Signs of the Emerging Third Leg: Strengthening India's Triad

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Nuclear weapons are seen as the ultimate guarantors of nations' security. During the cold war, peace between the two super powers, for instance, was tenuously guaranteed by the fear that conflicts could escalate into a nuclear conflagration. Consequently the nuclear weapon states which had assiduously built their stockpiles, worked with an equal sense of urgency to obviate the use of these very weapons. They did so by paradoxically working to guarantee their usability.

The magnitude of destruction that nuclear weapons can wreak is seen as negating any advantages, technological or numerical, that conventional forces could bestow. Nuclear weapons are perceived as 'levellers' and hence are coveted by weaker nations. The acquisition of nuclear weapons by the US during the Second World War had therefore the inevitable effect of spawning similar desire in many nations faced with threats to their security. This made the proliferation of nuclear weapons inevitable. The nuclear quest of nations was further fuelled by the mechanisms engineered by the Nuclear Five to perpetuate an unprincipled and discriminatory nuclear world order where only they could be the owners of nuclear weapons.

India's Nuclear Quest

India is a reluctant nuclear power. India's quest for nuclear weapons gained purpose and direction after its humiliation by China in the 1962 war. Its insecurity was further heightened when China exploded two nuclear devices in 1964. But after some hesitation India broke its nuclear silence in 1974 in Pokhran. Since then it has been engaged in the effort to build a nuclear weapon capability to give it credible deterrence. This

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led India to conduct five nuclear tests in May 1998, motivated in part by its traditional enemy Pakistan's covert nuclear programme.

Today India is a de facto nuclear weapon state after it resolved its internal moral conflict and shed its self-imposed reluctance to safeguard its security in a world striving to perpetuate "nuclear apartheid". India, like Israel, has not, however, declared its nuclear weapon stockpile. The conservative estimate is that India has around 50 nuclear weapons and 520 kilograms of weapon grade plutonium (at the end of 2005) to produce more than double of what it already has.[1]

India's No First Use and the Nuclear Triad

In 1999, India announced its draft nuclear doctrine enunciating a No First Use (NFU) policy and its resolve for a "credible minimum deterrence". The policy of NFU was meant to convey India's abhorrence of the use of the power of the atom for destructive purposes. It was equally revealing of India's reluctance to cross the nuclear Rubicon. The 1999 policy was expanded in 2003 to encompass the use of nuclear weapons to deter and use against any attack involving WMD, including chemical or biological weapons.

Minimum credible deterrence capability would, however, require India to possess the critical capabilities to ensure the survivability of its nuclear weapons even after a first strike against it. NFU therefore casts a responsibility on the nation to achieve a second strike capability.

A second strike capability can only be imparted by a Triad: the three classical nuclear legs comprising of the land, air and sea components. The land and air legs of the Triad are the weakest two while the sea leg, which primarily depends on Submarine Launched Ballistic Missiles (SLBMs), is the strongest in view of the difficulties associated with their destruction in a conflict. For a nation that has limited land and air launched nuclear weapons, comparatively rudimentary delivery systems and a declared NFU policy, the strengthening of this leg is of paramount importance.

The Agni and the Prithvi missiles are the land leg of India's Triad. Their deterrent value is, however, circumscribed by their limited range. Consequently, at present India does not have and based missiles with the range to reach all of China. Land based missiles are also easier to locate in an age of sophisticated satellite technology and could be vulnerable to a surprise attack. The constantly reducing Circular Error Probable (CEP) of missiles has increased their lethality and in a pre-emptive strike could destroy land based assets. Road/rail mobile systems and underground silos have decreased their vulnerability to some extent by making it difficult to locate them. Yet, they are not the most dependable of deterrents. India's land leg has, however, been augmented by the successful testing of Agni-III in 2007 showcasing the nation's capability to soon cover almost the whole of China.

Jaguars, MiGs and Sukhoi aircraft at present constitute the air leg of the Triad. But aircraft are vulnerable when deep penetration of enemy airspace has to be achieved. Sophisticated anti-aircraft weapons and interceptors have made it more difficult to reach targets deep inside a nation's territory. The distances that aircraft have to fly to reach their pre-determined targets further undermine their effectiveness in an actual conflict and to that extent weaken their deterrent value. Therefore, though Sukhoi Su 30 MKIs have a range to reach most of China, and their range and effectiveness could be enhanced when used in conjunction with IL-78 aerial refuelling tankers, there is no assurance that they would be able to survive the anti-aircraft defences of an enemy.

