COUNTERING INDIAN BALLISTIC MISSILE DEFENSE & STRATEGIC STABILITY IN SOUTH ASIA

Dr. Zafar Nawaz Jaspal [*]

Abstract

India's conventional and nuclear arsenal calibrates the nuclear weapons capability of Pakistan. The Indian Ballistic Missile Defence (BMD) program intensifies destabilizing arms race in South Asia. Its deployment certainly increases the reciprocal fear of surprise attack. The logical choice for Pakistan is to build nuclear weapons only that needed for deterrence, instead of entangling in the arms race. Simultaneously, it continues encouraging India to do the same. Hence, Pakistan continues its efforts for constituting Nuclear Restraint Regime in South Asia. Realistically, cataloguing the required strength of the forces to deter the adversary's aggression in the absence of arms control arrangement between the New Delhi and Islamabad is impossible. The continued modernization of both ballistic and cruise missiles is imperative for the credibility of Pakistan's nuclear deterrence that ensures the continuity of strategic stability in South Asia.

Keywords: BMD, Missiles, MIRVs, Arms Race, Stability.

Introduction

The Indian strategic pundits' acclaimed ballistic missile defense systems a central shielding weapon for the cities and forward-deployed forces. Since four decades, therefore, the Indian scientific establishment has been working on its Ballistic Missile Defense (BMD) program. The stated objective of the Indian BMD policy is to defend against missile strikes from Pakistan and China. The Pakistani defense policy-makers, however, seem convinced that the Indian BMD would only affect the strategic equilibrium between nuclear-armed South Asian states. It would be having little efficacy against Chinese missiles.

India's conventional and nuclear arsenal calibrates the nuclear stockpile of Pakistan. Islamabad immensely relies on ballistic missiles because they provide accuracy and confidence that is not achievable by bombers or submarine-launched missiles.[1] The missiles need a short time to reach the target. In the case of India and Pakistan, either side is capable of striking the adversary's cities within 5 to 10 minutes. The Pakistani strategic analysts opine that ballistic missiles provide an insurance policy in case of Pakistan's nuclear bomber force would be incapacitated. Therefore, Indian

[*]Dr. Zafar Nawaz Jaspal is Professor at the School of Politics and International Relations, Quaid-i-Azam University, Islamabad.

BMD operationalization could undermine Pakistanis confidence in the effectiveness of their ballistic missiles.

The reliability of the BMD system is debatable. "There is no effective defense against these missiles, even though the United States has spent more than 30 years and $ 500 billion trying to build radars that can track them and interceptor missiles that will shoot them down."[2] Despite the probability of malfunctioning, Indian military planners are determined to develop and field BMD system. The operationalization of the BMD system would be destabilizer. It would increase the likelihood of deadly miscalculations. Hypothetically speaking, the confidence in missile shield raises the temptation to attempt for a splendid first strike based on the assumption that BMD interceptors can successfully intercept any leftover offensive missiles the adversary could then fire in retaliation.

It was reported Indians are planning to deploy BMD in the next 4-5 years.[3] The aim is to defeat Pakistan's nuclear deterrent. Therefore, the modernization and deployment of Indian BMD oblige Pakistan to adopt countermeasures. The latter would embrace new nuclear weapons and delivery system using Multiple Independently Targetable Re-entry Vehicle (MIRV) technology. Precisely, Indian BMD program progress incites the proliferation of offensive and defensive missile capabilities in the region.

India's BMD program steady modernization germinates three interlinked questions. Where does India's BMD program currently stand? How does Pakistan endure the credibility of its nuclear deterrence capability? What are the ramifications of India's BMD program on the strategic stability in South Asia? The following discussion is an attempt to answer these questions. It proceeds in three substantive parts. The first section spells out the prowess of Indian BMD program. This is followed by practical and normative Pakistan's countermeasures to endure the strategic stability in South Asia. The third section summarizes the debate on Indian BMD program ramifications for the Strategic Stability in South Asia.

India's BMD Program

India's Defense Research and Development Organization (DRDO) contemplated to develop indigenous BMD program in 1983, but the substantial development on the project started in the mid-1990s.[4] Currently, "India is pursuing a two-tiered missile defense shield. To that end, it is constructing the Prithvi Air Defense to address high-altitude threats and the Ashwin Advanced Air Defense interceptor program for low-altitude threats."[5] It has planned to develop lower- and upper-tier systems for air and missile defense applications that enable to track and destroy incoming hostile missiles both inside (endo) and outside (exo) of the earth's atmosphere. It is also aspiring for longer-range exo-atmospheric interception capability.[6] "With the successful testing of the Prithvi Air Defense missile in 2007, India became only the fourth country to have developed a functioning ballistic missile defense system, ahead even of China."[7] Dr. V K Saraswat a leading scientist of India's Defense Research and Development Organization claimed in December 2007: "within

three years major cities such as Delhi and Mumbai would be under a protective shield. A county, which has a small arsenal, will think twice before it ventures."[8]

