

# Ballistic Missile Defence: Viability for India

## Abstract

The missile threats India presently face are exemplified by the missile inventories of China and Pakistan. South Asia, Indian sub-continent in particular, become nuclear flashpoint when 'Buddha smile again' in May 1998 and followed by 'Chagai' test. Since then, Islamabad has been testing various short and medium range missiles that could target major parts of India. China, with its huge arsenal of solid-fuelled missiles, would be the most potent threat of India. With the huge disparity in force levels, New Delhi has all reasons to worry of Chinese IRBM's and MRBM's, which can reach India's farthest corners.<sup>1</sup> Reports suggest that the Indian heartland is targeted by Chinese missiles (DF-2; DF-4; DF-5) deployed in Tibet, Datong & Kunming.<sup>2</sup> With the opening of the Tibetan Railway even shorter range missiles can be transported easily to the Indian border during conflict.<sup>3</sup> The prevailing sentiment in some quarters is that China's ongoing military modernisation programmes would not undercut India's deterrence. On the contrary, it is clear that any Chinese build-up would directly undermine India's modest nuclear deterrent and compel diversion of scarce resources to nuclear and missile augmentation. China's known capabilities in multiple independent re-entry vehicles (MRV) and anti-satellite weaponry endows it with massive military advantage.<sup>4</sup> China is also developing medium-range missiles, including for the sea leg of its triad (SLBM).<sup>5</sup> An Indian BMD shield, even if limited in number, would therefore act as a deterrent to Beijing. However, considering its massive asymmetry with China and innate technological short comings India would need external technological inputs to deal with the challenge. Although China is known to be pursuing BMD programmes such as the FT-2000 and *Hongqi*, a comprehensive Indian BMD would directly challenge the asymmetry and could facilitate a *quid pro quo*, where by China could reduce missiles in Tibet in return for India numerically limited AGNI-II, AGNI-III.

*"In the next two decades, anti-ballistic missile systems are going to be a major force, after which space system and strategic military satellites will come in a big way, to guard against nuclear weapons attack"*

-Dr. A. P. J. Abdul Kalam

## Abhaya Kumar Srivastava

Associate Professor  
Deptt. of Military Studies  
D.A.V. College  
Kanpur, India

## Introduction

Pakistan's mounting missile capability and fledging nuclear arsenal could be the main stimulants for India's missile defence planning. There is a feeling in New Delhi's south block that Pakistan might have gained a narrow edge in missile capability, neutralising India's conventional superiority, which emboldens Pakistan to pursue a proxy war in Kashmir.<sup>6</sup> Although operational readiness of India's nuclear forces is assumed to be on track, India has struggled to adequately respond to Pakistan's nuclear and missile challenge. Pakistan's unpredictable nuclear posture clearly necessitates a credible and deterring missile defence capability. Irrespective of its effectiveness, uncertainty would prevail in the minds of an adversary when a missile shield is in place. A missile defence system could offer potential insurance against adventures by a deviant regime in Islamabad.

Pakistan has dynamic inventory of short and medium range missiles i.e. *Hatf-I* (80 kms.) and *Hatf-II* (300kms.) and longer range systems such as *Ghauri Series* with range from 1500-3000 kms. Pakistan's operational readiness to deploy solid fuelled mobile missile such as 750 kms *Shaheen-I* and 2500 kms *Shaheen-II* reflects its capability to target the Indian heartland. Pakistan also has a strong aircraft inventory consisting of the F-16s capable of delivering thousand-kg nuclear payloads to a range of 1600 kms. Equally disturbing in China's clandestine transfer of missile technology to Pakistan- one reason why New Delhi favours missile defences. China's nuclear/missile dalliance with Islamabad reportedly started with the transfer of M-II missiles and the setting up a factory in the

mid 1990's. Likewise, there are reports that North Korea has supplied *NO Dong* missiles and its technology to Pakistan with Chinese connivance.<sup>7</sup>

### **India's Missile Defence System**

With this new threat in the Indian neighbourhood, particularly from China, this did not figure prominently in Indian calculation for a missile defence shield. Initially New Delhi traditionally opposed missile defence, but later on it acknowledges its utility and is developing it publicly. The factor that has changed the mindset of India's decision maker was changed international context where there is a greater emphasis on missile defence issues, moreover from the American side. Earlier India opposed Washington's strategic defence initiative (SDI) of 1980's and now she took a U-turn and shows a positive reaction on President Bush's NMD speech of May 1<sup>st</sup> 2001. India was one of the first countries that not only welcomed Washington's new initiative but also expressed her keen interest on joining such an initiative, clearly with an eye on the potential High-Tech cooperation as part of the missile defence cooperation besides the line of thinking that India may be integrated into the new nuclear order and be part of the solution than part of the problem.