Ironically India is the weakest in the sea leg of the Triad, which is the most reliable of all the three legs. India's capability in this area is very limited. It only has the ship launched nuclear missiles developed under the Dhanush programme. This missile, which is a modified version of the Prithvi-II, has a limited range of 250 km and this has impaired its deterrent value.

Submarine Launched Ballistic Missiles as the Guarantor

In consonance with India's policy of NFU, it maintains a "recessed" nuclear weapon capability. This implies that India's nuclear weapons are

not stored in a ready state. Nuclear war heads and their delivery systems are not married or mated. Therefore, land and air systems have to transit through a definite period to achieve a state of readiness. In a surveillance intensive environment their vulnerability increases manifold.

On the other hand, SLBMs are the most reliable of the nuclear Triad because of the survivability of the platforms that carries them. The vast expanse of the oceans makes detection of submarines very difficult, giving these underwater platforms a distinct edge in survivability. If the vessels do not break radio silence, the chances of detecting them are further reduced.

The endurance of nuclear submarines is another significant advantage that the sea leg of the Triad has. Today, nuclear submarines are capable of travelling at least 640,000 km (400,000 mi) without refuelling. Theoretically the endurance of a submarine is only limited by the endurance of its crew. These vessels can lurk in ocean depths for months and within striking range of the adversary, creating a virtually indestructible arm of deterrence.

The survivability and endurance of the submarines, therefore, make it virtually impossible for a foe to completely take out the retaliatory capability of a nation that has SLBMs. For the reason of its perceived invulnerability, all the Nuclear Five have emphasised the importance of developing and improving their nuclear submarine fleet and sought to preserve them in the various arms limitation talks.

Even before the advent of nuclear powered submarines, the importance of SLBMs was underlined. In the 1950s, both superpowers used diesel-electric submarines to carry SLBMs. But during this era, submarines had to surface to fire missiles, thus increasing their vulnerability. Since they also lacked nuclear propulsion, they had to surface within a couple of days to recharge their batteries. Despite these shortcomings, US vessels carried cruise missiles called Regulus, while Soviet Vessels carried SS-N-3 Shaddock cruise missiles and short range-SLBMs called SS-N-4 Sark.

In 1959, the US launched USS Nautilus, the world's first nuclear submarine. Since then, the major navies of the world have embarked on projects to develop similar capability and today the Nuclear Five have a total of 142 nuclear submarines (US-71, Russia-39, UK-13, China-9 (one new type under trial) and France-10).[2] The submarine fleets, particularly of the US and USSR/Russia, have become stealthier and more potent and are the most important arms of their triad.

Submarines are becoming increasingly silent, further enhancing their role in ensuring nuclear deterrence. Submarine designers are even toying with "metamaterials" that would prevent electromagnetic waves from being reflected back by engulfing the vessels in flows to create invisible platforms. Soon, "acoustic cloaking" could become a reality. It is in this context that India's quest for building indigenous nuclear submarines should be seen. Especially for India, with has a NFU policy, a credible submarine fleet capable of carrying SLBMs is a sine qua non for the success of its deterrence.

Third Leg of India's Triad

The submarine based leg of the Triad is the most difficult of the three to achieve and far more complex than the land and air legs. India has been endeavouring to build this leg of the nuclear Triad since the mid-1980s.[3] It had leased a nuclear powered attack submarine from Russia of the Charlie-I class (Project 670M) between 1988 and 1991. Rechristened as INS Chakra, the submarine had Indian crew and Russian specialists. It gave India valuable experience in operating the complex platform that nuclear submarines are.

Given the critical importance that SLBMs, that give a nation a virtually guaranteed nuclear retaliatory capability, India launched Project Sagarika. Though it was planned for completion in 2005, it had faced certain technical problems. India overcame them and in February 2008 successfully launched its first SLBM (K-15), from a submerged pontoon, marking the beginning of the nation's attainment of an altogether new capability.