The current DRDO's BMD project is aimed to produce a two-tiered BMD system. The two-layer ballistic missile defense shield comprises the Prithvi Air Defense (PAD) system and Advanced Air Defense. The former provides long-range high-altitude ballistic missile interception during an incoming missile's midcourse phase, and the latter offers short-range, low-altitude defense against missiles in the terminal phase of their trajectory.[9] The DRDO conducted a successful test of an Advanced Area Defense (AAD); endo-atmospheric missile capable of intercepting incoming target missile at an altitude of 15 to 25 km range on March 1, 2017. It had tested the exo-atmospheric interceptor missile in January 2017.[10] The DRDO is "currently testing a successor to the PAD—the Prithvi Vehicular Defense—with greater range and speed, and a maximum interception altitude approaching that of U.S. THAAD system. [11] The missile interceptors "are cued onto their targets by giant Swordfish Long-Range Tracking Radars, an indigenously built derivative of the Israeli Green Pine radar. [12] It was reported in August 2017 that New Delhi had decided to install its BMD system at two villages—Alwar and Pali—in the western state of Rajasthan.[13] The deployment of the BMD system in Rajasthan very close to Pakistani border alarms Pakistani defense policymakers about the operationalization of Cold Start Doctrine. [14] Thus, BMD could provide India a space below Pakistan's nuclear threshold to launch a limited war or a low-scale conventional strike.

The Indian scientific bureaucracy claims that its missiles program is "the result of indigenous scientific research and consistent endeavor and resolve in the field of ballistic missile defense." [15] However, many analysts objected Indians claim and concluded that the Indian missile program is beneficiary of direct and indirect assistance of many nations. Ashok Sharma pointed out "India is seeking international collaboration with countries like Israel, Russia, the United States and different nations in Europe to get the best support in missile defense technology." [16] Zafar Khan is of the view that, "The post-9/11 India–the U.S. growing strategic partnership has further supported India's BMD program by seeking support from countries such as Russia, France, and Israel that have also contributed to India's missile defense system." [17] It is an open secret that India's indigenous military equipment programs especially missile defense program are encountering technological problems. The Indian armed forces expressed their severe reservations over the Defense and Research Development Organization (DRDO) manufactured weapons reliability. Notably, the Indian Comptroller and Auditor General in its report on July 28, 2017, exposed the limits or deficiencies of the Indian indigenous program "Make-In-India initiative."[18] The objective of the said initiative was to reduce India's dependence on imported arms. The authors expressed dissatisfaction over the advancement of air defense system and development of missile shield.[19]

The Comptroller and Auditor General report also pointed out the failure of Akash a medium-range surface-to-air missile system designed to intercept enemy aircraft and missiles at a distance of 18-30 km.[20] It was reported, "the missiles fell short

of the target, had lower than the required velocity, and there was malfunctioning of critical units."[21] It means state-run Bharat Electronics wasted 3,600 crores (Indian currency) over the development of Akash. The Bharat Electronics also admitted the 30 percent failure rate of the missile. It was reported; the Indian air force is reluctant to deploy Akash due to its technical faults and thereby is pressuring to purchase such systems from technologically advanced nations. The Defence Minister Arun Jaitley reacted immediately to prevent the political fallout of the Report. He assured the members of Lok Sabha, 'the shortage in terms of arms and ammunition would be expeditiously made up.'

New Delhi is determined to restart its ballistic missile defense program on the firm foundation. Indigenously, however, India is incapable of resolving its technological and material deficiency problems. For instance, the speed is in the advantage of both offensive and defensive weapons. India needs to develop a higher speed interceptors. "The ultimate weapon in terms of speed is a Directed Energy Weapon (DEW). DEWs, such as a high-power laser or a high-power microwave beam, travel at the speed of light."[22] The problem with DEWs is that their effectiveness is compromised in adverse weather conditions such as fog or rain. Moreover, PAD is a two-stage rocket, and it uses liquid fuel in its second phase. "As liquid rocket fuel corrodes fuel tanks when stored for longtime, the PAD could not be on standby 24/7. Instead, it would need to be gassed up during a period of crisis in anticipation of trouble. This is less than ideal for a weapon intended to defend against an attack which might come at any moment." Presently, DRDO is scientifically incapable of producing DEWs and replacing liquid fuel propellant of PAD with solid fuel propellant. [23] Therefore, it has to procure advanced components of missiles systems from foreign contractors to perfect its defensive missiles as well as offensive missiles, such as Agni series and BMD system. India's full membership of the Missile Technology Control Regime (MTCR) and Wassenaar Arrangement (WA) and above all India's cementing partnership with the United States provides New Delhi an opportunity to purchase duel use space material and import sophisticated technologies to modernize and perfect its BMD program.

India joined MTCR cartel of 34 countries in June 2016. [24] The cartel established in 1987, and it controls trade in missile and space technology[25]. Since 1987, the members of the MTCR have been maintaining firm control over trade in missile and rocket components. Hence, the membership of the MTCR would have a productive effect on India's space and missile programs. Being a member of missile club, New Delhi is having access to sophisticated missile technology. Thus, the entry into MTCR expedites New Delhi's endeavor to acquire vital equipment for its space programme, high-end missile systems and technologies as well as surveillance drones.

India was admitted as the 42nd member of the multilateral export control regime WA on December 7, 2017. New Delhi's entry into to WA assists Indian armed forces in acquiring critical dual-use military goods and technologies for their modernization and up gradation. WA in December 2013 had amended its export control clauses to deny to support non-member states many new technologies, including 'intrusion software.' Indeed, the WA membership permits India's Defense Research and

Development Organization to import sophisticated material and technologies for restarting its stalled weapon manufacturing projects.