Sniffing the new threat from the neighbourhood, New Delhi began thinking the need for a shield in 1995. In 1996 ministry of defence (MoD) asked the then scientific advisor to the defence minister Dr. A.P.J. Abdul Kalam whether India could ready a shield to protect itself from an incoming missile from Pakistan.<sup>8</sup> By 1995 India had already the Prithvi missile, and the Agni missile was underway – these were certain nuclear deterrent measures that India had already undertaken. These missiles were a part of Integrated Guided Missile Development Programme (IGMDP) which was initiated in 1983. The IGMDP team began feasibility studies as well as scouting for ingredients – Radar with a range of 300 km's (to pick up the enemy missile launch at a distance of 300 km's) – for a potential system. The longest range radar that India had, 'Rajendra', which had a range of 60 km's and was no use for a missile defence purpose. In the process of scouting for the radar, India sought help from Russia. However India subsequently turned to Israel with an eye on the arrow-1 system that used the 'Green Pine Radar'. Though India could not buy the Israeli system because it included U.S. technology, although Israel agree to work with India a long range tracking radar (LRTR) – The target acquisition and fire control radar.<sup>9</sup>

New Delhi then needed guidance radar for tracking down the missile and this was internally developed by DRDO laboratory- The Electronics and Radar Development Establishment with the collaboration of French company Thales.<sup>10</sup> Soon after the Indian government approved the development of an ABM (Anti Ballistic Missile)

programme in 1998, though the programme was kept under the wraps given the sensitivity of the programme because it was the time when India conduct her second nuke test. It was a general feeling in the power corridor of New Delhi that any formal announcement of the programme would scuttle foreign collaboration and affect the programme adversely. Meanwhile, India readied interceptor missiles, mission control centre and the launch control centre. New Delhi willing to have a multi-layered defence system, her programme is essentially a two tiered system with two interceptor missiles Prithvi Air Defence (PAD) missiles for high altitude interception (Exo-Atmospheric) and the Advanced Air Defence (AAD) missiles for lower altitude interception (Endo-Atmospheric) with these interception systems, it is estimated that India will be in a position to intercept any missiles launched from a distance of up to 5000 km's.

Phase-I of India's missile programme, which initiated in 1998, has been undergoing tests, the first test of the PAD was carried out in November 2006 & AAD test in December 2007. With the 2006 test, India became the fourth member of the elite club having such capability. The others are U.S., Russia and Israel. Thereafter in March 2009, India conducted another test, using a ship launched *Dhanush* missile (A naval version of the Prithvi missile) as the target following the trajectory of a missile range of 1500 km's. The target was tracked by swordfish (LRTR) radar and destroyed by a PAD missile at 75 km's altitude.<sup>11</sup> With three successful tests in a row, India claims a optimistically that it will have an effective shield by 2015. DRDO chief controller Dr. W. Selvamurthi stated that the next step is to 'move towards multiple target-interception'.<sup>12</sup>

A press note issues from the MoD that a fourth missile defence test was conducted on July 26, 2010 using single stage interceptor missile fitted with directional war head and the other advance systems to neutralise the target.<sup>13</sup> India conducted yet another interception test, using a modified Prithvi missile as the enemy missile, intercepting at a height of 16 km's, on March 2011. After this test DRDO chief and scientific advisor of MoD noted that 'Our BMD programme has matured and it is really ready now for integration into the air defence assets of the country'. India is next only to the US, Russia, France and Israel, who have BMD capability.<sup>14</sup> Having had five successful tests of its missile defence system, India's programme by and large, still at the adolescence stage.

