

A Missile Stability Regime for South Asia

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Abstract

India and Pakistan have created sizeable ballistic missile forces and are continuing to develop and enlarge them. These forces can be both stabilizing (e.g., providing a survivable force for deterrence) and destabilizing (e.g., creating strategic asymmetries). Missile forces will be a factor in bilateral relations for the foreseeable future, so restraint is necessary to curtail their destabilizing effects. Such restraint, however, must develop within an atmosphere of low trust. This report presents a set of political and operational options, both unilateral and bilateral, that decreases tensions, helps rebuild the bilateral relationship, and prepares the ground for future steps in structural arms control. Significant steps, which build on precedents and do not require extensive cooperation, are possible despite strained relations. The approach is made up of three distinct phases: 1) tension reduction measures, 2) confidence building measures, and 3) arms control agreements. The goal of the first phase is to initiate unilateral steps that are substantive and decrease tensions, establish missiles as a security topic for bilateral discussion, and set precedents for limited bilateral cooperation. The second phase would build confidence by expanding current bilateral security agreements, formalizing bilateral understandings, and beginning discussion of monitoring procedures. The third phase could include bilateral agreements limiting some characteristics of national missile forces including the cooperative incorporation of monitoring and verification.

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Acronyms

CBM	Confidence Building Measure
CEP	Circular Error Probable
DGMO	Director-General of Military Operations
EMP	Electromagnetic Pulse
GPS	Global Positioning System
ICBM	Intercontinental Ballistic Missile
IGMDP	Integrated Guided Missile Development Programme (India)
INF	Intermediate Range Nuclear Forces Treaty
IRBM	Intermediate Range Ballistic Missile
MOU	Memorandum of Understanding
MRBM	Medium Range Ballistic Missile
MTCR	Missile Technology Control Regime
NRRC	Nuclear Risk Reduction Center
NTM	National Technical Means
OSCE	Organization for Security Cooperation in Europe
RPV	Remotely Piloted Vehicles
SLBM	Submarine-launched Ballistic Missiles
TEL	Transporter Erector Launcher
WMD	Weapon of Mass Destruction

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EXECUTIVE SUMMARY

South Asia is a region at risk. India and Pakistan are strategic competitors who became overt nuclear powers in 1998. Some analysts opined that nuclear weapons would bring stability through mutual deterrence. Despite periods of optimism, tensions between Pakistan and India remain high and the last five years have been among the most difficult since independence. In parallel with their nuclear programs, India and Pakistan both established ballistic missile programs. Both countries now have militarily significant missile forces and continue to develop and expand them. The pairing of missiles with nuclear warheads can be both stabilizing (e.g., providing a survivable force for deterrence) and destabilizing (e.g., creating strategic asymmetries). It is the readiness postures, doctrine, the command/control structures, the types and numbers of weapons, delivery vehicles, and defenses available that determine the overall effect on stability.

Missiles and nuclear weapons are not going to go away from South Asia in the foreseeable future. Their presence must thus be managed in a way that does not add to their destabilizing features while preserving the elements of deterrence. Thus, restraint is necessary to reduce the risks resulting from the India-Pakistan missile competition. Restraint can be achieved through an incremental process beginning with tension reducing measures, moving on to confidence building measures, and eventually concluding in arms control agreements.

The purpose of this study is to investigate how India and Pakistan could structure their missile programs to increase stability and avoid damaging the existing state of deterrence. Steps to increase stability should support the concept of minimum credible deterrence advocated by both countries. There are a number of actions that can improve current conditions and head off future problems.

To provide the context for the conceptual missile restraint regime, the report reviews the Pakistani and Indian missile programs dating back to 1983 and notes their linkage with political and security events that occurred in South Asia over the last two decades. Missile systems have assumed special significance in both countries because they are used as instruments of both strategy and diplomacy. Missiles are displayed prominently in national parades and flight tests are timed for political purposes. These actions are aimed at impressing multiple audiences: the adversary is expected to be deterred, the domestic

audience – that views missiles as symbols of pride and prestige – is placated with messages of resolve, and outside powers are induced to focus on the region and possibly intervene and diffuse crises.