New Delhi has been spending a vast amount on the military hardware purchases from the technologically advanced nations since 2007. According to the Stockholm International Peace Research Institute (SIPRI) fact sheet (February 2017), India was the leading arms importer in both 2007–11 and 2012–16. As the largest importer of major arms in 2007-11, India accounted for 9.7 percent, and in 2012–16, it was accounted for 13 percent of the global total. Hence, India's imports were increased by 43 percent between 2007–11 and 2012–16.[26] On May 20, 2017, Premier Narendra Modi government announced to spend $ 250 billion on the modernization of its armed forces over the next decade.[27]

Realizing the DRDO deficiencies in manufacturing BMD high-tech components, India's Cabinet Committee on Security; a government body responsible for military procurements, headed by Indian Prime Minister Narendra Modi approved 17,000-crore ($ 2.5 billion) for purchasing medium-range surface-to-air missile system from Israel on February 22, 2017.[28] The Indian armed forces already armed with Israel's Green Pine radars, which used in BMD system in both Israel and South Korea. According to Ashok Sharma "India wanted to buy the Israeli Arrow-2 system from Israel, a deal which required US endorsement. However, America expressed its helplessness in selling the Arrow, citing Missile Technology Control Regime (MTCR) commitments."[29] Notably, many analysts including Charles D. Ferguson and Bruce W. MacDonald pointed out: "Nonetheless, the George W. Bush administration did assist India by approving the sale of the Arrow-2, which is very similar to PAC-2. Besides, the Israeli Green Pine radar system came with this deal. India has further enhanced its surveillance capabilities with the acquisition of the Phalcon Airborne Warning and Control System."[30]

India was granted the full membership of MTCR in June 2016. Even, if one agrees with Mr. Sharma that Americans were reluctant to sell BMD technology or material due to MTCR prohibitions. After Indian's joining MTCR it would be able to purchase Israeli Arrow-2, the U.S. PAC-3, the Russian S-300V, etc. "The June 26, 2017 summit between President Donald Trump and Prime Minister Narendra Modi covered an extensive discussion on defense cooperation and arms deals with India elevated the position of "major defense partner." [31] New Delhi is also negotiating with Tel Aviv to purchase two more long-range Phalcon, Airborne Warning and Control System (AWACS). The Cabinet Committee of Security had approved the deal for additional AWACS in 2016. India and Israel also announced to develop a medium-range surface-to-air missile (MR-SAM) system for the Indian Army. The missile has a range of 50-70 km.[32]

New Delhi had concluded a deal with Moscow to purchase the four (some sources say five) regiments of S-400 Triumph advanced Air Defense Systems (NATO reporting name: SA-21 Growler),[33] which is a robust anti-access & area-denial (A2/AD) asset. It is a fourth generation advanced air and missile defense system, designed to

protect high-value military, political, and economic targets from ballistic and cruise missiles, and air strikes. According to the Russian defense sources the S-400 deliveries to India are 'likely' to start by 2020.[34]

The United States remains a giant in arms exports globally. It holds the first place in military hardware exports to its allies. Washington is also striving to expand its military exports through new opportunities for sustaining its military-industrial complex. Since the beginning of the twenty-first century the Indian defense market has been desirable for American defense contractors. For instance, on February 5, 2003, the US had eased its rules on the export of dual-use technology to India. The sales of US dual-use technology or hi-tech products have military applications.[35] Rajesh Basrur pointed out: "Simple pragmatism backs the Indian position. Since the United States will go ahead with missile defense regardless of what others say, why not hop aboard the bandwagon and try to extract the maximum advantage?"[36] Nevertheless, during the last decade, India has become one of the largest importers of American military hardware.

The Indo-US strategic partnership has been contributing constructively in the Indian BMD buildup. A high-level American delegation visited New Delhi for the negotiation on the transfer of technology related to BMD in June 2004. Ashok Sharma envisaged, "In the coming years, missile defense will emerge as one of the more important components of the Indo-US bilateral relationship."[37] New Delhi has been soliciting Washington for "the cooperation in the area of BMD as part of an emerging strategic partnership with the United States. These discussions subsequently even included the possible sale of the US Patriot-3 BMD system to India."[38] The U.S. licensed Boeing's satellite systems to the Indian Space Research Organization to build a communication satellite. Moreover, US did not oppose the transfer of Green Pine Radar and Cruise missile technologies to India by Israel and the Russian Federation respectively. More precisely, being a member of MTCR, New Delhi can purchase the Arrow-2 type of technologies for perfecting its BMD programme.

Pakistan's Countermeasures

The introduction of the Indian BMD system in the South Asian strategic environment, indeed, intensifies Pakistan's security dilemma puzzle. "It does not take much imagination to anticipate Pakistan's response. There will be legitimate pressure for Islamabad to attempt to redress this perceived Indian defense by producing more missiles and nuclear weapons."[39] Nevertheless, Islamabad needs to respond intelligently to counter Indian BMD shield. Therefore, Islamabad revamps its military doctrine, especially nuclear posture, to acquire reliable means to deter India's military threat and for the sake of effective responses, if deterrence fails. The challenge for the makers of Islamabad's current strategy is to chalk out a strategy, which is neither risky economically nor undermines the deterrence credibility. What can Pakistan do? Perhaps, in the prevailing situation, the arms race with India is not in the advantage of Pakistan. Therefore, avoiding an arms race with India is imperative. "There is only one way to win an arms race: Refuse to run."[40] Equally, the makers of Pakistan's defense

policy cannot ignore the Indian BMD program. Many Pakistanis are debating whether they need their own BMD program to balance the Indian BMD shield.