The missile, with a range of about 1000 kilometres and a capacity to carry a payload of 500 kilograms, was launched from a fixed underwater launcher simulating a submarine. Dr. Prahlada, Chief Controller, DRDO, in a written reply to the author revealed that this was the first complete system test of the missile. Subsystem tests of the missile were conducted over the last one year. The success of the sub-system tests and the first "complete system" test is a milestone in the attainment of the SLBM capability.

India could not conduct the tests from a submarine as the nation does not at present have any submarine from which the firing could have been undertaken. According to sources in the public domain, India has only 16 submarines, 4 of which are of German origin and the remaining are from the former Soviet Union. These are old vessels which cannot be modified to fire these missiles.

The K-15 is planned to be fitted on the super secret Advanced Technology Vehicle (ATV). The ATV is being developed as a joint project of the Navy, DRDO and the Department of Atomic Energy (DAE) which designed its nuclear core, reportedly with a little help from Russia. (Incidentally, the ATV hull is of similar design as that of the *INS Chakra*.) Reportedly, the DRDO may need another test to "ratify" the K-15 missile systems and the parameters which would form the main armament of the ATVs.

The successful testing of the the K-15, is a milestone in India's effort to fill the gap existing in the nation's nuclear deterrence. But it would have to be matched with the development of indigenous submarine building capability which India is yet to fully develop. India frittered away the opportunity when it failed to take advantage of the programme approved in 1980 for the indigenous development of submarine building capability. Under the project, India had envisaged the acquisition of four HDW Type 1500 submarines of German origin. Two submarines were to be built at HDW and the other two at MDL. There was also an option to build two more submarines at MDL with higher indigenous content.

After importing two submarines and building as many at MDL, the option of building the 3rd and 4th vessels was abandoned. It led to the virtual

shutting down of the facility after the delivery of the second submarine constructed by MDL in 1994. Consequently, from 1994 to 2006, the submarine building facilities at MDL remained largely idle.

With the termination of the project, the naval designers who were trained in submarine construction at ILK Lubeck in Germany could also not put their skills to any practical use. The building of two submarines at MDL had resulted in the development of expertise especially in hull fabrication, specialised welding techniques and adopting normatives for the first time in the country. With the early closure of the HDW project, the nation could not exploit fully the expertise that was painstakingly developed.

It has been demonstrated by some nations that the technology developed for conventional and nuclear submarines can significantly complement each other. The experience of the nations which have exploited such complementarities in technology evidently did not evidently receive enough attention among the defence planners in India. The submarine building programmes of Russia, France and China (the only three nations[4] that design and produce both conventional and nuclear submarines) should have ideally spawned a change in India's planning and strategy. Though little is known about Chinese submarine design, as far as Russia and France are concerned it has been widely acknowledged that most of the equipment (except propulsion) and sensors are common on conventional as well as nuclear submarines.

If India had continued with the submarine building programme under the HDW project, the nation would today have had a far more advanced indigenous submarine building capability and Indian companies would have been able to obtain "threshold technologies" on which submarines are built. Further, had India pursued the planned indigenous submarine building capability, efforts could have been focused on the integration of the BARC developed nuclear propulsion system on indigenously built submarines. Therefore the premature closure of the HDW project has negatively impacted the development of the third leg of India's nuclear Triad.

The limited range of K-15 missiles substantially impairs its deterrent value. To be an effective deterrent against China, for instance, the ATVswould have to be deployed very close to its borders. Missiles with just around 1000 kilometre range also have an inherent limitation in that they can only be used against one city or counterforce assets in one small defined area. The limited range of the missiles can also adversely affect the deterrent value of the payload capability of submarines. If these missiles are to constitute an effective deterrent, their limited range should be offset by deploying more number of nuclear platforms.

Though the successful test of the K-15 is an indication that India would soon launch its first ATV, symbolising the near completion of an effort that dates back more than two decades (since 1986), the attainment of the third leg of deterrence would have to wait for some more time. To attain a credible sea based deterrent capability, besides missiles of requisite range, India should have at least five to six nuclear submarines to have two to three of them at sea at any given time. Even if the hope that the first ATV would be ready for sea trials next year, and the complete integration of the missile and deployment of the vessel could be achieved in a span of three years is not belied, it would take a decade or more before India can build an adequate fleet of operational nuclear submarines with SLBMs. To some extent this deficiency can be offset if India is able to produce SLBMs of the range of 3000 kilometres or more. According to the present indication, it may take close to five years to accomplish this. But, India may have to accelerate its nuclear submarine programme and perhaps start another project to have adequate number of platforms to carry the sea launched Intermediate Range Ballistic Missiles (IRBMs) that India would not take long to produce.

