

SRBMs, DETERRENCE AND REGIONAL STABILITY IN SOUTH ASIA: A CASE STUDY OF NASR AND PRAHAAR

ZAHIR KAZMI

Introduction

During the times of crises, Indian and Pakistani leaders have claimed that their countries eschew nuclear “war-fighting,”⁽¹⁾ implying that their nuclear weapons are meant only for deterrence. Hence, Pakistani and Indian policy to develop short-range ballistic missiles, the so-called tactical nuclear weapons (TNWs) or non-strategic weapons, raises the question whether it is a volte-face. The Western retrospective thinking of the Cold War holds that short-range ballistic missiles (SRBMs) are the sinews for nuclear war fighting whereas the so-called strategic nuclear weapons have just the opposite function. Pakistan flight-tested Hatf-IX — Nasr (victory)⁽²⁾ on 19 April 2011 and some considered it provocative.⁽³⁾ Three months later, India unveiled Prahhaar⁽⁴⁾ (strike) through a flight test on 21 July 2011 but the debate remained muted. Consequently, several questions have come to the fore, which are either partly explained or left unanswered. What prompted Pakistan and India to develop the short-range nuclear-capable ballistic missiles?⁽⁵⁾ If India enjoys conventional supremacy to “draw out [a] war and eviscerate Pakistani military capabilities,”⁽⁶⁾ why would it secretly develop Prahhaar for almost two years and react to the Nasr test within three months? How would the SRBMs affect deterrence and strategic stability in South Asia? Is the South Asian situation similar to the Cold War competition involving the TNWs, which has hitherto dragged on between Russia and the US?

This paper attempts to answer these questions by offering and validating the South Asian perspective as an alternative. For instance, the notion

Zahir Kazmi is an M.Phil. candidate at the National Defence University (NDU), Islamabad. He writes on non-proliferation, disarmament and security issues. *Regional Studies*, Vol. XXX, No.4, Autumn 2012, pp.69-101

that nuclear weapons can be 'tactical' or non-strategic would be challenged.⁽⁷⁾ In the first part, a detailed profile of Nasr and Prahaar weapon systems has been given. The content analysis of available information on Nasr and Prahaar offers some unique inferences about the developmental trajectories, technological limitations, technological spin-offs, and command and control issues regarding these weapons. For instance, while Pakistan may exercise assertive control over deployment and employment of Nasr, analysis indicates that India may exercise delegative control over Prahaar, thereby increasing the possibility of inadvertent or unauthorised use.

In the second part of the paper, an attempt is made to establish the impact of these SRBMs on deterrence and regional stability. The assessment is based on the causal relationship of short-range ballistic missiles with deterrence and regional stability variables, using the assumptions of deterrence and rational choice theory. Effects of South Asian politics, economic factor and military developments on deterrence and strategic stability have been debated in detail.

Profiling Nasr and Prahaar

This part is a collection of declared specifications and assessments made on Nasr and Prahaar ballistic missile systems. A technical and technological assessment of these systems would assist in ascertaining their effect on the stability of deterrence between Pakistan and India. Incidentally, Pakistan's Inter-Services Public Relations (ISPR) Directorate issued a prompt, short and rather ambiguous press release after the first flight test of Nasr. In obvious contrast, India flight-tested Prahaar on 21 July 2011 and a delayed, though less ambiguous, official statement appeared on the Defence Research and Development Organisation (DRDO) website in August 2011. Other details on the test were, however, instantly available in the Indian media. This degree of ambiguity about the results of missile flight-tests is understandable as the states do it to maintain technological advantage and to hide operational details that might reveal the trajectory of progress.

Experts were quick to amplify the officially released information on the Nasr flight-test to make technical and other assessments. While Nasr remains in the spotlight, there was muted response or analysis on the implications of the Prahaar test. The Western assessments on Nasr carried strains of disbelief in the technological feat of miniaturising a warhead that could fit into a missile of about 300-mm diameter. Since primary sources and academic work on Nasr and Prahaar is scant, all available information has been considered for a swift content analysis of both weapon systems. Appendix I provides a comparative chart of the technical specifications of the two missiles.

The Nasr

Soon after the Nasr test, Rodney Jones, the noted US expert, made a comprehensive analysis about its implications. The ISPR Press release and Jones' assessment have been compared below. Rodney Jones wrote:

Pakistan has either developed or acquired nuclear warheads small enough to fit inside [a thin 300-mm diameter missile] and possibly of relatively low-yield [warhead]... Pakistan probably produced significant quantities of weapons-grade plutonium only after the May 1998 tests and has not test-detonated any weapons systems since then. Hence, the Army would be averse to using untested weapons...Making a plutonium-based implosion device for a 300 mm diameter missile would be a real feat.⁽⁸⁾

The above assessment is circumspect about Pakistan's capability to miniaturise the warheads and might imply that the weapon system could be a bluff and the army would resist its induction at the operational level. These aspects have been addressed in the following paragraphs. The ISPR's partly ambiguous press release on the Nasr test⁽⁹⁾ offers various points of analysis. It reads:

Pakistan today successfully conducted the 1st flight test of the newly developed Short Range Surface to Surface Multi Tube Ballistic Missile Hatf-IX (NASR). The missile has been developed to add deterrence value to Pakistan's Strategic Weapons Development programme at shorter ranges. NASR, with a range of 60 km, carries nuclear warheads of appropriate yield with high accuracy, shoot and scoot attributes. This quick response system addresses the need to deter evolving threats.

The test was witnessed by [DG SPD], Lieutenant General (Retired) Khalid Ahmed Kidwai, Chairman National Engineering and Science Commission (NESCOM) Mr Irfan Burney, senior officers from the strategic forces, scientists and engineers of strategic organisations.

On this occasion, the [DG SPD], Lieutenant General (Retired) Khalid Ahmed Kidwai said that the test was a very important milestone in consolidating Pakistan's strategic deterrence capability at all levels of threat spectrum. He said in the hierarchy of military operations, the NASR weapon system now provides Pakistan with short-range missile capability in addition to the medium and long-range ballistic missiles and cruise missiles in its inventory.

The successful test has also been warmly appreciated by the President and Prime Minister of Pakistan, who have congratulated the scientists and engineers on their outstanding success.⁽¹⁰⁾

If the available information on Nasr is analysed in the backdrop of Pakistan's cold and hot tests of nuclear weapons in March 1983 and in May 1998, seven important inferences can be made.

One, the extent of missile's accuracy cannot be ascertained since the circular-error-probable has not been publicised and the statement only identifies that the missile is "highly accurate." This ambiguity looks pronounced once compared to similar information about Prahaar. There is also no information about what kind of navigation system has been used in Nasr. If Nasr can carry a

nuclear warhead of “appropriate yield,”⁽¹¹⁾ accuracy becomes a secondary issue. The explosive and destructive power of nuclear weapons would compensate for accuracy. Use of the word “appropriate” in the press statement appears deliberate. The yield can also indicate the type of device tested, i.e. plutonium- or uranium-based, or a device that is a combination of the two, with added tritium. The information available immediately after Pakistan’s 28 May 1998 tests gave a combined yield of devices at 40 kilotons only.⁽¹²⁾ Likewise, the device tested on 30 May 1998 was of 12 kilotons yield, which indicates that it would have been a boosted fission device that used a mix of uranium, plutonium and tritium.

Two, emphasis that it was the “first flight test,”⁽¹³⁾ indicates the desirability of more tests to further improve accuracy and validate other design parameters. While Nasr’s flight parameters can be improved, the yield and other technical parameters of the nuclear warhead can only be effectively validated through hot testing.

Three, out of the six tests on 28 and 30 May 1998, four were reported to be of sub-kiloton yield.⁽¹⁴⁾ This shows that Pakistan had kept its options of making all genres of nuclear weapons – including the low-yield warheads – open. That said, the desirability of hot-testing of warheads and missiles should not be ruled out. While Pakistan continues to flight-test its missiles, it remains to be seen how it would develop appropriate and reliable warheads for each delivery system without further testing. It may be recalled that even after conducting 1032 tests and having developed other means to test reliability of warheads, the US is still reluctant to ratify the Comprehensive Test-Ban Treaty (CTBT), as it may need more testing.⁽¹⁵⁾

Four, notwithstanding the sceptical view that Pakistan could not achieve technological mastery of miniaturising the warheads to fit a short-range ballistic missile, there are indicators that it had cold-tested⁽¹⁶⁾ and then hot-tested such state-of-the-art warheads by 1998.⁽¹⁷⁾ Almost 14 years on, it might be safe to assume that Pakistan would have developed highly sophisticated plutonium-based warhead designs to suit [short-range ballistic missiles].

Five, the above arguments lead to the issue of employment, as to when, if at all, and which land forces would induct Nasr. As Rodney Jones alluded to the fact in the above-cited article, the militaries are usually cautious about inducting weapons without proven reliability. Hence, if they forego hot tests to validate the reliability of low-yield warheads for Nasr, the land forces would opt for a series of flight tests in all probability. Nasr would most likely become Pakistan Army’s Strategic Force Command (ASFC) asset. As indicated in the press statement, only the senior members of the “strategic forces”⁽¹⁸⁾ were present to witness the flight test. An implication of Nasr going to ASFC could be that Pakistan would exercise assertive control over short-range ballistic missiles and would preclude the likelihood of pre-delegation. Though, assertive control would be a factor of stability, it would create the attendant ‘use them or

lose them' dilemma that Pakistan will have to delicately balance by further augmenting the delivery system survivability.