Islamabad, certainly, has chalked out and is executing its counterbalancing strategy. It cannot ignore India's BMD program. It commenced modernization and increase of the size of its offensive ballistic missile force in response to its assessment of India's BMD program. Pakistani missile designers modernize their offensive missiles to improve the offensive techniques to collapse the battle-space. "One of the most effective defense penetration techniques is to collapse the battle-space by minimizing the engagement time available. The primary techniques available to collapse the battle-space for the offensive missile designer to exploit speed, altitude, and radar cross-section."[41] It seems possible. Pakistani missile designers could increase the speed of the offensive ballistic missiles (Shaheen-I, Shaheen-II, and Shaheen-III) and also increase their effectiveness in penetrating missile defenses by equipping them with technologies to defy the Intelligence, Surveillance, and Reconnaissance (ISR), detection and tracking systems of Indian BMD system.

The offensive missile tactics and raids can be used to reduce probability-of-kill or probability-of-raid annihilation. "Tactics can include jamming and maneuvers either in combination or separately. Jamming is employed to delay detection by the radar and missile seeker and to deny the radar and missile seeker accurate range and angle estimates." [42] Second, "evasive maneuvers are one of the most, if not the most, effective tactics used to evade defensive weapons such as missile and radar-directed gun weapon systems and bring down probability-of-kill."[43] Third, offensive missile "raids are used to saturate and confuse the defensive systems and can be a stream or simultaneous."[44] Fourth, the offensive missiles use radar-absorbing material to reduce BMD radar cross-section.

Today, the 'Full Spectrum Deterrence' nuclear posture of Pakistan, prevents the country from both India's nuclear blackmailing coercion and conventional military invasion. Therefore, responding this way, by adding the BMD system in Pakistani military arsenal seems a costly option. As Jeffrey Lewis has pointed out, "An enemy who can be deterred will be deterred by the prospect of a counterattack, even if it consists of only a few nuclear weapons. Beyond that minimum threshold, nuclear weapons provide little additional deterrent benefit."[45] Therefore, Islamabad increases the protection of its ballistic and cruise missiles from pre-launch attack, and also increase their effectiveness in penetrating missile defenses.

Theoretically, three options are available to penetrate and defy the adversary's BMD shield. The Indian BMD shield can be overwhelmed by a flurry of ballistic missiles utilizing the multiple independently targetable re-entry vehicles (MIRVs) technology to deliver multiple conventional and nuclear warheads. With MIRV "the weapons can be launched towards different targets, they can also be directed towards one target in an attempt to overcome a missile defense system."[46] MIRVs enables Pakistani strategic forces to engage multiple targets with a high level of precision by a few missiles. It simultaneously disrupts or destroys the radars of India. Strategists have consensus that

MIRV is very effective against the adversary, which deploys ballistic missile defense system. It was rightly opined that: "If a state is worried about the survivability of its limited missile force and anticipates significant attrition of that force by the adversary, MIRVs provide multiple warheads with which to retaliate for every missile that does survive."[47] On January 24, 2017, Pakistan conducted successfully the test of a medium-range, surface-to-surface, ballistic missile Ababeel, which uses the MIRV to deliver multiple conventional and nuclear warheads.[48] The Ababeel range is 2,200 kilometers — three times the distance between Islamabad and New Delhi — having the capacity to engage multiple targets and thereby it would be very lethal for the Indian BMD shield. Michael Krepon and Travis Wheeler rightly pointed out that: "If New Delhi decides to absorb the costs of ballistic missile defenses for high-value targets, along with the radars to accompany BMD deployments, these expenses will be in vain."[49] Ankit Panda concurred Krepon's conclusion. He wrote: "a MIRVed Pakistani strategic capability may stand as a powerful deterrent to India's retaliatory capabilities, freeing Pakistan up to use battlefield nuclear weapons as a war-terminating strategy without concerning itself with escalation to the strategic level."[50] Precisely, Ababeel seems a cost-effective, dependable ballistic missile to neutralize India's BMD shield.

Second, using a deep penetration strike aircraft, a nuclear attack could be launched. The BMD shield technologically offers no resistance to it. Third, Pakistan could employ its supersonic cruise missiles to evade enemy radars by flying at low altitudes while striking the target. On December 14, 2016, Pakistan conducted the successful test of an improved version of the medium-range and subsonic cruise missile—Babur Weapon System Version-2.[51]

Pakistan can further improve the efficacy of its missiles by developing and employing decoys, chaff, jamming, thermal shielding, evasive trajectories, warheads with very low infrared signature and Multiple Reentry Vehicles (MIRVs) to shower warheads over several targets. "The balance of nuclear technology strongly favors the offensive, which has cheaper, far superior technology that can quickly be deployed to defeat India's nascent BMD."[52] Thus, Pakistan's qualitative and quantitative improvement in its nuclear and missile forces and its strategy pose a formidable challenge to the Indian BMD shield.