### **India's And Chinese Missile Defence: Concern and Rationale**

India's missile defence programmes have been primarily Pakistan centric. The Chinese sale of M-9 and M-11 short –range missiles in the early 1990's triggered the Indian plans to establish a missile defence system. DRDO head V. K. Saraswat told after the December 2007 test that if we keep quiet and wait for a missile to fall on a city

and then start sending my own deterrent missile—a lot of damage is done. Hence it is obvious; you have a system which will first take on that kind of threat. Because we have a ballistic missile defence system—a country which has a small arsenal will think twice before it venture.<sup>15</sup> this reference was obviously to Pakistan. Some defence analysts have argued that missile defence shield cannot protect large number of locations and is not a perfect solution, if we can knockout three out of every five warheads; it means our adversary has to fire more rockets. It is a means of deterrence.<sup>16</sup> Therefore, the deterrence value of missile defence systems has been an important consideration in India's missile defence plans.

The Chinese missile threats have been rather secondary in its calculations. Nevertheless, India's missile defence plans, even of a limited range, would have inference for China. India's plan to move into the second phase of the missile defence programme with a range of 5000 km's indicate that New Delhi has begun to factor Chinese ICMB's as a potential threat from which it needs to secure itself.

Meanwhile, Chinese media has stated that china needs defence against small nuclear states with Inter Mediate Range Ballistic Missiles (IRBMs). A missile defence capability would be reasonable as a hedge against smaller nuclear powers, such as India.<sup>17</sup> Soon after Chinese missile defence test in January 2010, Jin Canrong, The school of international studies at Renmin University of China, in an interview with the global times, noted that China has always followed a defensive strategy and that the missile defence test has not changed that strategy, but only reinforced it.<sup>18</sup> Therefore, there are some ambiguities on the Chinese missile defence programmes as India looks at it.

#### **Impact on South Asian Stabilities**

Even while much information is not available on the Chinese missile defence test one is tempted to draw out a few implications for the region and beyond. The Chinese missile defence test will sharpen the security dilemma that already exists in Asia. Clearly the test has upped the ante in the region, with other regional powers considering measure in reaction. India had already announced that its ABM programme will be expanded to include anti-satellite programmes.

A potential arms race in Asia is well within the realm of possibilities. An Indian reaction to the Chinese tests will touch of a response in Pakistan and a potential collaboration between China and Pakistan on nuclear, missile and space matters is likely to intensify the regional competition significantly. One has to look into the history to understand the China-Pakistan nuclear and missile cooperation. Analysts also believe that Pakistan will sight India's BMD programme 'destabilizing factor' to justify the argumentation of her nuclear

inventory, both in qualitative and quantitative terms.<sup>19</sup>

One could potentially visualise a scenario where there is a more robust military build up and active deployment on a large scale and on greater alert status, which could raise the potential for accidental crises. This could be witnessed on both the India-Pakistan and India-China cases.

#### **BMD: Viability for India:**

The actual space and role for missile defence in India's security calculations continued to be hypothetical construct owing to divergent perceptions on actual threats, ambiguity on choosing between indigenously developed and foreign systems, and lack of clarity on suitable architecture that can serve India's purpose with minimal consequences for regional stability. There are sections in India who are cynical about the largely unproven BMD technologies and the massive costs involved in developing or acquiring such systems. Nonetheless, there is greater acceptance in the country on the need to invest in affordable interception capabilities, be it through the indigenous route or through other sources of technology assimilation viz. Licence production from foreign sources.

Despite indigenous development of systems such as *Akash* and *Trishul*, and planned acquisition of foreign air defence and limited-range theatre defence systems, it is clear that these systems would not be adequate to address all conceivable threats. Although limited range air-theatre defence systems are deemed to be effective against slower Pakistani system i.e. *Hatf-I* and *Hatf-II* (100-300 kms) and Chinese systems such as M-7 and DF-11 (150-300 kms), there ineffectiveness against faster – flying short range ballistic missiles (SRBMs) and medium range ballistic missiles (MRBMs) is well understood. Thus the need for comparatively longer range interception technologies to tackle a large gamut of faster missiles in the neighbourhood propelled India's search for systems beyond the realm of indigenous programmes and friendly imports.