Six, since Nasr is mounted atop the AR1A/A100-E Multiple-Launch Rocket System (MLRS), it was presumed to be of 300-mm (11.8-inch) diameter.⁽¹⁹⁾ The MLRS is a two-round system believed to be carried atop Chinese-origin 8x8 high-mobility truck chassis. Its shoot and scoot attributes mean that the launchers can quickly fire (shoot) and change location (scoot) to avoid counter-targeting.⁽²⁰⁾ Rodney Jones thinks:

This system is probably a four-tube⁽²¹⁾ adaptation of a Chinese-design [MLRS], possibly the A-100 type, on an eight-wheeler truck, capable of carrying four, ready-to-fire 20-foot ballistic missiles of about 300 mm (11.8-inch) diameter...The truck-launcher otherwise may be a Chinese knock-off of the Russian 300 mm Smerch [MLRS] sold to India.⁽²²⁾

Seven, stretching the idea of miniaturising further, some analysts have contemplated that Pakistan could now forge ahead to make multiple independently targetable re-entry vehicles (MIRVs) for ballistic missiles, make submarine-launched ballistic missiles (SLBMs) or re-model these to fit the torpedo bays of existing submarines and improve the cruise missiles designs.

The Prahaar

Unlike Pakistan's prompt press statement, within hours of flight-test, Indian official and measured stance appeared on the DRDO website a month after the test.⁽²³⁾ Before that, the Indian media carried excerpts of the statements made by Dr. VK Saraswat, DG, DRDO, and other unnamed scientists. By then several experts had vented all their intellectual steam against Nasr's test and were probably not inclined to critically evaluate Prahaar by reconsidering their expressed positions. A gist of the DRDO statement and other statements on Prahaar is given below:

DG Indian Artillery also witnessed the test besides others. Developed in a short span of less than two years – support from Indian industry and quality assurance agency MSQAA...will be the battlefield support system for the Indian Army: cost-effective, quick reaction, all weather, all terrain, and highly accurate battlefield support tactical system...Diameter 420 mm...length 7.3 meter...Range 150 km...apogee 35 km...time of flight 4 minutes and 10 seconds...weight 1280 kg...single-stage solid propulsion system...payload 200 kg (carries different types of warheads...terminal accuracy is <10m (high accuracy navigation, guidance, and electromechanical actuation systems, latest onboard computers)⁽²⁴⁾ ...the road mobile system carries 6 missiles at a time...can fire a salvo in all directions covering entire azimuth plane.⁽²⁵⁾

Some additional information that appeared in the media coverage immediately after the flight test is also worth noting. Prahaar "has high

[manoeuvrability] and [an] excellent impact accuracy."⁽²⁶⁾ The missile has a quick reaction time of launch "within a few minutes."⁽²⁷⁾ Dr. Saraswat, who is also scientific adviser to the Indian defence minister, said:

It is an all-weather missile that can be launched from canisters. Since it can be fired from a road mobile launcher, it can be quickly transported to different places. It can be deployed in various kinds of terrain such as snow-bound areas or jungles...after a couple of more flights; we will be ready for production.⁽²⁸⁾

The short-range missile would fill the gap "between unguided multi-barrel rocket system Pinaka with 40 km range and guided missiles like Prithvi, which can strike at 250 km to 350 km range."⁽²⁹⁾

Related news items reflected that the Prahhaar system "can tackle multiple targets and allows a mix of different kinds of missiles to be used from a single launcher."⁽³⁰⁾ "Prahhaar can hit a target 50-150 [kilometres] away," read the short report in the *Economic Times*.⁽³¹⁾ The available information on the flight test of Prahhaar leads to seven main inferences:

One, since the Director-General (DG) Indian Artillery — Lt Gen Vinod Nayanar — was specially mentioned in the statement,⁽³²⁾ it indicates that Prahhaar may be inducted into the Indian army's field artillery formations. That opens the inherently risky proposition of this weapon system's control falling into the hands of junior commanders, delegative command and control and associated risks of inadvertent or unauthorised use. While the concern over command and control risks regarding Nasr remained exaggerated, surprisingly, no analyst has referred to such an obvious risk relating to Prahhaar.⁽³³⁾

Two, the DRDO worked in complete secrecy and in collaboration with the national industry for almost two years, which shows effective civil-military-industrial synergy and cooperation. More importantly, the development time span clearly shows that India did not develop Prahhaar as a reaction to Nasr. India was already developing its short-range ballistic missile even if Pakistan's Nasr had not come to the fore. The flight test on 21 July 2011 – three months after Nasr – also suggests that development of Prahhaar was not at a very successful or advanced stage. The flight test was initially planned on 18 July but was delayed till 21st, probably due to technical reasons. The video footage of the test shows that the flight test was done on an overcast day,⁽³⁴⁾ thus precluding the option of not testing on 18 July due to weather limitation. Like Prithvi I (liquid-fuel missile), Prahhaar (solid fuel) may still have technical glitches to overcome.

Three, since the missile has a maximum range of 150 kilometres and can be deployed even in snow-bound areas or jungles; it can also be deployed against China. If deployed against its 3,380-kilometres⁽³⁵⁾ border with China, it may provoke Beijing and add to the arms race in short-range ballistic missiles too. If India decides to deploy Prahhaar against China, it would require a large number of missiles. It will, nevertheless, have sufficient fissile material to make the required number of warheads — thanks to the pressure relieved on its domestic sources by several civil nuclear energy cooperation deals as well as the

'recently discovered'⁽³⁶⁾ uranium mines in Andhra Pradesh that started production in December 2011.

Four, due to Pakistan's geographical shape, Prahaar can engage both counter-force and counter-value targets. Likewise, Prahaar's range is identical to Prithvi-I. Hence, it can be argued that Prahaar is a solid-fuel-Prithvi I.

Five, since the missile can be launched within a few minutes, it would give the Indian forces good reaction time and quick launch options. If India decides to delegate the control to junior leaders in the battlefield, it will further telescope the decision time and the senior leadership will have little time to reverse the decision.

Six, though the Prahaar weapon system allows a mix of different kinds of missiles to be used from a single launcher, only one missile was fired on 21 July. Hence, more tests would be required to check weapon systems' performance once all missiles are simultaneously fired in multiple directions. The reason that some DRDO scientists suggest attempts to reduce the missile-weight points that launcher will be more manoeuvrable once the load is reduced.

Seven, Dr. Saraswat was intentionally vague about the time Prahaar would reach the production-ready status. If the timeline of the induction of Prithvi-I missile is any guide, it may take up to seven years before Prahaar is actually handed over to the ground forces.⁽³⁷⁾ Given the complexities involved in developing multi-barrel capability, Prahaar would take even longer than Prithvi-I.

Seven, specifying minimum range as 50 kilometres is significant in the sense that a vertically fired missile can fall back at the launch site too. This becomes more important as some Indian missiles have failed at launch in the past. The 50-km minimum limit could be interpreted that the system would be deployed in a way that it is 80-100 kilometres away from the target. Besides, the 50-km limit also indicates the safety distance that would be kept between the Indian troops and the ground zero of the very low-yield explosion.

This argument can be extended to ascertain the yield of warhead and device type. The warhead for Prahaar-type SRBMs can be an enhanced radiation (neutron) bomb. This can be understood from the excerpt of an online source, which offers the following information on the yield and destruction capacity of a 0.01-kiloton bomb:

The smallest warhead at present capable of providing significant tactical effort is .01 KT (10 tons). Deriving its effect from neutron and gamma radiation it produces loss of co-ordination in 1 minute (death in 36 hours) against troops in the open up to a distance of approximately of 70 yards. It can be fired with safety at a distance of 600 yards from our own troops.

At 1 KT (1000 tons) the same effect as above can be sustained up to a radius of nearly 400 yards while the safety distance increases to 1,500 yards.⁽³⁸⁾

If the information on minimum range is juxtaposed to Prahaar, it can be inferred that India may be using neutron bombs atop Prahaar missile – which

would leave the structures intact and kill only the humans within 36 hours and keep the effects localised. It may be recalled that the US reversed its development of neutron bombs because there were protests over their employment in Europe — these would kill humans and retain the structures.⁽³⁹⁾ A high-energy neutron warhead (atop) Prahaar would theoretically allow India to use it against mechanised forces in an area the Indian forces would want to use for further ingress into Pakistani territory. A fission bomb, due to its blast effect, would render the territory impassable.

Deterrence, strategic stability and SRBMs

This part first provides the theoretical framework regarding the effect of short-range ballistic missiles on deterrence and stability in South Asia. It begins with operationalizing and testing two vague terms – TNWs⁽⁴⁰⁾ and strategic stability.⁽⁴¹⁾ Thereafter, an attempt is made to establish a correlation of deterrence and strategic stability against political, economic and military factors peculiar to South Asia. While this causal relationship is identified between these complex and intertwined factors, the impact of SRBMs — like Nasr and Prahaar — on these factors has been dovetailed into the discussion. This analysis has also been tabulated for a bird's eye view in Appendix II.

The analysis in this part suggests that the Western categorisation of nuclear weapons into tactical (non-strategic) and strategic realms is inadequate, especially in the South Asian environment. Secondly, the so-called TNWs can add to credibility of deterrence if the will-to-use is unequivocally communicated to the adversary. Short-range ballistic missiles affect the strategic stability once a causal relationship is established with the military factors. If history is any guideline and assuming that both India and Pakistan behave as rational actors, then it is likely that SRBMs would only be used as a last resort. By way of causal relationship of likely impacts of these missiles on deterrence, it has been re-established that an assured second-strike capability would enhance the credibility of deterrence amongst these two rational actors. As mentioned in the first part, it may take up to seven years to induct Prahaar and Nasr into the land forces due to production and technical imperatives. The South Asian SRBMs would thus start affecting deterrence and regional stability around 2018 and by that time the new war fighting doctrines of India and Pakistan would also mature. Until then the existing regional dynamics in political, economic and military domains could continue to define the security landscape.

Definitional issues

Given that there is no standard definition of TNWs,⁽⁴²⁾ this paper offers an argument that what constitutes tactical or non-strategic in Western terms does not hold for South Asia, for several reasons. From the Western perspective, the so-called TNWs could be defined as short-range (from as less as 2-4 kilometres⁽⁴³⁾ to a maximum up to 500 kms),⁽⁴⁴⁾ low-yield weapons (0.4 - 40 kilotons to a maximum of 150 kilotons)⁽⁴⁵⁾ meant for counter-force targeting in

the battlefield. These can be both surface- — ballistic and cruise — and air-launched weapons.