Implications for Strategic Stability

Theoretically, India's BMD program has a defensive projection, but it is an integral measure of offensive planning to conduct pre-emptive or preventive nuclear strikes with impunity of Pakistan's retaliatory nuclear strikes. It is an attempt to dent the balance of terror, which is causing deterrence stability between India and Pakistan. Indeed, deterrence stability between the belligerent neighbors is a prerequisite for sustaining the strategic stability in South Asia. Though the stated focus of India's BMD program is to defend against missile strikes from Pakistan, the BMD assets (advanced radar systems) also strengthen the Indian air defense system. After successful development and deployment of PAD and AAD, India would plan for an "enhanced air defense capability" covering a wider part of India's territory, its population centers, and

strategic assets."[53] Consequently, India would be invulnerable from Pakistan's air force bombings, cruise, and ballistic missile strikes. Hence, the BMD deployment undermines the balance of strategic nuclear deterrence between nuclear-armed India and Pakistan. The implication is that BMD program may give the Indians a sense of greater security; emboldening the Indian hawks to ignore the Pakistani ballistic and cruise missile threat and actively resist confidence-building measures or efforts to endure strategic stability in South Asia. India's BMD program could have the following destabilizing consequences:

- The defensive weapons, particularly BMD, could undermine the viability and effectiveness of ballistic missiles. The compromise of the offensive strikes dents the credibility of the retaliatory strikes, which deter the adversary from aggression. The probability of absorbing an opponent's retaliatory strike in a crisis undermines the deterrent capability of a state desiring to deter the adversary with its ballistic missile capability. Sumit Ganguly pointed out: "After such a strike, which would disable much of Pakistan's nuclear arsenal, the ragged retaliation that would follow could be significantly denuded through the use of India's BMD." [54] Nevertheless, the BMD destabilizes the deterrence stability. The deterrence instability subverts strategic stability between the strategic competitors by reducing the vulnerability of the BMD's holders.
- Second, the BMD deployment is a threat to nuclear deterrent stability entailing strategic instability. It is destabilizing because it intensifies a nuclear arms race between India and Pakistan. Many analysts are convinced that BMD changes the nuclear order and alter strategic stability, and can encourage Indian leadership to engage in offensive actions or first strike, on the premise that they are invulnerable to Pakistani strategic forces retaliation. [55] Indeed, "deployment of BMD could boost the Indian confidence in its ability to strike first with the belief that it could protect itself afterward against what strategists have called 'ragged retaliation.'" [56] That is why; the Indian ruling elite threatened to conduct surgical strikes to devastate Pakistan's nuclear weapons capability. On October 5, 2017, the Indian Air Force Chief Marshal, B. S. Dhanoa, had claimed that the Indian Air Force (IAF) could target Pakistan's nuclear sites and could carry out surgical operations.[57] The gravest danger now is that India and Pakistan will stumble into a catastrophic war that is neither in the interest of New Delhi nor Islamabad.
- Third, India's 2003 "nuclear policy draft is based on a counterforce strategy in India." [58] The BMD deployment increases the Indian hawkish leadership temptation for counterforce surgical conventional attacks on Pakistan storage facilities to end the nuclear threat. Proponents of this course believe that the Indian missile shield and threat of further escalation by India (massive retaliation) would deter Pakistan from responding militarily to a limited first strike. On September 29, 2016, Indian DGMO Lt Gen Ranbir Singh announced in a joint press conference of the Indian Ministry of External Affairs and Ministry of Defence: "some terrorist teams had positioned themselves at launch-pads along the Line of Control. The Indian army conducted surgical

strikes last night at these launch-pads. Significant casualties have caused to these terrorists and those who are trying to support them."[59] Pakistani armed forces spokesperson while rubbishing Lt Gen Ranbir claim stated: "The notion of surgical strike linked to alleged terrorist bases is an illusion being deliberately generated by Indians to create false effects."[60] Perhaps, increasing confidence in the operational reliability of the Indian BMD system can encourage Indian hawks to execute his frequently articulated strategy "jaw for a tooth" to punish Pakistani armed forces.[61] Positively, Islamabad will react with its so-called tit-for-tat strategy, if there is a surgical strike on Pakistani soil. "As per rules of engagement, same was strongly and befittingly responded by Pakistani troops."[62]

- Fourth, the BMD deployment will gear up India and Pakistan nuclear plans toward pre-emption. Both sides will opt a built-in option to launch nuclear weapons if officials believe that an enemy attack is imminent and unavoidable. This produced a danger that the strategist Thomas Schelling called "the reciprocal fear of surprise attack."[63] Thus, India's BMD impressive progress and its collaboration with the United States and other countries such as Israel create uneasiness in Pakistan. It obliges Pakistan to modernize its offensive ballistic and cruise missiles to evade the Indian BMD shield before striking the target. In simple words, Pakistan develops technology to thwart the BMD system. The advancement of the offensive forces of Pakistan causes India's BMD shield ineffective. While debating the Indian BMD operational perfection, many analysts concluded that even after spending tens of billions of dollars over 30 years, United States still not be able to shoot down a couple of North Korea missiles.[64] Glenn Kessler pointed out: "The interceptor system has been tested 18 times since 1999, with a success rate of about 56 percent. The most recent test, on May 30, 2017, was a success, but the three of four before that failed. It is worth noting that the tests are done under ideal conditions — during the day, not at night, and without having to deal with an adversary's countermeasures, such as decoy warheads or technology that confuses the interceptors."[65] Scott D Sagan expressed similar apprehensions about the BMD. He wrote: "But military leaders should be candid about the limits of U.S. ballistic missile defenses. Most such systems have failed numerous tests, and even the most effective ones, such as the Terminal High Altitude Area Defense (THAAD) system, could be overwhelmed if North Korea fired multiple missiles—even dummy missiles—in a salvo at one target." [66] Thus, India's BMD only increases risk and fuels colossal defense spending between India and Pakistan, and it might not even protect the former against a nuclear attack by the latter.