#### **India's Dilemma for BMD**

Designing missile defence architectures involve complex decisions concerning issues, such as nature of the system to be developed or acquired, development priorities, identifying the vulnerable areas (VAs) and vulnerable points (VPs) to be protected, and of course the cost factor. As matter of fact it is still not clear whether Indian planners desire a limited theatre system or a comprehensive nation-wide shield, or whether they would satisfy with a rudimentary framework of an augmented air defence network supported by a limited theatre defence capability, before graduating into advanced interception mechanism. Unfortunately, there are no reliable indications on the existence of an architectural plan. More complex is the task of determining the VAs and VPs that have to be protected. Some report

suggested that New Delhi was seeking six to eight systems estimated to cost over \$ 8 billion to protect high value targets i.e. Raisina Hill, the national command authority, and strategic force command.<sup>20</sup> The real problem of choice would be with deployment outside Delhi where many counter-value population and commercial centres and counter-force nuclear/ military installations are to be safeguarded. Although an agreement exists with Pakistan that 'Not to attack each other' nuclear installations, there can be no guarantee that restraint will always be exercised. Such a deal being absent with China naturally necessitates protection of nuclear installations. In this bargain, a conflict of preference and affordability would dominate the decision-making process.

### **Suggestion and Conclusion**

India's emphasis, therefore, should strictly start with the rudimentary level of short-range threats ranging nuclear armed aircraft, cruise missiles, UAVs, and slower flying missiles, and then progress to interception capabilities against medium to long range missiles. This could be undertaken through a long-drawn but phased, technology development and integration process starting from the basic level of augmented air defence for point and limited area defence, followed by theatre defence for wider area applications at lower and upper endo-atmosphere. On a parallel scale, considering the strides made by the India's space programme, the IAF could be allowed to deploy and operate space-based platforms under an aero-space command. A phased approach would thus mean an intensive synergizing of various development processes along with faster assimilation of external technological resources.

The nature of India's theatre does not require the country to depend on high-end technologies that are yet to mature, and would find negligible application in the Indian context. India's primary threats emanate from shorter range systems that have to be intercepted in endo- or lower exo-atmospheric environments, for which theatre defences are deemed sufficient. When co-deployed in peculiar architectures with augmented air defence systems, a theatre defence network can be expected to sufficiently meet India's security environments in the foreseeable future.

Despite being a burgeoning economy, India cannot afford to divert monetary resources on advanced, and proven technologies with a heavy military modernisation bill at hand, New Delhi has to choose between best available choices which would incur minimal investments without compromising on actual needs. Although the indigenization wheel has to roll on, India can wait with anticipation for its products to cum in a timely manner. Irrespective of its fate, the planning should with judicious integration of off-the-shelf system with affordable impact on India's fiscal health.

The key to India air/missile defence planning rests on creating a non-provocative, yet reliable network that can deter offensive systems of its neighbours and can be deployed without disturbing stability. For that matter, an Indian BMD would do little to trigger an armed race in the region. China is already in arms race, and Pakistan has to join this technology hunt for its own security needs. In fact, an Indian BMD system can, in the long term create a stable equation if Pakistan legitimately acquires at least a limited BMD through its excising cooperation corridor with China or through a prospective South-Asian TMD system promoted by Washington.

Our scientist is also working to use lasers in the missiles defence system that will give it the capacity to potentially strike at the boost phase itself. We have to put in many systems like the surveillance and tracking systems together for such a system to work. It will take another 10-15 years before we talk of integrating all these elements.<sup>21</sup> Besides four of five successful testing cannot ensure a perfect system for India. In comparison, the US, since 2001, has conducted 36 missile defence test.<sup>22</sup> Therefore, it is suggested that New Delhi need to do more missile interception test to ascertain her credible BMD capability and thus India will have an effective system that can tackle all threats in its neighbourhood. Dealing with the Pakistani situation may be relatively easy as compared to the threat from the Chinese missiles that will require huge satellite system and much larger dedicated spending.