Available literature on the so-called TNWs shows that the differentiation of tactical and strategic nuclear weapons is blurred and primarily rooted in American endeavour aiming to target Soviet/Russian mainland and its extended deterrence commitment to the European NATO allies.⁽⁴⁶⁾ Range, and not the yield, would thus be the primary factor in deciding what constitutes a tactical or strategic nuclear weapon in the Cold War parlance. This implies that any weapon that could reach and hit American mainland would have ‘strategic’ effects and would be classified as a strategic weapon. If a weapon remained within the European battleground it could both be tactical or strategic.

“The distinction between what is tactical and what is strategic [is becoming] increasingly vague,” infers a 2010 study by The National Defence University (NDU), Washington, DC.⁽⁴⁷⁾ This could be illustrated by Israel’s example where one-third of the population is under the threat of tactical ballistic missiles from regional adversaries. Hence, “those tactical missiles are a strategic threat.”⁽⁴⁸⁾

Translating these definitional nuances of TNWs to South Asia, the following inferences can be drawn. Unlike the East-West proxy battlegrounds in Europe, which were geographically detached from the American and Soviet/Russian mainland, Pakistan and India have contiguous borders. Several cities and towns along the border and the Line of Control (LOC) in Kashmir would be within Prahhaar as well as Nasr’s range. Since India cites China as one of its security concerns, it could deploy Prahhaar against it. Contiguous South Asian territory implies that the Indians could easily hit Lahore by Prahhaar. Hence, the range and yield distinction used for SRBMs in a classic sense, would be irrelevant if Prahhaar was used against Pakistan close to the border or LoC.

Hence, if the South Asians are forced to believe that their under-development SRBMs are theatre nuclear weapons in strictly Western sense, only a Kafkaesque definition comes up: Short-range ballistic missiles in 50-150 km range, with a maximum yield of 5 KT that would primarily target armed forces and affect only small border towns in desert terrain.

It is obvious such fine distinction cannot be maintained for the SRBMs. Theoretically, all nuclear weapons in South Asian territory would be strategic because they would have strategic effect in terms of damage, number of casualties, radiation fallout as well as the administrative and logistical challenges long after the weapons have been used.⁽⁴⁹⁾ This does not factor-in in the dramatic consequences of larger yield weapons, if war escalates to an all-out nuclear exchange. That might be the reason why Pakistan and India did not use the term TNW in their statements for their short-range ballistic missiles. The TNW moniker appeared in the Western analyses and was conveniently bought by experts in South Asia.

Theoretical paradigms

Deterrence theory provides the overarching framework to test the impact of SRBMs on the bilateral deterrence relationship and regional stability

between Pakistan and India. However, two aspects related to the deterrence theory are more applicable to South Asia. These are “credible, minimum deterrence”⁽⁵⁰⁾ policy and the “stability-instability paradox.” The stability-instability paradox means that the probability of a direct war between two nuclear-armed states greatly decreases due to these weapons, but the probability of minor or indirect conflicts between them increases.⁽⁵¹⁾

Both India and Pakistan essentially profess a policy of minimum deterrence. The adjective ‘credible’ is used either before or after “minimum” without a comma, hence creating an impression that there is either a doubt in the ‘credibility’ or in the ‘minimum’ nature of deterrence. “Credibility”, Freedman once observed, “is the ‘magic ingredient’ of deterrence.”⁽⁵²⁾ The emphasis on ‘credibility’ is unique to South Asian nuclear powers. The nuance was probably invented to communicate to each other and to the older nuclear powers the ‘credibility’ of their will to use weapons. As and when the South Asians enhance their nuclear weapons capability to deliver an assured second strike, the word ‘credible’ might eventually fade away.

Assessing deterrence and strategic stability

In a classic sense, deterrence is ‘absence of war’ and a stable condition. Over 65 years of the nuclear age shows that it would be impossible to validate that nuclear weapons prevent war.⁽⁵³⁾ From South Asian perspective, the Kargil War of 1999 is a unique example in which two nuclear-armed states fought a limited war yet were deterred from using nuclear weapons. Hence ‘absence of nuclear war’ would realistically define the environment to judge stability in South Asia.⁽⁵⁴⁾ However, accepting the fact that nuclear weapons only prevent a nuclear war creates the stability-instability paradox. Hence it would be difficult to quantify what constitutes deterrence and strategic stability between Pakistan and India and what role would their so-called TNWs play.

In this paper, deterrence would constitute absence of nuclear war and it is assumed that deterrence would hold if both Pakistan and India develop an assured second-strike capability. It is difficult to quantify strategic stability because the literature on this variable is vague and concerns East-West competition from the Cold War period to this day.⁽⁵⁵⁾

For South Asia, strategic stability would be a situation between South Asian nuclear powers, in which Pakistan has the confidence that India is serious in resolving the territorial disputes and that Indian strategic partnerships with the developed world are not at the cost of Pakistan’s security. Likewise, India’s confidence in Pakistan’s willingness to resolve bilateral disputes without alleged indirect strategy. The paper attempts to test both variables in the subsequent sections.

Factors affecting deterrence and stability

Dr Zafar Iqbal Cheema, in his seminal work, has addressed the nature of South Asian deterrence at length. He argues that Pakistani officials and analysts claim that an elementary form of nuclear deterrence between India and

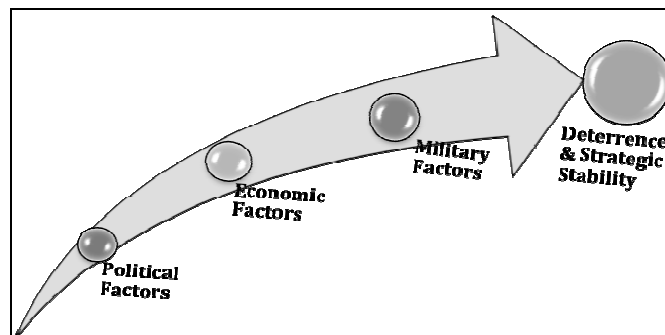
Pakistan has been operative since 1988.⁽⁵⁶⁾ He identifies six factors that contribute to instability in deterrent relationship between India and Pakistan. These are: existence of outstanding disputes, existence of low-intensity conflict, occasional outbreak of crises and conflict situations, geographic proximity and [low] early warning time and divergent perceptions about nuclear and security doctrines.⁽⁵⁷⁾ The following section amplifies these findings, links these with the perceptions of other experts and seeks to establish correlation with the TNWs.

Correlation of SRBMs, deterrence and regional stability

The development-time of Nasr and Prahaar would be the first factor that would affect deterrence and stability in South Asia. As analysed earlier, Prithvi-I's development and induction took almost seven years. Both India and Pakistan have not tested their weapon systems in salvo-firing role. Additionally, India has indicated that it intends reducing the weight of Prahaar. Depending on how many units ultimately get these SRBMs missiles, the numbers of weapons needed would be certainly more than the medium-range missiles in the current inventories.

During this period three other factors would continue to influence the future of deterrence and stability in South Asia. These can be broadly classified into political, economic and military factors and can be tested against the 'Three Cs' — capability, credibility, and communication — of deterrence. It is worth noting that these factors have no absolute value and impinge on and interact with each other in complex ways. (See the figure below).

Figure I:
Factors Affecting Deterrence and Strategic Stability



Impact of political factors

A segment of British strategic thinkers considers the need to change status quo and resolution of political grievances underlying conflict as significant for stability. India-Pakistan animus over territorial issues falls in that category of regional instability. Hanwee et al argue that during a crisis the leadership would face the dilemma of maintaining a balance between assertive

and delegative control over nuclear weapons. An assertive control could be fatal and a delegative control irreversible, thus destabilising.⁽⁵⁸⁾ To achieve political stability, they suggest steps beyond “freezing the status quo”⁽⁵⁹⁾ with the following argument:

An enduring political stability... must allow for the resolution of grievances and conflicts by changes to forms of political organisation and ultimately to the boundaries and legitimacy of current nation-states. But while states hold each other under threat with nuclear weapons, it is hard to see how such change could take place. This system of stability, in other words, may be self-defeating.

The political stability between Pakistan and India rests on three territorial disputes (future of Jammu and Kashmir, Siachen, and Sir Creek). These apparently ‘territorial’ issues are really about water. J&K and glaciers including Siachen are a source of water for the entire subcontinent and Sir Creek’s small territorial boundary has implications on marking of exclusive economic zone. From Pakistani perspective, Indian ingress in Afghanistan and alleged involvement in fanning instability in Balochistan and elsewhere would be of particular concern. Likewise, for India the prospect of a Mumbai-II and alleged militant activities in Indian-held Kashmir (IHK) would compel it to operationalize its Proactive Defence Strategy. The prospect of limited war would, in turn, induce Pakistan to ostensibly rely on short-range ballistic missiles. India would also feel justified to continue to develop Prahara to balance Pakistan’s capability. Interestingly, India eschewed (the so-called) TNWs earlier.⁽⁶⁰⁾

Weighed against the Three Cs of deterrence and the rational behaviour of both states during the post-Kargil crisis, the credibility of nuclear deterrence would hold. The communication of willingness to use nuclear weapons would continue as well. While hiatus over these long-standing disputes may exist, the likely wild card would be a terrorist activity in Pakistan or India that the affected side would view the other to have given covert state-patronage. In that case the crisis behaviour of both states and ensuing instability would be difficult to predict.

Hence, from the political perspective, development of SRBMs would have little impact on deterrence and regional stability, at least until 2018. Once Prahara and Nasr have been commissioned in the land forces, the risk of a nuclear exchange during a crisis would only enhance if either side considers the other’s willingness to use these weapons a bluff. It can be argued that the domestic political stability indirectly contributes to regional and strategic stability.

Impact of economic factors

The international media’s spotlight on Pakistan has three hues: domestic instability due to militancy, proliferation record and the dismal economic situation. In marked contrast, India’s internal instability and its proliferation record — that is the mother of nuclear proliferation in South Asia

— is overlooked by the West because India has a buoyant economy and it is a haven for investors. The Western experts consider “India has an interest in regional as well as domestic stability and space to maximise its economic growth,”⁽⁶¹⁾ implying that Pakistan has marginal interest in regional stability.