Conclusion

The BMD program of India, the countermeasures of Pakistan, and above all the rational strategic calculations manifest that New Delhi's operational missile shield cannot create a deterrence gap that needs to be filled, immediately. It is because there (during the war) is always a reasonable probability that one or more nuclear-capable

ballistic and cruise missiles penetrate in the Indian missile defense system. Since a single nuclear missile hit inflict, unacceptable damage on India, therefore its BMD program does not change the strategic equilibrium between the strategic peers in South Asia.

The action-reaction theory, however, indicates that despite the absence of deterrence gap, Islamabad does not only modernize its nuclear-capable delivery vehicles but also multiply their numbers. The Indian BMD program embarks Pakistan on the process of modernizing almost every component of its armed forces. Thus, the region experiences a lethal devastating arms race between India and Pakistan. The arms race between the belligerent neighbors, obviously, undermines the prevalent strategic stability in South Asia.

The practical choice for Islamabad is that it builds nuclear weapons only that needed for deterrence, instead of entangling in an arms race. Simultaneously, it continues encouraging India to do the same. Hence, Islamabad continues its efforts for constituting Nuclear Restraint Regime in South Asia. Even, if it does not, Islamabad's level of nuclear forces should be determined by what it requires for credible deterrence instead of a misguided desire to match New Delhi's missile for missile. Realistically, cataloguing the required strength of the forces to deter the adversary's aggression in the absence of arms control arrangement between the New Delhi and Islamabad is impossible.

To conclude, today Pakistan's indigenous BMD program is neither affordable nor executable, and thereby not advisable. The declassified information about Pakistan's missile program reveals that its ballistic and cruise missiles are becoming more flexible, mobile, survivable, reliable, and accurate. Though Presently, Pakistan can only rely on offensive ballistic and cruise missiles instead of developing ballistic missile shield, yet the continued modernization of both ballistic and cruise missiles is imperative for the credibility of Pakistan's nuclear deterrence that ensures the continued strategic stability in South Asia.

NOTES

[1] "But as technology advances, we have to recognize the possibility of new threats to submarines, especially cyber-attack and detection by swarms of drones." William J. Perry, "Why It is Safe to Scrap America's ICBMs," *The New York Times,* September 30, 2016. https://www.nytimes.com/2016/09/30/opinion/why-its-safe-to-scrap-americas-icbms. html?mcubz=3, accessed on October 29, 2017.

[2] James E. Doyle, "Ballistic missiles: Limit them first. Then ban them." *Bulletin of the Atomic Scientists,* October 25, 2017. https://thebulletin.org/ballistic-missiles-limit-them-first-then-ban-them11222 accessed on October 29, 2017.

[3] M Somasekhar, "DRDO test interceptor missile successfully," *The Hindu Business Line,* March 1, 2017. http://www.thehindubusinessline.com/news/science/drdo-tests-interceptor-missile-successfully/article9565489.ece, accessed on December 20, 2017.mul. See also Franz-Stefan Gady, "India Successfully Tests Supersonic Interceptor Missile," *The Diplomat,* March 2, 2017. https://thediplomat.com/2017/03/india-successfully-tests-supersonic-interceptor-missile-2/ accessed on December 20, 2017.

[4] Although Akash and Trishul projects were part of the Integrated Guided Missile Development Programme (IGMDP) launched in 1983, substantive planning to construct a missile defense shield seemingly began in the 1990s. Ashok Sharma, "India's Missile Defense Programme: Threat Perceptions and Technological Evolution," *Manekshaw Paper*, No. 15, New Delhi, Centre for Land Warfare Studies, 2009, p. 3.

[5] Sumit Ganguly, "India's Pursuit Of Ballistic Missile Defense," *The Nonproliferation Review,* Vol. 1, No 3-4, 2014, p. 373.

[6] Ashok Sharma, "India's Missile Defense Programme: Threat Perceptions and Technological Evolution," p. 1.

[7] Sébastien Roblin, "Get Ready, Pakistan: India Is Developing Its Missile-Defense Shield," *The National Interest,* October 15, 2017. http://nationalinterest.org/blog/the-buzz/americas-killer-m1-abrams-tank-now-has-its-own-shields-22719?page=show accessed on December 19, 2017.

[8] "Missile defence shield to be ready in three years: India," *Dawn*, December 13, 2007; "India's AAD-O2 performs first endo-atmospheric kill," Missiles & Rockets 12, No. 2, February 2008, p. 1.

[9] Sébastien Roblin, "Get Ready, Pakistan: India Is Developing Its Missile-Defense Shield."

[10] M Somasekhar, "DRDO test interceptor missile successfully."

[11] Ibid.http://www.thehindubusinessline.com/news/science/drdo-tests-interceptor-missile-successfully/article 9565489.ece, accessed on December 20, 2017.

[12] "The Swordfish currently has a range of 500 miles, though there are plans to upgrade it to over 900 miles. It can track up to 200 targets simultaneously, and is claimed to have the resolution to detect an object the size of a cricket ball." M Somasekhar, "DRDO test interceptor missile successfully."

[13] "India to Deploy two Ballistic Missile Defense Systems Near Pakistan Border," *Indian Defense News,* August 08, 2017. http://www.indiandefensenews.in/2017/08/india-to-deploy-two-ballistic-missile.html,accessed on December 20, 2017.