The study assesses missile operations relative to the role of intelligence, command and control, and the geophysical conditions in South Asia. Seven key characteristics of missiles (short time of flight, range, pre-launch survivability, accuracy, autonomy after launch, response time, and ambiguity about the type of warhead) are assessed within the context of South Asia to determine whether they are inherently stabilizing or destabilizing.

The answer to the problems of stability identified in the analysis lies in greater yet controlled transparency. The United Nations defines transparency as “the systematic provision of information about specific aspects of military activities under formal or informal international arrangements.” Transparency can be unilateral or bilateral, and governments do not typically ratify transparency agreements. Sometimes it is in a state’s best interest to act unilaterally to avoid misinterpretation of intent. In practice, there is a role for both transparency and opacity in missile threat perception reduction. Choosing *not* to share certain information can enhance stability.

Within the context of the increasing linkage of missiles with power projection and as deterrent forces, this report defines elements of a conceptual missile restraint regime for India and Pakistan. Recognizing that India-Pakistan relations are poor, a phased approach to the evolution of a missile restraint regime is proposed: (1) tension reduction measures, (2) confidence building measures, and (3) arms control agreements. This process could eventually evolve into broader agreements on arms control and reductions with favorable political conditions. The process includes both unilateral and bilateral actions that contribute to rebuilding bilateral relationships, increasing confidence and preparing the ground for structural arms control if favorable conditions occur.

The conceptual regime seeks to reduce the key sources of instability by:

- Decreasing the overall perception of threats created by missile development and deployment
- Removing the ambiguity created by missiles capable of delivering both conventional and nuclear warheads
- Decreasing the risk of unintentional conflict

- Increasing the time for communication and consultation during a crisis
- Avoiding a missile race by capping the ability to develop new classes of missiles while maintaining the existing capability for deterrence.

The goal of the first phase, tension reduction measures, is to make missiles a security topic for bilateral discussion, initiate unilateral steps to decrease tensions, and set a precedent for bilateral cooperation:

- Exercise restraint in official statements and displays of missiles
- Reinvigorate existing agreements on notifications of military exercises
- Declare no use of artillery rockets across the Line of Control
- Declare that nuclear warheads are not routinely mated to missiles
- Agree not to conduct flight tests during crises
- Continue and reinforce the practice of advance announcement of missile tests
- Initiate cooperation in international treaties and organizations
- Initiate official military-to-military contacts.

The second phase, confidence building measures, would expand transparency measures, formalize bilateral understandings, and begin discussion and experimentation with monitoring procedures for limitations on missile-related activity:

- Developing joint delegations to various international bodies
- Declare elements of the national missile command and control structure
- Invite observers to missile tests, and military exercises
- Bilaterally declare that the Hatf-1 and Prithvi-1 are non-nuclear systems
- Establish Risk Reduction Centers at the National Command Authorities
- Establish new consultative lines of communication between command authorities
- Formalize a bilateral missile test notification agreement
- Initiate additional military-to-military contacts.

The third phase, arms control agreements, could include bilateral agreements to increase communications, limit missile-related activity, or remove some aspect of national missile forces, with the cooperative incorporation of monitoring and verification:

- Limit the number and frequencies of missile tests

- Bilaterally declare that no missile garrisons will be located within a specified distance from the border
- Establish an agreement defining missiles with 150 to 250 km range as non-nuclear systems (specifically the Hatf-2 and Prithvi-2).
- Establish an agreement to eliminate short-range ballistic missiles with less than 150 km range (specifically the Hatf-1 and Prithvi-1).
- Establish a bilateral nuclear test ban.

The Indian and Pakistani missile programs have significantly altered threat perceptions in South Asia. Although ballistic missile forces support the goal of credible deterrence, each country's reactions to the perceived threats posed by the other could engender actions that are destabilizing. The remedy for this instability lies in mutual restraint in missile-related activities facilitated by selective transparency. There are a number of procedural and technical options - both unilateral and cooperative - that can maintain the stabilizing aspects of deterrence while reducing destabilizing effects. These options should be integrated into a system, or regime, to gain the maximum benefits for stability. Public confidence in these initiatives is important. Public confidence drives politics, which, in turn, defines the acceptability of cooperation. The benefit of strategic stability needs to be made clear to the respective publics. The political and operational process of building a restraint regime can evolve over time as confidence and experience increase.