The Aman ki Aasha (Hope for Peace) joint initiative by Pakistan’s *Jang Group* and *Times of India* holds that economy has a *Yin-Yang* relationship with strategic stability in South Asia.⁽⁶²⁾ In their view, if Pakistan and India develop their trade and economic relations, mutual interests could become serious incentives for peace and friendship and a point may arrive that they have a serious disincentive in starting or escalating crises. The Cold War history shows some merit in economic factor as a disincentive to escalate crises to the point of nuclear war.⁽⁶³⁾ However, owing to South Asia’s peculiarities this desire here may remain a pipedream for several reasons.

Pakistan’s economy is not likely to jumpstart for domestic and external reasons. Rife corruption, poor tax regime, circular debts, inconsistent economic policies coupled with lack of political will, investor-hostile security environment and the dire energy crunch are some of the major reasons for Pakistan’s poor economy. There is growing discontent with the dismal economic situation. In a departure from issuing only security-related statements, Pakistan’s apex National Command Authority (NCA) expressed its concerns about economy and the strategy to resolve these problems in the following words:

As part of energy security strategy, the NCA also reviewed and approved the futuristic, self-sustaining Nuclear Power Program – 2050, to meet the existing energy shortfalls and to respond to the future requirements of a growing population and economy. The NCA emphasized the need to focus on socio-economic development of the people as a foremost priority.⁽⁶⁴⁾

Though the onus of improving its economy lies on Pakistan, there are two areas where the international community has to make its contribution. First, Pakistan needs a level playing field in international trade. For instance, Pakistan’s textile industry does not get the same incentives in the American market as the Indian or Bangladeshi industry does.⁽⁶⁵⁾ Second, a more serious matter is the energy sector. For instance, the US offers assistance in improving existing energy infrastructure but refuses offering civil nuclear technology to Pakistan — in open contrast to the cooperation it has with India in this field. There may be three possible reasons behind the denial. One, Pakistan is not a signatory of the Nuclear Nonproliferation Treaty (NPT), but so is India. Two, Pakistan cannot afford to invest in the nuclear energy sector and economy’s uplift is nurtured over a long time. Three, Pakistan’s proliferation record is not considered ‘as clean as India’s,’ despite the fact that New Delhi diverted material from its safeguarded facility (CIRUS Reactor) to test its first nuclear device in 1974 and the Nuclear Suppliers Group (NSG) was created the following year as a reaction. Pakistan’s steps to punish the chief perpetrator in the A.Q. Khan private network and its export control measures after 2004, such as the Export Control Act 2004, are generally disregarded for political reasons.

Both lines of above reasoning have flaws. Pakistan took credible measures after 2004 and its cooperation in implementing UN Security Council Resolution 1540 (2004) is commendable as Pakistan plugged all holes that could be manipulated by non-State actors for proliferation.⁽⁶⁶⁾ Also, the safeguards required by the International Atomic Energy Agency (IAEA) would cover civil nuclear energy cooperation and the mechanism is effective enough to prevent proliferation.

Incentives similar to those offered to India could be offered to Pakistan — Islamabad has been a major non-NATO ally and the key country that supports international efforts in the fight against terrorism. Actually, what prompts discrimination is Western geo-politico-economic imperatives that see India as a larger market and a possible bulwark to contain rising China. Pakistan, therefore, does not fit in the immediate or mid-term Western interests in the region.

The above trend of selectivity against Pakistan encumbers its meagre efforts to give a fillip to its economy. That in turn increases discontent in Pakistani society, thus contributing to the propensity for violence and resultant instability that affects the region. Like several other states, Pakistan gives its security concerns a higher priority thereby affecting the investment in public sector development, which consequently gets lower priority than the defence expenditure. Even with greater expenditure in the defence sector, Pakistan finds it difficult to address the growing conventional weapons asymmetry with India.

If India and Pakistan's decision to develop short-range ballistic missiles is judged purely against 'expense factor,' both would face difficulty in footing the bill for the number of weapons that would be required for deployment on the multiple fronts that India or Pakistan could open up against each other, in a future conflict in line with their new war-fighting doctrines. Economy factor would impinge upon India more if it decides to cover its Chinese front with Prahaar or other SRBMs. According to Dyer:

TNWs [would] not play a sufficiently significant role in the deterrence of Soviet aggression against Europe to justify their expense. With each individual atomic artillery shell costing perhaps \$ 400,000 this weapon system is not cheap.⁽⁶⁷⁾

Dyer posited that the [TNWs] only "complicated [Soviet] plans for overrunning Europe."⁽⁶⁸⁾ The security and control of these weapons [consumed] the equivalent of over one full division of American troops who could be used more profitably in another role."⁽⁶⁹⁾

From the above discussion, it can be inferred that even India would be reluctant once it decides to make 'enough' SRBMs to deter both Pakistan and China. The lesson for Pakistan is somewhat different. While Pakistan needs bolstering its security through credible, minimum deterrence, it must offer "credible economic assurance"⁽⁷⁰⁾ to the investors in the developed countries.

The West may reconsider its policy of de-hyphenating Pakistan and India and use an evenhanded approach with Islamabad, especially in the energy sector. Until progress is made in these areas, the South Asian region would continue to be strategically unstable and nuclear deterrence between the two

states would continue to be fragile. Considering the state of its economy, there is also the risk that an arms race may exhaust Pakistan.

Impact of military factors

To establish a causal relationship between the SRBMs, regional stability and the credibility of deterrence, an overview of security paradigms and drivers that dictate nuclear doctrines and the force postures in South Asia, has been taken. Their cumulative relationship with these missiles has been established to assess the effect on strategic stability and the credibility of deterrence.

Pakistan considers India as the sole external threat to its security and its security policies and the nuclear doctrine appear to be driven by this paradigm. This India-centric security approach may be myopic and can be termed “Indyopia.”⁽⁷¹⁾ Post-1998 security environment of Pakistan shows that the list of its external security challenges seems to be expanding and requires taking into consideration other entities or states. While national security policy, defence and nuclear doctrines, and consequent strategies account for India, potential adversaries must also be factored in.

Pakistan maintains ambiguity about its nuclear weapons employment policy and its nuclear doctrine. However, both can be discerned from several policy statements and positions taken over the years in arms control and disarmament affairs at domestic and international forums. The decision to develop short-range nuclear-capable ballistic missiles is considered a major development relating to Pakistan’s credible deterrence policy. Previously, both Pakistan and India eschewed the so-called TNWs,⁽⁷²⁾ but the situation has now changed. While the possible Pakistani in developing the 60-km-range Nasr are documented subsequently, it is unfathomable why India has been developing Prahaar since 2009⁽⁷³⁾ once it is considered to have “an interest in regional stability.”⁽⁷⁴⁾

Besides countering India’s proactive defence strategy that seeks to punish Pakistan by fighting a limited war, remaining below Islamabad’s nuclear threshold, another contributory factor behind development of Nasr would be to address the growing conventional weapons asymmetry⁽⁷⁵⁾ between the two countries. Pakistan army’s Azm-e-Nau III — roughly means: renewed will — and the PAF’s High Mark exercises were concluded successfully in April 2010.⁽⁷⁶⁾ These exercises were tests of Pakistan Army’s new war-fighting concept⁽⁷⁷⁾ and PAF’s new air strategy that were developed in response to India’s proactive defence strategy.⁽⁷⁸⁾

It is fair to question why would Pakistan develop Nasr once it claims to have developed a credible conventional strategy to deter India? Also, why Pakistan would readily accept that it is a conventionally weak state compared to India? Is Pakistan not confident about its nuclear deterrence? Development of SRBMs can be considered adding ‘another layer of deterrence’⁽⁷⁹⁾ providing redundancy to the new war-fighting concept. Like India’s proactive defence strategy, Pakistan’s new war-fighting concept would also take some time to come into effect. Like India, Pakistan’s policy of minimum deterrence “is not a

fixity.”⁽⁸⁰⁾ Considering that India was already developing Prahaar, Pakistan would have followed suit through a Nasr-like project in any case.

Some experts interpret Nasr’s development as Pakistan’s willingness to initiate or fight a nuclear war. Their rationale is that the nuclear weapons are supposed to deter nuclear war and SRBMs ostensibly increase that risk. Command and control⁽⁸¹⁾ issues and risk of an inadvertent nuclear war are considered inherent to these missiles. Similar concerns exist to this day about the so-called TNWs of the US and Russia in their European initiative. This fear factor is best expressed in an excerpt from a 1998 paper:

[TNWs] might have to be deployed rapidly out of their storage ‘igloos,’ [short-circuiting] the normal PAL codes and procedures. Decisions to use such weapons might devolve to low-level military officers, highly decentralised and subjected to immediate threats of being overrun by hostile forces. Even if someone on ‘our’ side did not initiate the use of nuclear weapons and subsequent ‘progress up the escalation ladder, the threat of such decentralised and largely inadvertent escalation might well produce a supposedly [pre-emptive] strike by the Soviet side.’⁽⁸²⁾

Dyer dispels the fears about the command and control of short-range ballistic missiles in these words:

...that the [‘fail safe’] system for TNWs, sometimes referred to as Permissive Action Link (PAL), is at least as effective as it is for strategic weapons. Thus, at the present time, it is unlikely that a field commander on his own initiative could overrule the president’s decision. One further assumption underlying this discussion is that there will be a certain degree of rationality exercised by decision makers even after hostilities start.⁽⁸³⁾

While developing new weapon systems, states make a rational choice based on cost-benefit analyses and risk calculation. Presence of the so-called TNWs in Europe to this day and Russia’s unwillingness to dispense with them vindicates this assertion. Hence, if Nasr forecloses India’s dangerous option to fight a limited war under nuclear overhang, it contributes to the regional stability and makes Pakistan’s deterrence more credible.⁽⁸⁴⁾

The problem of deterrence would, however, arise if India considers Pakistan’s will to use Nasr incredible. In an interesting development, India has started distancing itself from this perilous proactive strategy.⁽⁸⁵⁾ While this may be an expression of Indian intent, Pakistan must nevertheless base its force posture and anchor its nuclear doctrine on India’s capabilities. Another reason for India re-styling its Cold Start Doctrine as Proactive Defence Strategy could have been that the former is inherently aggressive in nature, tending to tag India as an aggressor state. The latter term is a more benign formulation that can be related to the reference to India’s ‘inalienable right of self-defence.’