[14] General Bipin Rawat, India's Chief of Army Staff, in an interview to India Today in January 2017 acknowledged India's military doctrine, i.e., Cold Start Doctrine. He stated: "Cold Start doctrine exists for conventional military operations." Sandeep Unnithan, "We will cross again," *India Today*, January 4, 2017. Khan, U.U., & Khalid, I. (2018) Indian Cold Start Doctrine: Pakistan's Policy Response. *Journal of the Research Society of Pakistan, Vol.55(1).*

[15] Ashok Sharma, "India's Missile Defense Programme: Threat Perceptions and Technological Evolution."p. 1.

[16] Ibid. pp. 1-2.

[17] Zafar Khan, "India's Ballistic Missile Defense: Implications for South Asian Deterrence Stability," *The Washington Quarterly,* Fall 2017, p. 189.

[18] Rs 3,800 cr spent, missiles not inducted: CAG," *The Tribune,* July 29, 2017. http://www.tribuneindia.com/news/nation/rs-3-800-cr-spent-missiles-not-inducted-cag/443772.html accessed on December 25, 2017.

[19] Ibid.

[20] "Made-in-India' Akash Missile, worth Rs 3,600 crore, fails test," *Rediff.com,* July 28, 2017. http://www.rediff.com/news/report/made-in-India-Akash-missile-worth-Rs-3600-crore-fails-test/20170728.htm. "CAG spots weaknesses in missile defense system," *The Hindu,* July 28, 2017. http://www.thehindu.com/news/national/cag-spots-weaknesses-in-missile-defence-system/article19380293.ece. Accessed on December 25, 2017.

[21] Ibid.

[22] Warren J. Boord, John B. Hoffman, Air, and Missile Defense Systems Engineering, (London: CRC Press: Taylor & Francis Group, 2016), p. 24.

[23] M Somasekhar, "DRDO test interceptor missile successfully."

[24] "India joins Missile Technology Control Regime as a full member," *Hindustan Times,* June 27, 2016. http://www.hindustantimes.com/india-news/india-joins-missile-technology-control-regime-as-a-full-member/story-MW7ZbbyxaoJtw9zCQCO9sM.html accessed on October 9, 2017.

[25] "The Missile Technology Control Regime at a Glance," *Arms Control Today,* July 2017. https://www.armscontrol.org/factsheets/mtcr accessed on October 8, 2017.

[26] Aude Fleurant, Pieter D. Wezeman, Siemon T. Wezeman, and Nan Tian, Trends in International Arms Transfers, 2016, *SIPRI, Fact Sheet,* February 2017.pp. 6-7. https://www.sipri.org/sites/default/files/Trends-in-international-arms-transfers-2016.pdf accessed on December 13, 2017.

[27] "India announces the policy for strategic partnerships in defense," *Reuters,* May 20, 2017. https://ca.reuters.com/article/topNews/idCAKCN18G0GS-OCATP accessed on December 25, 2017.