A Missile Stability Regime for South Asia

1. Introduction and Context

South Asia is a region at risk. India and Pakistan are strategic competitors with a history of threat making and conducting provocative military exercises. They became overt nuclear powers in 1998. India has ambitions of becoming a global power, and maintains one of the largest standing armies in the world, along with a blue water navy and a sophisticated air force. Pakistan views India as its primary threat and has developed sizeable military forces to achieve a rough parity with its larger neighbor.

Missiles with increasing sophistication are being introduced to the region at the same time that nuclear weapons are being developed and produced. In South Asia, missile systems have assumed special significance because they are used as instruments of both strategy and diplomacy. Missiles are displayed publicly in defense exhibitions and national parades. Such tactics are aimed at impressing multiple audiences: the adversary is expected to be deterred; the domestic audience – that views missiles as symbols of pride and prestige – is placated with messages of resolve; and outside powers are induced to focus on the region and possibly intervene and diffuse crises.

The combination of missiles and nuclear warheads can be either stabilizing or destabilizing to the region. It is the readiness postures, the command and control structures, the types and numbers of weapons, delivery vehicles, and defenses available that will determine the overall effect. Thus, restraint is necessary to achieve stability and reduce the risks resulting from unbridled India-Pakistan missile competition. Restraint can be introduced and stability achieved through an incremental process passing through tension reducing measures, confidence building measures, and eventually concluding in arms control agreements. The purpose of this paper is to investigate how India and Pakistan could structure their missile programs to increase stability and avoid damaging the existing state of deterrence.

1.1. Problem Statement

It is impossible to expect that missiles will disappear soon from the South Asian stage – both India and Pakistan have invested considerable resources in missile development and procurement, and have inducted various missile systems into their militaries. Missiles have become symbols of national pride. The risk is that either side may misunderstand missile-related activities. It is important; therefore, that India and Pakistan initiate and develop a missile restraint regime that manages the respective missile programs in a manner that promotes stability.

1.2. Goals of the Study

This paper examines whether missile development and induction in South Asia improves or worsens regional stability. Within this context, the paper goes on to define elements of a conceptual missile restraint regime for India and Pakistan. Although steps toward reconciliation have recently occurred, India-Pakistan relations have a long way to go to achieve full normalization.¹ Consequently, an incremental approach to the evolution of a missile restraint regime is proposed. The process could eventually evolve into broader agreements on arms control and reductions with favorable political conditions. This paper will hopefully be complementary to the restarted India-Pakistan security dialog.

¹ In late 2003, ambassadors were reappointed to each country, transit links reopened, and a ceasefire established along the Line of Control in Kashmir. The two heads of state met at the SAARC regional summit in Islamabad in January 2004 and pledged to restart dialogue with the intent of reconciliation. In February 2004, structural dialog restarted.

2. Missiles in South Asia

To frame this analysis, the Indian and Pakistani missile programs are reviewed and operational factors in South Asia assessed in this section.

2.1. Definition of Missiles

In general, a *rocket* is a self-propelled cylinder using liquid or solid fuel. In modern military terminology, a rocket is an unguided weapon. The mission of military rockets is similar to that of artillery, except they are used at longer ranges (usually less than 75 km). A *missile*, in the military context, is a rocket with a guidance system that adjusts its flight path to the target after launch.

Military missiles fall into two major categories: ballistic and cruise. Ballistic missiles have an initial powered boost phase followed by supersonic free flight along a high, arcing trajectory. This trajectory is the ballistic trajectory of a hurled object. Guidance occurs during the boost phase and, in more advanced systems, during the re-entry phase. The term "cruise missile" refers to unmanned, automatically guided, self-propelled air-breathing vehicles that sustain flight through the use of aerodynamic lift. Missiles can also be categorized by virtue of their points of launching and impact, type of propulsive system, and guidance system.

This paper focuses on surface-to-surface ballistic missiles because they have been integrated into the military forces of India and Pakistan and play the greatest strategic role. Cruise missiles, however, are under development in both countries and will become a factor in the strategic balance in the future.