As discussed in the first part, the warhead and missile technology used in Nasr could be mutated for nuclear submarine platforms. It would, however,

be a challenge to make a naval version since the missile would have to be fitted into conventional submarines, and then there is the bigger technological challenge to navigational mechanism before the missile surfaces. Once developed, it would give Pakistan a second-strike capability and hence improve deterrence against India and contribute to regional stability. An assured second-strike capability would develop if and when Pakistan has a nuclear-powered and armed submarine and has the finances to do that. Zalmay Khalilzad, the former US ambassador to Afghanistan, said in 1976, “Given the poverty of Pakistan, it will be very difficult for it to acquire a second strike capability in the foreseeable future.”⁽⁸⁶⁾ Khalilzad appears to be supporting the point that possession of second-strike capability would be stabilizing.

Similarly William Walker, a noted analyst — also points to the stabilizing nature of second-strike capability when he says, “Pakistan and India face each other across contested borders and zones, and neither has established a second-strike capability, thereby making Islamabad and New Delhi more fearful of pre-emptive attacks.”⁽⁸⁷⁾

Such arguments indicate that Pakistan and India did not develop the SRBMs in reaction to other’s similar capability; only the flight-testing of Prahaar was a reaction to the Nasr test. The development of short-range weapons systems capability hence, was a well-considered rational choice and both states seem to follow the same course that NATO and the erstwhile Warsaw Pact did in the 1960s.⁽⁸⁸⁾ If strategic stability sustained with the so-called TNWs in East-West relationship, the rational actors in South Asia would also remain similarly deterred. The history of crises between Pakistan and India is a proof that de-escalation occurs below the nuclear threshold. However, as the stability-instability paradox shows, that should not be the source of overoptimism.

It is also important to evaluate the effect of Prahaar on deterrence and strategic stability. Presence of Prahaar in the same theatre as Nasr should ideally deter both states from crossing the Rubicon. If rationality is at play during a conflict, both states would go for a “tit for tat”⁽⁸⁹⁾ response involving SRBMs only and the fear of horrific fallout would deter them from massive retaliation. Cold War literature indicates that the adversaries would be deterred from using the SRBMs.⁽⁹⁰⁾ However, the heat of fighting can quickly erode rationality and war could spiral out of control. This “confusion argument” about short-range ballistic missiles is best understood from the following narration:

The deterrent value of TNWs is the “confusion argument” which suggests that even [if] all the objections raised against TNWs are true, the weapons would still have sufficient deterrent impact precisely because of the ambiguity surrounding them. Neither the first user of the TNW nor the retaliator would be able to control the course of events.⁽⁹¹⁾

The corollary of the “confusion argument” is that both the Soviets — now Russians — and the NATO did not fight a war even after the SRBMs were introduced; the deterrence held despite the change in doctrines, weapons system

advancements and relative conventional forces balance that shifted in NATO's favour.

Since India projects China as its adversary, therefore deploying Prahaar against China, at some point, cannot be ruled out. This can lead to an arms race and the instability would not remain limited to the region.⁽⁹²⁾ Another related factor that would destabilise the region and may force Pakistan to rely heavily on SRBMs is India's pursuit of a ballistic missile defence (BMD) shield in collaboration with the US and Israel. Even a basic BMD capability may encourage a first-strike and pre-emptory tendency in Indian thinking. This suggests that Indian pursuit of BMD would affect the minimum deterrence levels and would nudge India towards a pre-emptory policy. A recent analysis provides the following opinion:

In the final outcome, the minimum deterrence levels currently exhibited could quickly disappear as the two sides enter a tit-for-tat upgrading system...[India] could adopt a more aggressive posture...and even [contemplate] pre-emption against Pakistani nuclear assets.⁽⁹³⁾

William C. Potter also considers a state's no-first-use doctrine incredible and mere lip-service until it possesses short-range ballistic missiles. According to him:

It is very hard to see how, under no-first-use doctrine, short-range nuclear weapons in [arsenal would] serve a useful and legitimate purpose...If a no-first-use agreement is to be more than mere lip-service to a popular objective, it should be reflected in nuclear postures. A NWS subscribing to a no-first-use will have a hard time, justifying the continued possession of TNWs.⁽⁹⁴⁾

Russia's reliance on the so-called TNWs despite conventional force advantage offers a lesson. The American-led BMD shield in Europe has forced Russia to rely more on SRBMs and it is unwilling to negotiate reductions in this genre of weapons until the US addresses Russian concerns over BMD. Russia has hinted that short-range missiles could be used to neutralize deployed US antimissile systems in Europe and threatened to deploy Iskander missiles to the Kaliningrad.⁽⁹⁵⁾ Some argue that the so-called TNWs, owing to short time of flight, would render the BMD less effective.⁽⁹⁶⁾ However, there are competing claims that ABM systems — like the American PAC-3 — are also effective against tactical ballistic missiles.⁽⁹⁷⁾ If the former contention were true, Nasr would offer similar advantage to Pakistan through its short-range and possibility of saturating the BMD shield by firing multiple missiles at a target.

The above discussion shows that short-range ballistic missiles would have a direct impact on strategic stability and nuclear deterrence.⁽⁹⁸⁾ No one can be certain if short-range ballistic missiles would ever be used. In this sense, Pakistan-India situation mirrors that of the Cold War competition between 1960s and 70s. Dyer's following comments may be equally appreciable to South Asia, "It is very difficult to see under what combat conditions, especially in Europe, these weapons would ever be employed."⁽⁹⁹⁾

Nasr was produced to deter India from pursuing its Cold Start Doctrine, which has recently been re-styled as Proactive Defence Strategy. India evolved this strategy to punish Pakistan for attacks like the one on Indian Parliament in New Delhi in December 2001 and Mumbai in November 2008. Pakistan maintains that these attacks were not State-sponsored and was forthcoming in cooperation to investigate the despicable attacks and bring the perpetrators to justice. Nasr's development is also linked to the growing conventional force asymmetry between Pakistan and India. Prahaar was not developed in reaction to Nasr but its flight test was a reaction. Since Prahaar can be deployed or used against China, it would reduce the strategic stability of the region. The military imperatives of Pakistan raise the question about the limits of dynamism in its policy of credible, minimum deterrence. Can Pakistan sustain an arms race in the longer run? If the answer is no, then Pakistan would have to set a limit on the size of its nuclear arsenal. The Cold War model shows that an assured second-strike capability offers credible deterrence. Hence, economy permitting, Pakistan needs developing a triad of nuclear forces with a credible submarine-based nuclear missile capability. Nasr's warhead design may be the first technological step in that direction.

Conclusion

Deterrence, like beauty, lies in the eye of the beholder.⁽¹⁰⁰⁾ Notwithstanding their earlier claims of eschewing the so-called TNWs, both Pakistan and India have started developing these for different reasons. Once substantially operationalized and inducted into the forces in the next few years, Pakistan is likely to exercise assertive control over their deployment and the ensuing decision to use them. In contrast, India may delegate control of these weapons to junior field commanders if it inducts these into the artillery corps rather than the strategic forces. Deterrence between India and Pakistan would constitute absence of a nuclear war and may become incredible if either of the adversaries believes there is a lack of political will to use these weapons.

The Cold War model and the existing East-West competition shows that an assured second-strike capability is the true guarantor of the credibility of deterrence. India is moving fast in that direction due to its robust economy and due to Western arms industry's eagerness to sell and transfer technology. Such circumstances require that Pakistan endeavour to achieve a balance by internal economic reforms and by convincing the West that it is equally eligible for a similar preferential treatment by resetting its relations with the US on terms that offer a win-win situation to both.

South Asia can have a semblance of strategic stability if the "neo-apartheid"⁽¹⁰¹⁾ against Pakistan in the nuclear realm is lifted and it is provided an opportunity to benefit from civil applications of nuclear technology and improve its economy.

The Cold War terminologies – like definitions of strategic stability and TNWs – are irrelevant to South Asia. Even the West does not have a standard formulation for these terms. Hence there is a unique 'South-Asianess' to the nature of deterrence and stability between Pakistan and India.

Notes and References

1. The then Indian external affairs minister, Jaswant Singh, in an interview in 1999, said, "Regarding [TNWs], let me remind you that we do not see nuclear weapons as weapons of war fighting." See, "India Not to Engage in N-Arms Race: Jaswant," *The Hindu*, New Delhi, 29 November 1999. Text of Singh's interview available on Indian Embassy web page at <http://www.indianembassy.org/inews/indianews_dec_99.pdf>, accessed 29 December 2011. This policy was echoed on 11 January during the 2002 crisis. Then Indian army chief, General Sunderajan Padamanabhan, said, "Nuclear weapons are not meant for war fighting. It's very foolish for us to even think of nuclear weapons in war fighting." See "India is 'ready for war'," *The Guardian*, London, 11 January 2002, <<http://www.guardian.co.uk/world/2002/jan/11/kashmir.india1>>, accessed 1 November 2011. Former president General (retd) Musharraf made a similar statement in an interview to CNN in June. He said, "Any sane individual cannot even think of going into this unconventional war, whatever the pressures." See, "Musharraf tries to quell nuclear war fears," *CNN World*, 1 June 2002, <http://articles.cnn.com/2002-06-01/world/pakistan.india_1_indian-controlled-indian-administered-pakistan-and-india?_s=PM:asiapcf>, accessed 1 November 2011. Other statesmen expressed similar views and Indian Army Chief General V. K. Singh said on the sidelines of Army Day parade and a day before Nuclear Security Summit in January 2012: "Nuclear weapons are not for war fighting... They've got a strategic significance and that's where it should end." See, "Nuclear weapons not for war: Army Chief Gen. V. K. Singh," *The Economic Times*, New Delhi, 15 January 2012, <<http://economictimes.indiatimes.com/news/politics/nation/nuclear-weapons-not-for-war-army-chief-gen-v-k-singh/articleshow/11497755.cms>>, accessed 15 January 2012.
2. In this paper, the missile system has been referred to as Nasr (Arabic for 'victory') only. Hatf is the Arabic word for 'vengeance.'
3. See for example, Rodney Jones, "Pakistan's Answer to Cold Start?" *The Friday Times*, Lahore, 13-19 May 2011, <<http://www.thefridaytimes.com/13052011/page7.shtml>>, accessed 30 May 2011.
4. Prahaar is the Sanskrit word for 'strike.'
5. Western argument holds that "nuclear capabilities are no guarantee of sensible national security policy." See Michael Krepon and Chris Gagné, "The stability-instability paradox: Nuclear Weapons and Brinkmanship in South Asia," Report No. 38 (June 2001), Henry L. Stimson Center, vii, <<http://www.stimson.org/images/uploads/research-pdfs/NRRMTtitleEtc.pdf>>, accessed on 9 October 2011.