There is, therefore, a compelling need for India to strengthen its submarine building capability. Most critically, the strategy should focus on achieving self-reliance in this sensitive area. Presently, India's conventional and nuclear submarine building programmes are separate and is devoid of any meaningful synergistic relation between them. The separation has resulted in duplication of efforts, wastage of resources and ineffective utilisation of scarce technical assets available in the area and, wheels are being reinvented. It also precludes indigenous industries from undertaking series production of equipment.

To achieve self-reliance in submarine equipment, India should harness the opportunity afforded by both programmes (conventional and nuclear) and bring them under one single authority to achieve commonality in equipment etc. Such a strategy, besides helping in design and indigenous production capabilities would also attract more private players into the arena motivated by the benefits of economies of scale in the production of equipment. The suggested overarching organisation should be entrusted with the responsibility to oversee all types of submarine building programmes. Such a body would encourage the exploitation of complementary technologies, appropriating the knowledge/capability and commonality in equipment where possible for the overall development of indigenous submarine building capability—both conventional and nuclear.

Lease of Akula-II

The Stockholm International Peace Research Institute (SIPRI) has reported that India is possibly leasing two Akula-II class attack nuclear submarines from Russia and placed orders for them in 2005.[5] SIPRI has further speculated that the submarines could possibly be armed with Indian nuclear weapons. *India Today* a leading national journal also reported that India is leasing an Akula-II class submarine from Russia.[6] These reports achieved added credibility when Admiral Sureesh Mehta, Chief of Naval Staff of India, stated in December 2007 that the Indian navy is "shopping for the Russian SSN Akula Class nuclear submarine".[7] The induction of this highly sophisticated platform would give Indian naval personnel, the Indian Naval Chief said, training on "how to operate nuclear reactor and platform and other systems".

Speculation is, however, rife over the actual use India would put this sophisticated submarine to. While some defence analysts refer to India's desire to better the operational skill of its naval personnel, it has also been reported that the platform would come with nuclear missiles.[8] Akula-IIs that are currently in the service of the Russian Navy carry the N-21 cruise missiles which have a range of more than 2500 kilometres. That India would also get the nuclear missiles along with the submarine appears to be mere speculation and not based on any evidence. Notwithstanding

the close India-Russia defence ties, it would be unrealistic to assume that Russia would run afoul the Missile Technology Control Regime (MTCR).[9]

The *India Today* story on the Akula-II also speculated that the vessel would be armed with indigenous nuclear-tipped cruise missiles with a range of over 1000 km but has not indicated who would do the reported integration. Some defence observers have also speculated that India would be able to fit its indigenous K-15 SLBMs on the platform. This also does not appear to be feasible as it would require modification of the platform, which India may not at present be capable of undertaking. Though, theoretically, such an exercise could be undertaken, it is doubtful if India has the technological capability to pull this off. The missile itself has to be perfected and is yet to be test fired from the ATV. Even after it has been successfully launched from the ATV, it is doubtful if such a project would add substansial value to India's deterrence.

It has also been reported that in 2006 India contracted for 28 Novator 3M-14 E Klub-S land attack submarine launched cruise missiles with a range of around 300 kilometers.[10] The other question is whether India would have the capability of modifying the conventional warhead of the 3M-14E to carry nuclear warheads. Though theoretically possible, it would be a daunting challenge for Indian defence scientists to practically achieve. In any case, Indian strategic planners are likely to question whether it is prudent to tie down the costly Akula-II for necessary modifications to test the viability of changing the warhead of the 3M-14E without commensurate benefits.

Akula-II as the Protector?

While Indian scientists work on developing missiles with range that can reach its adversaries, the Akula submarine could be deployed to contribute to India's nuclear Triad in yet another manner. Submarines are considered to be the most effective killers of their own kind and the Akula-II platforms (with a submerged displacement of 12390 tons)[11] are well equipped to perform this role. Using passive sonar that depends on the sound source of the target itself, submarines are the best submarine

killers. They are the more advanced version of the original Akula-I and the improved Akula. Even the Russian Navy has only two Akula-IIs while it has eight of the earlier Akula-Is.