2.2. The Evolution of the Indian and Pakistani Missile Programs

Although both India and Pakistan have maintained civilian space programs since the 1960's, it was not until India began the Integrated Guided Missile Development Program (IGMDP) in 1983 that the missile race began in earnest. India began with a modest technological base. By skillfully deriving technologies from the existing civilian space program and combining them with reverse engineering of missile hardware from Russia and elsewhere, India developed the Agni and Prithvi missiles. The short range Prithvi (first tested in 1986) was derived from Russian-supplied surface to air missiles (the SA-2), and the medium range Agni (first tested in 1989) was partly based on the US Scout

and Russian SA-2.² India now has a significant technical base and an ambitious military missile program. In addition, it has a world-class civilian space program. The development of intermediate range ballistic missiles (IRBMs) is on track and most analysts conclude that India could develop intercontinental ballistic missiles (ICBMs) if it chose.

Juxtaposed within this matrix of Indian missile development, were some disturbing crises in the mid-eighties. The serial South Asian crises began with India's decision to occupy the undemarcated Siachen Glacier in 1984. This operation was conducted amidst ongoing tensions over the Sikh Crisis in the Indian State of Punjab, bordering Pakistan. Two years later, India conducted the ambitious Brasstacks military exercise that created tensions in India and Pakistan, which escalated close to war. In each of these two crises, India has been accused of planning a pre-emptive strike against Kahuta, Pakistan's uranium enrichment facility.³ The plans were obviously rejected. By 1990, as the Cold War ended and the Soviets withdrew from Afghanistan, Kashmir witnessed a renewed freedom struggle and a major uprising that continues to date. India accuses Pakistan of fueling this uprising with financial and material support. The uprising came about under a new global and regional environment. After the Soviet withdrawal from Afghanistan, the US-Pakistan partnership also ended. The first manifestation of this change was the imposition of sanctions by the US (the Pressler Amendment) based on alleged uranium enrichment. The sanctions halted the delivery of previously purchased F-16 aircraft.

At the time, aircraft were the only long-range weapons delivery means for both countries. Pakistan thus found itself caught in a difficult situation. While its nuclear capability was the ultimate guarantor of deterrence, the F-16 was to be the main Pakistani delivery system to enable some sort of balance with India. The US refusal to deliver additional F-16s was a major blow for Pakistan's quest for balance. In fact, the air force imbalance widened as India continued to purchase state-of-the-art aircraft from Russia and France. It was then that Pakistan contemplated seeking a matching response in ballistic

² Rodney Jones, Mark McDonough, Toby Dalton, and Gregory Koblenz, *Tracking Nuclear Proliferation: A Guide in Maps and Charts*, (Washington DC: Carnegie Endowment for Peace, 1998) p.127-129.

³ See reports in Times of India, News Service, September 17 and 18, 1984 and Indian Express, New Delhi September 19, 1984 Scott Sagan "The Perils of Proliferation," CISAC Stanford University workshop on "Preventing War in South Asia," Bangkok, August 2001. Raj Chengappa, *Weapons for Peace: The Secret Story of India's Quest to be a Nuclear Power*, (New Delhi: Harper Collins Publishers, 2000) pp 322-323. Also See Abdul Sattar "Reducing Nuclear Dangers in South Asia: A Pakistani Perspective", *Non-Proliferation Review*, Winter 1995, p. 42.

missiles. The US embargo of the F-16s thus helped drive the Pakistani missile program. The missile program, along with nuclear weapon development, became a top national security priority for Pakistan.

Pakistan faced two major problems: a limited indigenous technology base and the Missile Technology Control Regime (MTCR). At the time, Pakistan's technology base for missile development was even more limited than India. The soft technology (organization, management, technical staff) was not the problem. The deficiencies were in the realm of hard technology (reentry vehicles, guidance systems, engines, and launch platforms).⁴ Like the nuclear program, Pakistan was a late starter in the missile program and faced the same non-proliferation barriers. India's lead in missiles and its strategy to "indigenize" the technology by reverse engineering and expanding its indigenous technical base could not be easily matched by Pakistan. Pakistan's indigenous industrial base was much smaller but its security requirements were urgent, and thus the prime objective was to redress security concerns promptly. Unlike India, there was a time premium to develop missiles quickly and also create a strong technical base before the window of opportunity for obtaining technical expertise and hardware transfers closed.