[28] "India clears Rs 17,000 crore missile deal with Israel," *The Indian Express,* February 24, 2017. http://indianexpress.com/article/india/india-clears-rs-17000-crore-missile-deal-with-israel/ accessed on December 25, 2017.
[29] Ashok Sharma, "India's Missile Defense Programme: Threat Perceptions and Technological Evolution," p. 15. The Indian Navy got the Barak antiship system to be co-produced in India, and the Indian Air Force (IAF) is looking for induction of Spyder system to fill its air defense requirements from Israel.
[30] Charles D. Ferguson and Bruce W. MacDonald, "Nuclear Dynamics: In a Multipolar Strategic Ballistic Missile Defense World," Federation of American Scientists, July 2017, p. 13.
[31] Ibid.
[32] "India clears Rs 17,000 crore missile deal with Israel," *The Indian Express,* February 24, 2017. http://indianexpress.com/article/india/india-clears-rs-17000-crore-missile-deal-with-israel/ accessed on December 25, 2017.
[33] Franz-Stefan Gady, "India Successfully Tests Prithvi Defense Vehicle, A New Missile Killer System," *The Diplomat,* February 15, 2017. https://thediplomat.com/2017/02/india-successfully-tests-prithvi-defense-vehicle-a-new-missile-killer-system/ accessed on December 21, 2017.
[34] Franz-Stefan Gady, "India and Russia Ink S-400 Missile Air Defense System Deal," *The Diplomat,* October 20, 2016. https://thediplomat.com/2016/10/india-and-russia-ink-s-400-missile-air-defense-system-deal/ accessed on December 21, 2017.
[35] "US eases rules on export of dual-use tech to India," *Dawn*, February 7, 2003.
[36] Rajesh M. Basrur, *Missile Defense and South Asia: An Indian Perspective* (Washington, DC: Stimson Center, 2002), 7.
[37] Ashok Sharma, "India's Missile Defense Programme: Threat Perceptions and Technological Evolution," pp. 2, 12-13
[38] Sumit Ganguly, "India's Pursuit Of Ballistic Missile Defense," p. 374
[39] Yousaf Butt, "The myth of missile defense as a deterrent," *Bulletin of the Atomic Scientists,* May 18, 2010. https://thebulletin.org/myth-missile-defense-deterrent accessed on October 30, 2017
[40] William J. Perry, "Why It is Safe to Scrap America's ICBMs," *The New York Times,* September 30, 2016. https://www.nytimes.com/2016/09/30/opinion/why-its-safe-to-scrap-americas-icbms.html?mcubz=3 accessed on October 29, 2017.
[41] Warren J. Boord, John B. Hoffman, Air, and Missile Defense Systems Engineering, (London: CRC Press: Taylor & Francis Group, 2016), p. 23
[42] Ibid. p. 23
[43] Ibid. p. 23
[44] "Stream raids are a series of missiles on the same trajectory with some time spacing between the individual missiles. Simultaneous raids designed such that all offensive missiles arrive at the target almost simultaneously." Ibid. p. 24
[45] Quoted in Yousaf Butt, "The myth of missile defense as a deterrent."
[46] IsabellaBeham, "China Provides Advanced Tracking System For Pakistan's Missile Program," *Valuewalk,* March 22, 2018. https://www.valuewalk.com/2018/03/china-tracking-system-pakistan-missile-program/ accessed on March 30, 2018.
[47] Ankit Panda, "Why Pakistan's Newly Flight-Tested Multiple Nuclear Warhead-Capable Missile Really Matters," *The Diplomat,* January 25, 2017. https://thediplomat.com/2017/01/why-pakistans-newly-flight-tested-multiple-nuclear-warhead-capable-missile-really-matters/ accessed on December 25, 2017.
[48] Zafar Nawaz Jaspal, "Pakistan's MIRVs Prowess," *Pakistan Observer*, February 2, 2017.
[49] Michael Krepon and Travis Wheeler, "The Second Coming of MIRVs," *Stimson Spotlight,* January 26, 2017. https://www.stimson.org/content/second-coming-mirvs-0 accessed on December 25, 2017.
[50] Ankit Panda, "Why Pakistan's Newly Flight-Tested Multiple Nuclear Warhead-Capable Missile Really Matters."
[51] Zafar Nawaz Jaspal, "Babur-III SLCM: Stabilizes Nuclear Deterrence," *Pakistan Observer,* April 12, 2018.
[52] Balraj Nagal, "India and Ballistic Missile Defense: Furthering a Defensive Deterrent," *Regional Insight,* Carnegie Endowment for International Peace, June 30, 2016. http://carnegieendowment.org/2016/06/30/india-and-ballistic-missile-defense-furthering-defensive-deterrent-pub-63966 accessed on December 22, 2017.
[53] Zafar Khan, "India's Ballistic Missile Defense: Implications for South Asian Deterrence Stability," pp. 189-190.
[54] Sumit Ganguly, "India's Pursuit Of Ballistic Missile Defense," p. 377.
[55] Balraj Nagal, "India and Ballistic Missile Defense: Furthering a Defensive Deterrent," Regional Insight, Carnegie Endowment for International Peace, June 30, 2016. http://carnegieendowment.org/2016/06/30/india-and-ballistic-missile-defense-furthering-defensive-deterrent-pub-63966 accessed on December 22, 2017.
[56] Zafar Khan, "India's Ballistic Missile Defense: Implications for South Asian Deterrence Stability," p. 193.
[57] "IAF Chief BS Dhanoa Asserts India's Capability to Fight Two-front War, Acknowledges Chinese Presence in Chumbi Valley," *First Post*, October 6, 2017, www.firstpost.com/india/indian-air-force-capable-of-targeting-pakistan-nuclear-sites-fighting-two-front-war-says-air-chief-bs-dhanoa-4112203.html
[58] Zafar Khan, "India's Ballistic Missile Defense: Implications for South Asian Deterrence Stability," p. 193.
[59] "Surgical strikes conducted against terrorists at Pakistan launch pads at LoC: DGMO," *The First Post,* September 29, 2016. http://www.firstpost.com/india/indian-army-conducted-surgical-strikes-against-terrorists-at-loc-dgmo-lt-gen-ranbir-singh-3026018.html accessed on December 25, 2017.
[60] Syed Sammer Abbas, "Army rubbishes Indian 'surgical strikes' claim as two Pakistani soldiers killed at LoC," *Dawn,* September 29, 2016. https://www.dawn.com/news/1286881 accessed on December 25, 2017.

[61] Shailaja Neelakantan, "Uri terror attack: No more tooth for tooth, 'for one tooth, complete jaw,' says BJP's Ram Madhav," *The Times of India,* September 19, 2016. https://timesofindia.indiatimes.com/india/Uri-terror-attack-No-more-tooth-for-tooth-for-one-tooth-complete-jaw-says-BJPs-Ram-Madhav/articleshow/54402287.cms accessed on December 25, 2017.

[62] ISPR, Press Release, No PR-334/2016-ISPR, September 29, 2016.

[63] Quoted in Scott D. Sagan, "The Korean Missile Crisis: Why Deterrence Is Still the Best Option," *Foreign Affairs,* November/December 2017. https://www.foreignaffairs.com/articles/north-korea/2017-09-10/korean-missile-crisis accessed on December 14, 2017.

[64] Jon Wolfsthal, "Our Missile Defenses Go to 11," *Foreign Affairs,* November 13, 2017. http://foreignpolicy.com/2017/11/13/our-missile-defenses-go-to-11-north-korea-icbm/, accessed on November 15, 2017.

[65] Glenn Kessler, "Trump's claim that a U.S. interceptor can knock out ICBMs '97 percent of the time," *The Washington Post,* October 13, 2017. https://www.washingtonpost.com/news/fact-checker/wp/2017/10/13/trumps-claim-that-u-s-interceptors-can-knock-out-icmbs-97-percent-of-the-time/?utm_term=.7012a22b15b5 accessed on November 15, 2017.

[66] Scott D. Sagan, "The Korean Missile Crisis: Why Deterrence Is Still the Best Option."