to absorb damage by any missiles which get through the defences. The IAF needs an adequate number of Hardened Aircraft Shelters (HAS) to park fighter aircraft. Another passive method which needs to be explored is deployment of modern means of runway repair material which can keep the runway down time to minutes instead of hours. The IAF also has the advantage of a large number of airfields in the east and west, so even if some airfields are down, operations can continue from other locations. The adversary cannot take out all our airfields. The best defensive strategy against China's missiles is to deter them by developing similar capabilities so that India can strike targets in China. India needs to step up its plans to develop the hypersonic Brahmos-2 cruise missile and subsonic 1,000 km range Nirbhay cruise missile. Apart from targets in Tibet, other targets are deep inside China, which may be beyond the range of our strike aircraft. Therefore, India needs to consider developing conventional ballistic missiles – the Agni class – and cruise missiles with sufficient range to strike at Chinese counter-force targets deep in China. India needs to develop these missiles in adequate numbers to retaliate forcefully against China, if required. India also needs to have persistent ISR capability to locate Chinese missile movements against India. Satellite reconnaissance has its limits in terms of swathe and revisit time. We need to increase the number of our satellites for ISR and also consider procurement of High Altitude Long Endurance (HALE) UAVs to carry out persistent ISR over Chinese targets.

The PLA Rocket Force suggests a security challenge for India. This is a challenge which India must accept, and build up its capabilities appropriately to withstand attempts at coercion by China, either on its own or in collusion with its "iron brother" Pakistan.