The second factor was that Pakistan's quest for acquisition of missile technology met with stiff resistance from the MTCR. With the bulk of western suppliers in the MTCR, Pakistan reached out on two paths for both liquid fuel and solid fuel propulsion systems. In the early 1990s, the only remaining and willing suppliers were in North Korea and China, respectively, for these two propulsion systems. Thus, Pakistan's liquid and solid fuel missile acquisition was achieved in a race to beat the closing iron grip of the MTCR. By combining various available technologies such as French Centaure sounding rockets and Soviet Scuds, Pakistan was able to produce the Hatf-1 and Hatf-2 missiles in the initial phases. Later, reverse engineering of M-series missiles from China and No-dong technology from North Korea enabled Pakistan to develop a sufficient missile technological base independent of MTCR limitations.

Pakistan was constrained in its flight tests for two reasons. First, Pakistan had to avoid MTCR sanctions as much as it could, not just for itself but also to save

⁴ Aaron Karp, *Ballistic Missile Proliferation: The Politics and Techniques* (New York: Oxford University Press, 1996), pp. 51-146.

embarrassment to its principal ally China. Second, it had remained under constant diplomatic pressure from the United States government to exercise self-restraint. Since the early 1990's the US had been applying unilateral pressure on Pakistan to undertake "self-restraint measures," which, defined in practical terms, asked for five major steps: 1) do not conduct live tests; 2) prohibit field training; 3) do not co-locate key missile components in a single area; 4) do not mate warheads and launch vehicles; and 5) and do not store key elements of missile hardware within operational range of targets in India.

Given that developments across the border in India were unhindered, it was obviously not possible for Pakistan to agree to such unilateral measures. To placate US nonproliferation concerns, Pakistan proposed a "Zero Missile" regime in South Asia, but India refused. The US, however, continued to put pressure on Pakistan, while tacitly looking for ways to grandfather technology transfers if Pakistan agreed to refrain from public displays and flight tests. Pakistan's missile development was thus conducted weighing the trade-off between diplomatic costs and developmental imperatives.

Although they followed quite different routes to missile system acquisition, both India and Pakistan now have quite mature missile development, testing and manufacturing infrastructures. The key issues remaining relate to the management and operation of their missile systems.

2.3. Operational Considerations for Missiles

Operational considerations in South Asia for missile deployments are different from those that prevailed during the Cold War. There is, however, an interesting parallel in that the US and the Soviet Union (and now Russia) had differing states of alert for their strategic nuclear forces depending on the severity of a crisis, much as is the case for India and Pakistan. Neither the US nor the Russians normally kept all their nuclear forces in the highest states of alert. The state of alert changed with security conditions. The US twice brought nuclear weapons and their delivery systems to a heightened state of alert during the Cold War. The US strategic alert scale goes from Defense Condition (DefCon)-4 (normal peacetime) to DefCon-1 (war imminent). During the Cuban Crisis (1962) and the

Arab-Israeli War (1973), the state of alert was reportedly increased to DefCon-3; that defines that “troops are on standby to await further orders.”⁵

During the Kargil Crisis of 1999 and the Compound Crises of 2001-2002, Indian and Pakistani conventional forces were mobilized and put on the highest state of alert.⁶ There is no evidence, however, of an increased alert status or deployment of nuclear weapons in the manner that happened in Cold War crises. Missiles and weapon components, however, may have been moved to different locations for defensive reasons. Conducting defensive measures is analogous to the actions taken during “Orange Threat Level” terrorism alerts in the US.⁷ Precautionary security measures are taken when a state of national vulnerability is deemed present.

Threat perceptions are driven by probabilities and consequences of events and responses may be based on worse case scenarios. In 1998, immediately after the nuclear tests by India, concern mounted in Pakistan that India might carry out a preventative strike at Pakistani nuclear installations. Pakistan took defensive measures as a result, creating the perception in the US that Pakistan was “reacting to false alarms” and creating instability. Fortunately, neither side construed these defensive measures involving the movement of nuclear forces or their enhanced defense as an escalatory move. Will this hold true in the next India-Pakistan crisis?