6. Ashley Tellis, "India's Emerging Nuclear Posture," (Santa Monica, Calif.: RAND, 2001), 133.
7. A view often expressed by Naeem Salik, former Director of ACDA, Strategic Plan Division, Pakistan, and author of *The Genesis of South Asian Nuclear Deterrence: Pakistan's Perspective*. Karachi: Oxford University Press, 2009. Also see, Zahir Kazmi, "Nasr: A bane or a boon?" *The Frontier Post*, Peshawar, 30 April 2011, <<http://www.thefrontierpost.com/?p=8176>>, accessed 30 April 2011.
8. Jones, ref.3.
9. See ISPR Press release No. PR94/2011-ISPR of 19 April 2011, <http://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1721&search=1>,_accessed 7 October 2011.
10. ISPR Press release of 21 April 2011.
11. ISPR Press Release.
12. "Thursday's N-tests measured 5.0 on Richter scale," *The News, Special Edition*, Islamabad/Rawalpindi, 31 May 1998.
13. ISPR's Press Release, ref.9.
14. "Thursday's N-tests measured 5.0 on Richter scale," ref.12.
15. The US conducted 1,032 nuclear tests between 1945 and 1992. See, "The United States' Nuclear Testing Programme," *CTBTO, Nuclear Testing*, <<http://www.ctbto.org/nuclear-testing/the-effects-of-nuclear-testing/the-united-states-nuclear-testing-programme/page-1-the-united-states-nuclear-testing-programme/>>, accessed 13 December 2011.
16. Pakistan conducted the cold tests on 3 March 1983. The design tested was large and unwieldy. Pakistan developed 5-6 more designs between 1983 and 1998 and successfully tested these. The most advanced design was hot-tested on 30 May 1998 at Ras Koh, 150 km from Chaghai. In a TV interview Dr. Samar Mubarakmand said, "...this bomb is very small in size and is very efficient and powerful in yield and... is fitted on to many of our delivery systems such as missiles and aircraft." (This is transcript of the interview in Urdu). "Geo TV Capital Talk Special: Interview with Dr. Samar Mubarakmand, Chairman, NESCOM, on 5 March 2004, <http://www.youtube.com/watch?v=gr3ocLUR_9M>, accessed 12 December 2011.
17. Dr. Samar Mubarakmand in a speech following the May 1998 tests claimed that Pakistan had indigenously mastered numerous designs and could produce state-of-the-art weapons. He said, "...if you give them the specifications: 'we want this much yield, this much size' and they would be out with an actual bomb in two months..." [The quoted text slightly altered because the transcript had some errors]. See, transcript of Dr. Samar Mubarakmand's speech on 30 November 1998 at Khwarzimid Science Society, Punjab University, Lahore. "A science Odyssey: Pakistan's Nuclear Emergence," *Pakistan Military Consortium*, <http://www.pakdef.info/pakmilitary/army/nuclear/science_odyssey.html>, accessed 1 December 2011.
18. ISPR Press Release, ref. 9-10.

19. Usman Ansari, "Pakistan Tests 'Nuke-Capable' Short-Range Missile." *Defense News*, 20 April 2011, <<http://www.defensenews.com/story.php?i=6282326&c=MID&s=TOP>>, accessed Sunday, 9 October 2011.
20. Jones, ref.3.
21. The missile flight test photographs and videos show that it is a two-tube adaptation and not "four", as contended by Jones, (ref.3).
22. Jones, ref.3.
23. "Prahaar hits the target," *DRDO Newsletter*, Vol. 31, No. 8, August 2011, <http://drdo.gov.in/drdo/pub/nl/2011/NL_Aug_web_25_8.pdf>, accessed 21 September 2011.
24. The missile has a sophisticated inertial navigation, guidance and electro-mechanical actuation systems. See T.S. Subramanian and Y. Mallikarjun, "Prahaar missile successfully test-fired," *The Hindu*, 21 July 2011, <<http://www.thehindu.com/news/national/article2279166.ece>>, accessed 21 July 2011.
25. Ibid. Some DRDO scientists said that there could be attempts to reduce the weight of the missile. For details see <<http://www.indiastrategic.in/topstories1092.htm>>, accessed 12 November 2011.
26. Ibid.
27. Ibid.
28. Ibid.
29. *The Times of India*, New Delhi.
30. "India test fires short range 'Prahaar' missile," *The News*, 21 July 2011, <<http://www.thenews.com.pk/NewsDetail.aspx?ID=19090&title=India-test-fires-short-range-Prahaar-missile>>, accessed 22 July 2011.
31. "India successfully tests new short-range missile 'Prahaar'," *The Economic Times*, New Delhi, 21 July 2011, <http://articles.economictimes.indiatimes.com/2011-07-21/news/29798426_1_single-stage-missile-range-missile-defence-base>, accessed 12 December 2011.
32. DRDO statement, ref.23.
33. India established its Strategic Force Command after the announcement of its Nuclear Command Authority in 2003. Prior to that all ballistic missile brigades and Prithvi were under Corps of Artillery's command. There is no clarity on command and control. Indians maintain Prithvi-I is not of nuclear missions but has a variety of conventional warheads. See "India – Missile," *NTI* (November 2011), <<http://www.nti.org/country-profiles/india/delivery-systems/>>, accessed 12 December.
34. The 'Live Fist' blog post carries an email conversation between two persons, one of whom had knowledge about the test schedule. The following correspondence took place, see <<http://livefist.blogspot.com/2011/07/prahaar-test-postponed.html>>, accessed on 23 October 2011): "The test of India's new tactical missile Prahaar, scheduled for today, has been postponed to later this week for unspecified reasons.

- Detail later. [17:22hrs]: The Prahaar test-firing is scheduled for tomorrow morning, weather permitting. [7:22 am/July 18] Nope, not happening. Sometime this week, likely Thursday (July 21). Sent on my BlackBerry® from Vodafone.”
35. “Geography — China,” *The CIA World Factbook*, <<https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html>>, accessed 1 December 2011.
 36. Abantika Ghosh, “Nuclear-boost: Uranium mine in Andhra could be among largest in world,” *The Times of India*, 19 July 2011, <http://articles.timesofindia.indiatimes.com/2011-07-19/india/29790250_1_uranium-mines-uranium-reserves-largest-uranium>, accessed 20 July 2011. According to the report, the Indian Department of Energy discovered that the mine has close to 49,000 tonnes or up to 1.5 lakh tonnes of uranium – three times the original estimate of the area’s deposits. This would make it among the largest uranium mines in the world.
 37. For instance, Prithvi-I’s flight tests began in 1987 and lasted until 1993. Subsequent to user trials with the Indian army in 1994, the missile entered serial production. See “India: Current Development/Operational Status of Strategic Missile Programs – Prithvi,” *NTI*, last updated November 2011, <<http://www.nti.org/country-profiles/india/delivery-systems/>>, accessed 10 December 2011.
 38. “Nuclear Weapons: A guide to British Nuclear Weapon Projects, a website by Brian Burnell, <<http://nuclear-weapons.info/images/tna-avia-65-1050-e81c-p2-3.jpg>>, accessed 30 December 2011.
 39. Richard A. Muller, *Physics and Technology for Future Presidents: An introduction to the Essential Physics Every World Leader Needs to Know* (New Jersey: Princeton University Press, 2010), 146.
 40. The author questions the notion of nuclear weapons considered as “tactical,” as generally used in the Western lexicon and unwittingly used in South Asia. A simpler term — short-range weapons — would suffice.
 41. The term ‘strategic stability’ has been used in theoretical sense and is synonymous with the term ‘regional stability’ used for Pakistan and India in this paper.
 42. Harald Muller and Annette Schaper, “Definitions, Types, Risks and Options for Control: A European Perspective,” Part II, in *Tactical Nuclear Weapons: Options for Control*, Eds. William C. Potter et al, Vol. 119 (New York: UNIDR, 2000), 21. Also see, “U.S. Tactical Nuclear Weapons in Europe — Fact Sheet,” *The Center for Arms Control and Non-Proliferation*, January 2011. <http://armscontrolcenter.org/policy/nuclearweapons/articles/US_Tactical_Nuclear_Weapons_Fact_sheet/>, accessed 30 October 2011. The definition is, “...it is generally characterized by a lower yield and shorter range than a long-range (strategic) nuclear weapon. [TNWs] are also sometimes referred to as battlefield nuclear weapons.” A similar

assertion is made by Gunnar Arbman and Charles Thornton, *Russia's Tactical Nuclear Weapons — Part I: Background and Policy Issues*, Swedish Defence Research Agency (November 2003), 7, <<http://www.cisssm.umd.edu/papers/files/thorntonrussia.pdf>>, accessed 30 October 2011. This article defines TNWs as, “All sub-strategic forces not covered by the INF Treaty.”