India's BMD programme has been by and large an indigenous effort, there has been some foreign collaboration. More importantly, a potential collaboration between India and the US/Israel can fuel suspicion in the region contributing to the insecurity and instability dynamics in the region. China and Pakistan may not take as granted to such developments. China could potentially strengthen her nuclear, ICBM programmes, both in quantitative and qualitative terms, adding to the security-insecurity dilemma in the region. A strengthen China-Pakistan nexus could be a direct fall out of this. Scholars believe that an Indian missile defence system would lead to China and Pakistan augmenting their missile strike capabilities to maintain the strategic deterrence.<sup>23</sup> In fact an ineffective system or a system which is not fully developed worsen and increases the India's vulnerabilities rather than strengthen her security. One drawback pointed out by some analysts that, India has been using Prithvi missiles as the target missiles in all the missile defence tests and the Prithvis are known to have slow speed where as Pakistan's missiles Ghauri (the Chinese CSS-5) or the M-9 and M-11 are known for faster speed. Hence it would be suggested that India should conduct the tests with Agni-I and Agni-II as the targets so that India's interception tests may be more realistic.<sup>24</sup>

**References**

1. Wendell Minnick, "China test New Land-attack cruise missile", James missiles and rockets, September 21, 2004.
2. Chandran, Ramnesh, New Chinese missiles target India, The Times of India, July 11, 1997.
3. Kondapalli.Srikanth, 'China's satellite killer: should India worry?' <http://in.rediff.com/news/2007/jan/24guest.htm>
4. Paul H.B. Godwin 'Potential Chinese responses to US BMD', at [www.stinson.org/china/pdf/CMDWP3.pdf](http://www.stinson.org/china/pdf/CMDWP3.pdf)
5. 'Missile defence: the current debate', CRS report for congress July 19 pp 7-8.
6. C.Rajamohan, 'Next steps in missile defence', Indian Express, Feb 27, 2005.
7. S Chandrashekharam, NMD, TMD and India; let not our imagination run riot, SAAG paper no.140, South Asia analysis group.
8. Shukla.Ajay, "The untold story of India's missile defence". Rediff, January.30, 2008; [www.rediff.com/news/2008/Jan/30missile.htm](http://www.rediff.com/news/2008/Jan/30missile.htm)
9. Technology export control regimes and end-user agreement which guide many of these transactions, do not permit transfer of US technologies to certain countries.
10. Electronic and Radar Development Establishment (LRDE), a subsidiary of the DRDO and a major player in the rupees 2000 crore programme, has developed two crucial types of radars- the long –range tracking radar and the multi function fire control radar with two different tie-ups, one with Israel and the other with French company Thales.
11. "India tests 'Swordfish' radar with successful Missile Defence Tests" domain-b-com, march 06, 2009.
12. Vishal Thapar, "India successfully tests missile defence system", CNN-IBN, March07, 2009, [ibnlinve.in.com/news](http://ibnlinve.in.com/news).
13. "DRDO successfully tests Anti-Ballistic Missile System", Broadsword, July26, 2010 : <http://ajayshukla.blogspot.com/2010/07>
14. India's Ballistic Missile Test – A Milestone: "V.K. Saraswat", domain-b.com, march07 2001, [www.domain-b.com](http://www.domain-b.com)
15. Randeep Ramesh, "India Star Wars Plan Risks New Arms Race", [www.gaurdian.co.uk/wprld/2007/dec/14/india.pakistan](http://www.gaurdian.co.uk/wprld/2007/dec/14/india.pakistan)
16. Ibid
17. "China Conducts Test on Ground-Based Midcourse Missile Interception". Xinhua news, January11, 2010 <http://news.xinhuanet.com/english/2010-01/11/content/12792329.htm>
18. Op.cit. <http://news.xinhuanet.com/English/2010-01/12/content/12797459.htm>
19. Pravin Sawhney. "India's Ballistic Missile Defence Capability is Grossly Exaggerated" Daily news and analysis, April 04 2011. [www.domainindia.com](http://www.domainindia.com)
20. "India, US Wrap up Missile Defence Talks", Aerospace daily, January 21, 2003.
21. "India plans to use laser weapons in ballistic missile defence", the Hindu, January 18, 2009.
22. Ramandeep Ramesh, op.cited
23. Cited in Animesh Roul,"India: Missile Defence Dreams", ISN Security Watch, March 27,2008.
24. Pravin Sawhney, op.cited