Official statements by India and Pakistan about the deployment status of their nuclear weapons are infrequent but occasionally provide some insight.⁸ The draft (1999) Indian Nuclear Doctrine implies that nuclear weapons are not normally kept ready for use and that their readiness is increased during a crisis or conflict: “The doctrine envisages assured capability to shift from peacetime deployment to fully employable forces in the

⁵ Bruce Blair “Alerting in Crisis and Conventional War” in Ashton Carter, John Steinbrunner and Charles A. Zraket eds., *Managing Nuclear Operations* (Washington DC, Brookings) pp 75-120.

⁶ The December 2001 attack on the Indian Parliament led to a massive military mobilization (including naval deployments) by India and Pakistan and a confrontation along their borders. The two countries came perilously close to war when a second attack occurred in May 2002 at Kaluchak, Kashmir.

⁷ “Orange Alert” refers to heightened security risk as defined by the US Department of Homeland Security in the wake of the September 11, 2001 terrorist attack.

⁸ An extensive discussion of this issue, with numerous references from the open literature and based on interview with Indian officials is contained in Ashley Tellis’s *India’s Emerging Nuclear Posture: Between Recessed Deterrent and Ready Arsenal* (2001, New Delhi: Oxford University Press).

shortest possible time....”⁹ When asked by *The Hindu* newspaper on November 29, 1999 if it was correct to conclude that India follows different peace-time and war-time deployment postures, External Affairs Minister Jaswant Singh replied: “This would be a correct assessment. You know that we would like to convey a sense of assurance in our region, also beyond so that our deployment posture is not perceived as de-stabilising. We have rejected notions of 'launch on warning postures' that lead to maintaining hair trigger alerts, thus increasing the risks of unauthorized launch.”¹⁰

Pakistan has not declared a nuclear doctrine but statements imply a similar approach. The Pakistani Foreign Secretary formally proposed the non-mating of nuclear weapons and delivery systems in a speech at the plenary of the Conference on Disarmament on January 25, 2001.¹¹

As a result of statements like these, analysts commonly assume Indian and Pakistani nuclear deployment to be in a “recessed” form. A recessed deployment status means that warheads are stored separately from delivery systems and that the warheads are stored as disassembled components. However, as a crisis develops, the readiness posture of nuclear weapons is expected to progressively change, moving through stages of increasing alert until a nuclear-armed delivery system reaches a ready-to-use state. Because the nuclear force is progressively reconstituted, both the location of warhead components and delivery systems and their proximity to each other are important. During the Cold War, the evolution of a crisis did not affect the deployment status of nuclear weapons as significantly.

The process of reconstitution raises questions about the risks associated with the changing deployment status of nuclear weapons during an unfolding crisis and their effect on stability. Many analysts believe a strategy of recessed deterrence is inherently stabilizing. Such a strategy actually entails some risks that are potentially destabilizing. When the recessed components of a nuclear deterrent force are brought into a more active readiness state, in a short time frame there is an increased risk of misperceptions and accidents. Furthermore, nuclear weapons and their delivery systems are vulnerable to

⁹ Section 3.2, Draft Indian Nuclear Doctrine, Indian of Ministry of External Affairs website: www.meadev.nic.in/govt/indnucl.d.htm.

¹⁰ Indian Government Ministry of External Affairs website: www.meadev.nic.in/govt/eamint-nov28.htm.

¹¹ Naeem Ahmad Salik, “Missile Issues in South Asia,” *The Nonproliferation Review*, Summer 2002, Volume 9, Number 2, pp. 47 - 48.

conventional or nuclear counterforce strikes when in a recessed posture. Missiles or warheads would be prime targets of the opposing air force or special operations forces during a war. Conventional strikes could also threaten the command and control structure that is necessary for the reconstitution of a nuclear force. If a limited conventional war were to occur, strikes against nuclear assets might occur inadvertently during attacks on other targets. Given India's geographic and military advantages, Pakistan, in particular, may perceive itself to be vulnerable. Thus, a recessed status could be stabilizing with respect to safety and control but destabilizing in the sense that it might encourage a preemptive strike.