43. NATO's ground-launched TNWs in Europe during the 1970s consisted of “artillery, surface to surface rockets and missiles. The artillery [included] the 155 mm and 8 inch howitzers... The nuclear shells for these weapons [were] engineered to fit the conventional artillery piece without modification, thus making all 600 or so of these weapons [then] in Europe nuclear-capable... The range of weapons was [up to 17 kilometres] and yield [varied] from less than [one KT] to more than 10 KT.” See, Phillip W. Dyer, “Tactical Nuclear Weapons and Deterrence in Europe,” *Political Science Quarterly*, Vol. 92, No.2, (Summer, 1977), 249-250, <<http://www.jstor.org/stable/2148352?origin=JSTOR-pdf>>, accessed 2 October 2011. Also see, David E. Hoffman, “The Little Nukes that Got Away,” *Foreign Policy*, 1 April 2010. <http://www.foreignpolicy.com/articles/2010/04/01/the_little_nukes_that_got_away>, accessed 11 December 2011. According to Hoffman, *Davy Crocket* was the smallest nuclear weapon ever produced by the US. It weighed 76 pounds and had a range of 2-4 kilometres.
44. Arbman and Thornton, ref.42, p.9. They posit, “Trying to define TNW by range only, i.e. encompassing weapon systems with some maximum delivery capability — 500 [km], for example — have invariably failed in spite of early attempts by the U.S. and NATO to do so during the Cold War period.” Hence, there is a problem in defining TNWs from the criteria of ‘range’ because by the Western standards, Pakistani and Indian MRBMs would be TNWs.
45. Ibid. As per the paper, “Attempts to define [TNWs] by (low) yield, intended for battlefield use only, have fared no better than trying to define them by range. For example, in the U.S. arsenal, the highest yield of weapons considered to be non-strategic nuclear weapons are a variant of B-61 bomb at 170 KT and the nuclear SLCM with a yield of 150 KT. By contrast, U.S. strategic weapons have yields as low as 5 KT for ALCMs and 100 KT for ballistic missile.”
46. Muller and Schaper, ref.42, p.25.
47. Jacques S. Gansler, “Ballistic Missile Defense: Past and Future,” *Center for Technology and National Security Policy*, National Defense University, Washington, DC, April 2010, p.ix. <http://www.ndu.edu/CTNSP/docUploaded/BMD_2010.pdf>, accessed 18 May 2012.
48. Ibid, p.60.
49. In an informal discussion, Director of Arms Control and Disarmament Affairs at Pakistan's Strategic Plans Division recently said that the

- peculiar South Asian situation, especially geographical contiguity, suggested that the Cold War definitions of missile ranges were not applicable in Pakistani terminologies. This may imply that an IRBM in Pakistani jargon may be of 1000–1500 km range.
50. Nuance of using a comma between “credible” and “minimum” introduced by the author in order to remove the ambiguity created by the oft-misused “credible minimum deterrence” and “minimum credible deterrence.” The latter term is the least acceptable in strict reference to clarity.
 51. Liddell Hart coined this term. Bhumitra Chakma has traced evolution of the term from Liddell Hart to Glenn Snyder, then Robert Jervis and later a host of other authors. See Bhumitra Chakma, “Nuclear Arms Control Challenges in South,” in *The Politics of Nuclear Weapons in South Asia* (Surrey: Ashgate Publishing, 2011), ed. Chakma, 215. Paul Kapoor captures the spirit of paradox unique to South Asian dynamic by, “A very small probability of lower level conflict escalating to the nuclear threshold has not encouraged aggressive conventional behaviour in the region. Rather, on-going violence has resulted from a significant possibility of subnuclear conflict escalating to the nuclear threshold. Thus, a substantial degree of *instability* at the strategic level has encouraged lower level South Asian violence.” See, Paul Kapoor, *Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia* (Singapore: NUS Press, 2009), 34.
 52. D. Marc Kilgour and Frank C. Zagare, “Credibility, Uncertainty, and Deterrence,” *American Journal of Political Science*, Vol. 35, No. 2 (May, 1991), 305, <<http://www.jstor.org/stable/2111365?origin=JSTOR-pdf>>, accessed 2 October 2011.
 53. “When [nuclear weapons] were invented, [they] were designed to be weapons of war. Now decision-makers believe they are weapons to prevent war by means of stable deterrence.” See, John Hanwee, Hugh Miall, Scillar Elsworth, “The Assumptions of British Nuclear Weapons Decision-Makers,” *Journal of Peace Research*, Vol. 27, No. 4 (November 1990), 371, <<http://www.jstor.org/stable/424261?origin=JSTOR-pdf>>, accessed 2 October 2011.
 54. The decade of the 1980s and the pre-1998 period of the 90s was that of “recessed deterrence” (Perkovich and Tellis). Nuclear deterrence was established once Pakistan successfully cold-tested its weapons. The stability in relations was maintained at the level of crisis at best. The Kargil conflict disturbed the equilibrium and the phenomenon that nuclear weapons prevented nuclear war but left room for limited conflict appeared. The paradox lies in the risk that neither of the two States can guarantee the crisis escalation behaviour once a limited war begins. The empirical evidence of the Kargil War, the 2002 and 2008 crises show that nuclear weapons would ideally keep “intra-war deterrence” in place.

55. Strategic stability is defined as “a situation between adversaries, in which they are unlikely to fight a strategic war involving attacks against industry, population or strategic military forces.” This vague definition does not fit into South Asian complexities. See Paul Stockton, *Strategic Stability between the Super Powers* (London: IISS, 1986), Adelphi Papers-213, 3.
56. Z. I. Cheema, “Conflict, Crisis and Nuclear Stability in South Asia,” *SASSU*, 2004, 2, <<http://www.sassu.org.uk/pdfs/Cheema.pdf>>, accessed 12 November 2011.
57. Ibid. p.14.
58. Hanwee, Miall, Elsworthy, ref.53, p.371.
59. Ibid.
60. George Perkovich, *India’s Nuclear Bomb: The Impact on Global Proliferation* (California: University of California Press, 1999), 485.
61. Jones, ref.3.
62. “Trading for Peace: Partners for Peace and Progress,” *aman ki asha*, <http://www.amankiasha.com/news_cat.asp?catid=8>, accessed 17 May 2011.
63. Dyer, ref 43. Dyer opined that the major reason why the Soviets or the NATO did not fight a nuclear war or did not escalate a crisis to a level that called for a nuclear exchange was the economic disincentive. Eastern Europe continues to be a source of immense natural resources both for NATO and states that were part of the erstwhile Soviet bloc. A nuclear exchange would destroy those resources. His main thesis is that the economic cost-benefit analysis had a major role in deterrence than the prospect of mutually assured destruction (MAD). For instance, he thought the Russians would not find the use of nuclear weapons feasible for the seizure of an intact Western Europe.
64. ISPR Press Release No PR166/2011-ISPR, of 14 July 2011. Available online at <http://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1796>, accessed 15 July 2011.
65. Imran Rana, “Textile industry: ‘Give me electricity or I will move to Bangladesh’,” *The Express Tribune*, 18 August 2011, <<http://tribune.com.pk/story/233698/textile-industry-give-me-electricity-or-i-will-move-to-bangladesh/>>, accessed 1 December 2011. The report reads, “Another huge attraction in Bangladesh is the lack of tariffs in major markets such as the United States and the European Union...”
66. Pakistan has submitted four reports to the 1540 Committee, showing its progressively increasing measures.
67. Dyer (ref.43) has quoted Senator Stuart Semington’s testimony in 1970s in the US Senate Hearings over proposed modernization of small nuclear weapons.
68. Dyer, ref.43, p.257.
69. Ibid.



70. Zahir Kazmi, "Neo-nuclear apartheid," *Dawn*, 31 December 2010, <<http://www.dawn.com/2010/12/31/neo-nuclear-apartheid.html>>, accessed 31 December 2010.
71. Ibid.
72. "Pakistani experts say the country has been forced to develop [TNWs]," reported *Dawn* shortly after the test. See "Pakistan builds low yield nuclear capability," *Dawn*, 15 May 2011, <<http://www.dawn.com/2011/05/15/pakistan-builds-low-yield-nuclear-capability-concern-grows.html>>, accessed 10 October 2011. India also denied any interest in TNWs. See Jaswant Singh's statement, ref.1.
73. DRDO statement, ref.23.
74. Jones, ref.3.
75. Ashley Tellis argues that even in the event of a Pakistani first strike employing [TNWs], India's conventional supremacy should enable it to draw out the war, steadily mass its forces, and eviscerate Pakistani military capabilities..." That argument would hold true if India had not developed Prahars. Indian pursuit of TNWs shows that it is probably not sure of its conventional supremacy against Pakistan. See Ashley Tellis, "India's Emerging Nuclear Posture," (Santa Monica, Calif.: RAND, 2001), 133.
76. ISPR Press release of 21 April 2011.
77. ISPR Press Release No. PR149/2010-ISPR of 10 April 2010, available online at <http://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1241>, accessed on 24 December 2011.
78. Jones, ref.3.
79. Rodney Jones questions Pakistan's rationale to develop TNWs once its Azm-E-Nau exercises suggest that its "conventional defences alone are fully capable of repelling or faying the quick but shallow penetrations Cold Start envisages." See Jones, ref.3.
80. In an excellent review of three books on South Asian strategic stability, Michael Krepon quotes Jaswant Singh, "Yet...Singh likes to say [minimal is not a fixity]." See Michael Krepon, "The Perils of Proliferation in South Asia," *Arms Control Today*, April 2010, <http://www.armscontrol.org/act/2010_04/BookReview>, accessed 1 December 2011.
81. As argued earlier, it is safe to assume that the decision to deploy TNWs during crises would be taken by Pakistan's National Command Authority and the safety codes in the warheads would prevent their accidental or unauthorized use. In addition, the Tri-Service Strategic Force Commands would most likely handle these weapons. The relevance of Pakistan's redundant strategic communication systems becomes imperative to avoid the "use it or lose it" dilemma. The same logic holds true for India.
82. Bruce Martin Russett, "Extended Deterrence with Nuclear Weapons: How Necessary, How acceptable?" *The Review of Politics*, Vol. 50, No.