The Akula class vessels are considered quite lethal in the performance of this role and have been rated as one of the most silent platforms ever to be produced. The Akula-IIs have incorporated several changes over its predecessors, notably to reduce their noise levels. Their length has particularly increased to incorporate this feature.[12] These submarines operate at very large depths (500 meters), significantly enhancing their capability to operate undetected. The greater the depth, the more difficult it is to pick up acoustic and electromagnetic signals of submarines. Greater depths enhance the effectiveness and lethality of these platforms manifold as is exemplified in the goal of every submarine builder to give their vessels the capability to ''Run deep, Run Silent''.

Besides the N-21 cruise missiles, Akula-IIs have eight torpedo tubes and six external tubes that can fire the SS-N-15 Starfish and SS-N-16 Stallion anti-ship missiles. In the absence of longrange cruise missiles that are unlikely to be sold by Russia to India, it could also use SS-N-27 Club (Klub) missiles which are anti-ship projectiles that India has purchased for use in the 9 Sindhughosh (Kilo class of Former Soviet Union) class of submarines. SIPRI Yearbook (2006) has also reported that India has already inducted the 3M-54E and 3M-54E1, which are anti-ship cruise missiles.

With the impressive attack capabilities of Akula II, it can spearhead an attack force creating protective screens and also work as mine layers. Therefore, the Akula India is reportedly leasing could at least be used in conjunction with the ATV which could be the carrier of India's SLBMs, with a dived speed of 35 knots,[13] they can outrun any submarine that the Chinese Navy has at present and contribute in some way to the fledgling third leg of India's Triad.

Conclusion

The successful test firing of the K-15 missile is a significant milestone in India's development of a credible nuclear deterrent. Though it is not

yet operational, it can be expected to go into full service in three years or so. The limited range of the missile would, however, require the ATV to be deployed close to Chinese waters for it to constitute an effective deterrent against China. India is also reported to be working on a longer range SLBM. The deployment of such a missile would reportedly take close to five years. But once this is accomplished, India would have moved one step closer to achieving a credible Triad – something very critical for a nation that has a declared NFU and "recessed" nuclear weapons. But India would also have to revisit its indigenous submarine building programmes to produce the platforms that can carry the missiles to achieve credible deterrence.

Notes

1 SIPRI Yearbook (2007), Armaments, Disarmament and International Security, Oxford University Press: Sweden, p. 539.
2 The International Institute for Strategic Studies (2008), The Military Balance 2007, Routledge: United Kingdom
3 According to some sources, however, India's quest for a nuclear submarine began in 1971. See Goromitz, Mark (1996), "Indian Strategic Nuclear S/M Project", accessed on 25 April 2008,URL: www.org/nuke/guide/india/sub/SS/Part 01-html
4 US today only produces nuclear submarines
5 SIPRI Yearbook (2006), Armaments, Disarmament and International Security, Oxford University Press: Sweden, p. 510
6 Unnithan, Sandeep (2007), "Defence: Nuclear Submarine the Secret Nuke Sub Deal", India Today, New Delhi, 27 August 2007.
7 Kumar, Shiv (2007), "Naval Chief's Remarks Stir Global Curiosity", The Tribune, Chandigarh, 18 December 2007.
8 Malhotra, Jyoti (2002), "Icing on Gorshkov Cake for India: A Nuclear Submarine", Indian Express, New Delhi, 2 December 2002.
9 MTCR prohibits inter alia the transfer of missiles of range of 300 kilometres or more, accessed on 26 April 2008, URL: www.fas.org/nuke/control/mtcr/text/mtcr_handbbokguide-annex.pdf
10 The International Institute for Strategic Studies, op cit, p. 329
11 World Navies Today: Russian submarines, accessed on 26 April 2008, URL: http://www.hazegray.org/worldnav/russia/submar.htm
12 Jane's Information Group Limited (2008), Jane's Fighting Ships, 2007-08, United Kingdom, p. 632.
13 SPG Media Limited, Naval Technology – SSN Akula Class (Bars Type 971) Attack Submarine, Russia, accessed on 26 April 2008, URL: http:// www.naval-technology.com/projects/akula/