- 2 (Spring, 1988), 294, <<http://www.jstor.org/stable/1407651?origin=JSTOR-pdf>>, accessed 2 October 2011.
83. Phillip W. Dyer, "Will Tactical Nuclear Weapons Ever Be Used?" *Political Science Quarterly*, Vol. 88, No.2, (June 1973), 225-226, <<http://www.jstor.org/stable/2149108?origin=JSTOR-pdf>>, accessed 2 October 2011.
84. According to Dyer, NATO's policy to introduce TNWs was based on four assumptions; the first being that they would "be able to stop Soviet onslaught." See, Dyer, ref.43, p.254.
85. Manu Pubby, "No 'Cold Start' doctrine, India tells US," *The Indian Express*, New Delhi, 9 September 2010, <<http://www.indianexpress.com/news/no-cold-start-doctrine-india-tells-us/679273/0>>, accessed 23 November 2011. The report said, "While the US has been assured that no such doctrine exists, the Army has now come on record to say that 'Cold Start' is not part of its doctrine. Army Chief General V K Singh has told...that India's basic military posture remains defensive."
86. Zalmay Khalilzad, "The Making of a Nuclear Power." *Asian Survey* Vol. 16, No. 6 (June 1976), 592. <<http://www.jstor.org/stable/2643521>>, accessed 26 October 2011.
87. William Walker, "International Nuclear Relations after the Indian and Pakistani Test Explosions." *International Affairs* (Royal Institute of International Affairs 1944-), Vol. 74, No. 3 (July 1998), 526.
88. Naeem Salik, "India-Pakistan Nuclear Competition: Implications for Regional Stability," *Centre for Muslim States and Societies/Political Science and International Relations*, University of Western Australia, 4, <<http://law.anu.edu.au/COAST/events/APSA/papers/248.pdf>>, accessed 22 December 2011. The online paper was presented at APSA Annual Conference in mid-July 2011 and that is why no reference to Prahara has been made.
89. Ali Ahmed, "Tit for Tat: A Nuclear Retaliation Alternative," *IDS*, October 3, 2011, <<http://www.idsa.in/idsacomment/TitforTatANuclearRetaliationAlternative031011>>, accessed 4 October 2011.
90. The British faced a dilemma over the use of the so-called TNWs against Germans. See, Hanwee, Miall, Elsworth, ref.53, p.361.
91. Dyer, ref.43, p.254.
92. Geller, in his examination of the implications of possession of nuclear weapons for war between India and Pakistan, concluded that their bilateral competition "may accelerate shifts in the relative power trends throughout Asia, causing abrupt changes in future foreign policy expectations and security that could ultimately affect the nuclear programs of both Russia and the [U.S.]. See Daniel S. Geller, "Nuclear Weapons and the Indo-Pakistani Conflict: Global Implications of a Regional Power Cycle," *International Political Science Review/Revue internationale de science politique*, Vol. 24, No. 1, Power Cycle Theory and Global Politics/Cycle de pouvoir et politique mondiale

- (January 2003), 137-150. <<http://www.jstor.org/stable/1601335?origin=JSTOR-pdf>>, accessed 2 October 2011.
93. Moeed Yusuf and Khalid Banuri, "India's Quest for Ballistic Missile Defense: A Slippery Slope," in *South Asia at Crossroads: Conflict or Cooperation in the Age of Nuclear Weapons, Missile Defense, and Space Rivalries*, Subrata Ghoshroy/Götiz Neuneck (eds.), Democracy Security, Piece No.197 (Hamburg: Nomos, 2010), 106-7. Also see, Khalid Banuri, "Missile Defenses in South Asia: The Next Challenge," *South Asian Survey*, Vol. II, No.2, 2004.
94. William C. Potter and others, eds. *Tactical Nuclear Weapons: Options for Control*, (Geneva: UNIDR, 2000), 49.
95. Acting Russian Defence Minister Anatoly Serdyukov, on 10 May 2012, renewed warning that short-range missiles could be used against the US BMD in Europe. See, "Russia may use Iskander missile system to neutralize US missile defense elements – minister," *Interfax*, 11 May 2012, <<http://www.interfax.co.uk/russia-cis-general-news-bulletins-in-english/russia-may-use-iskander-missile-system-to-neutralize-u-s-missile-defense-elements-minister-part-2/>>, accessed 13 May 2012.
96. Michael Krepon, "Missile Defense Phobia" *Arms Control Wonk*, 5 December 2011, <<http://krepon.armscontrolwonk.com/archive/3291/missile-defense-phobia>>, accessed 17 May 2012. He posits that TMD systems are only fractionally effective, and only against the bottom rung of cheap, short-range...missiles without countermeasures.
97. Jacques S. Gansler, "Ballistic Missile Defense: Past and Future," *Center for Technology and National Security Policy*, National Defense University, Washington D.C., April 2010, 46. <http://www.ndu.edu/CTNSP/docUploaded/BMD_2010.pdf>, accessed 18 May 2012.
98. "NATO thinking in the Cold War laid an emphasis "on tactical nuclear weapons to contain an anticipated massive Soviet conventional attack; later, as Soviet forces also acquired large numbers of [TNWs] Defence Secretary McNamara and others in the Kennedy-Johnson administration urged greater reliance on building up conventional deterrence, with the use of nuclear weapons only as a last resort...the European allies vigorously resisted that shift in emphasis, preferring the deterrent effect of reliance on nuclear weapons to the risk that non-nuclear deterrence would fail and result in the massive destruction of another conventional war on European soil." See Bruce Martin Russett, "Extended Deterrence with Nuclear Weapons: How Necessary, How acceptable?" *The Review of Politics*, Vol. 50, No. 2 (Spring, 1988), 284, <<http://www.jstor.org/stable/1407651?origin=JSTOR-pdf>>, accessed 2 October 2011.
99. Dyer, ref.83.
100. Zahir Kazmi, ref.7.
101. The term refers to the trends of selectivity and discrimination by the West against Pakistan and specifically denial of civil nuclear

technology by not letting Pakistan participate in export control cartels like the Nuclear Suppliers Group (NSG).

Appendix-I**COMPARISON – NASR AND PRAHAAR**

Specifications	Hatf-IX (Nasr)		Prahaar	
Meaning of name / Photo	Hatf: vengeance e Nasr: victory		To Strike	
Type	Short-range, surface to surface ballistic missile		Surface to surface missile	
Range	60 km		50 to 150 km	
Time of Flight / Velocity			150 km in 250 seconds (4 minutes 10 seconds) / 6 m/sec	
Diameter	300 mm (11.8 inches)		420 mm (1 foot 4 inches)	
Launcher	Two-round system on Chinese origin 8x8 high-mobility truck chassis. Pakistan Army uses AR1A/A100-E MLRS System		Launched from a road mobile system – carries 6 missiles at a time – can fire a salvo in all directions covering azimuth plane. Dr. Saraswat claimed in an interview, "Can be launched from canisters."	
Warhead Type / Payload	HE and nuclear (boosted fission device)		200 kg / carries different types of warheads	
Fuel Type	Single-stage solid fuel		Single-stage solid fuel	
Navigation	Not specified		H(high accuracy navigation, guidance, and electro-magnetic actuation system, latest on-board computers	
Circular Error Probable (accuracy)			< 10 m	
Other characteristics	Quick response system			
Use	Battlefield use			
Similarities	Russian Iskander		American ATACMS (Army Tactical Missile System)	
Date of Test / Number of tests	Tuesday, 19 April 2011 / first test		Thursday, 21 July 2011 at 8:15 AM / first test	
Length	20 feet (6.096 m) approx..		7.3 m	
Weight			1280 kg / 1.3 tons	
Apogee			35 km	
Miscellaneous			Cost-effective, quick reaction, all weather, all terrain, highly accurate battlefield support tactical system. Dr. Saraswat claimed, "...can [also] be deployed in snow-bound areas or jungles." Hence, not ruling out the possibility of its deployment in border areas with China.	
Source			DRDO News Letter, Vol. 31 No. 8, August 2011	
Development Period			Less than two years	
Take-off Type	Angular		Vertical	
Purpose	To add deterrence value to Pakistan's strategic weapons development program at shorter ranges. ...quick response system addresses the need to address evolving threats. ...consolidation of deterrence capability at all levels of threat spectrum		To fill the gap between unguided multi-barrel rocket system 'Pinaka' with 40 km range and guided missile like 'Prithvi' with 250-350 km range	
Launch Time			Few minutes	
Future Plans	First flight test ~ more to follow		Scientists said that there would be attempt to reduce the weight of the missile in future tests	
Manufacturers	NESCOM		DRDO and Larsen & Toubro, and MSQAA	

Appendix-II

**CORRELATION OF SHORT-RANGE BALLISTIC
MISSILES WITH DETERRENCE & STRATEGIC
STABILITY IN SOUTH ASIA**

Factors		Deterrence			Strategic Stability
		Capability	Credibility	Communication	
Political	Territorial Disputes	Unresolved political disputes > limited war doctrines > reliance on TNWs to counter limited war doctrine > deterrence credible if both states believe that the political will to employ TNWs exists			South Asian region is highly unstable in political, economic and military domains
	Afghanistan's future, Balochistan insurgency, terrorism in India				
Economic	Trends of selectivity	Conventional weapons asymmetries growing and hence seeming reliance on nuclear weapons > Deterrence maintained but would wear out if Pakistan's economy gets weaker			
	Energy security				
	Trade barriers				
Military	Limited war doctrine	Kargil > Cold Start Doctrine > Mumbai attacks > Cold Start Doctrine restyled Proactive Defence Strategy > Growing asymmetry with India > Nasr > Prahaar > China dragged into deterrence equation > arms racing > deterrence credible if actors remain rational > credible deterrence if assured second strike capability developed.			
	Conventional forces asymmetry				

Note:

The above chart is a rough – basic – model to graphically show the assessments. In a detailed study an attempt to quantify above elements can be made by giving values to each variable. The limited scope of this paper does not allow that level of analysis.