The establishment of deterrence in South Asia is complicated by a strategy of recessed nuclear deployment. Effective deterrence actually requires some transparency regarding the nuclear force's operational capability and survivability. With a force in a peacetime state of recessed deterrence, transparency measures to establish deterrence need to be carefully defined so as not to create vulnerabilities that degrade crisis stability. Crisis stability is a situation in which neither side believes that it can gain an advantage by initiating a preemptive strike.¹² Recessed nuclear deployment also complicates operational doctrine. The goal of crisis stability (to have a survivable deterrent through a dispersed force structure) is in some conflict with the goal of operational preparedness (to have a tightly controlled force structure).

In the five years since overt nuclearization, tensions have increased in South Asia. Crises have not disappeared – in fact, they have occurred with disquieting regularity. If India and Pakistan are to effectively work through issues of stability associated with crises, diplomatic efforts must commence to contain a future crisis. Communication links, crisis prevention centers, and third parties can facilitate these efforts. The hotline connecting the Directors-General of Military Operations (DGMOs) is helpful in routine clarification and may help prevent an impending crisis.¹³ This confidence building measure, however, is not designed to defuse an unfolding crisis. For that, unambiguous communication must occur at the highest possible levels of leadership.

¹² This definition has been developed by the Center for Nonproliferation Studies of the Monterey Institute of International Studies (Monterey, CA).

¹³ Under the Hotline Agreement, the DGMOs talk for approximately 30 minutes every Tuesday at a pre-designated time.

2.3.1. Missile Operations in India and Pakistan

Some of the operational conditions that may cause instability with regard to missile force operations are as follows:

Absence of Timely Intelligence. Missile movement is a potential source of escalation.

The command system requires timely and accurate information. At present, the capacity to collect this information is limited. India and Pakistan rely on remotely piloted vehicles (RPVs), human and electronic intelligence. In the absence of comprehensive and accurate intelligence, there is a significant chance that an adversary will misread passive dispersal and initiate its own deployment as a result. During a crisis, India and Pakistan could enter into a spiral of escalation. One side could interpret the defensive moves by the other as threatening. Steps taken to counter the perceived threat would be matched in turn by the other, resulting in further escalation. During a condition of heightened tensions, the intelligence organizations in both countries will likely have a tendency to report the first indications of activity even if not confirmed.

The Dilemma of Control. Wide and flexible dispersal is within the capability of both countries, but if exercised, it will underscore the problem of control. Dispersal of missiles during a crisis is understandable within the context of preserving survivability. The foremost dilemma facing the command authority will be retaining centralized control. Assertive negative control¹⁴ is desirable for stability but will undermine the effectiveness of the missile system to rapidly respond if required. Pre-delegation, on the other hand, will increase the risk of inadvertence.¹⁵ The command system will thus be under extreme stress if dispersal or deployment ever takes place. The principal decision-making problem is how to make an optimum trade-off between battle effectiveness and safety. The evolving national command systems will have to find an answer to this problem, which was not easily solved in the Cold war.

¹⁴ Peter Feaver, "Command and Control in Emerging Nuclear Nations." *International Security* 17:3:160-187 (Winter 1992-1993).

¹⁵ Barry Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, NY: Cornell University Press 1999).

Harsh Geophysical Conditions. Both countries have sufficient territorial space and variety of terrain for dispersal and concealment. However, the road network is not well developed in both countries. Conditions for mobility are harsh and compounded by generally hostile weather. Physical security must be maintained. There are multiple modes for missile deployment each having its own unique problems of safety in movement. The variety of missiles available may further compound the safety issues of mating them with the warhead – both conventional and nuclear.

2.3.2. Nuclear Linkages

Greater instability results when the potential operational problems of missiles just described are linked with the deployment of nuclear weapons. At least four major considerations will play into decisions by India and Pakistan to undertake nuclear deployment.

Political and Technical Control. The imperative for political control is critical and deployment will pose a major control challenge. To ensure survivability, there will be a tendency to deploy a large rather than a small proportion of the national nuclear arsenal. The command and control requirements are fundamentally the same for any number of deployed nuclear weapons. As Sir Michael Quinlan points out, “...requirements do not, however, decrease proportionally with size; it is not to be supposed that a small nuclear force does not need sophisticated control – indeed, small size may entail a potential vulnerability that heightens demands.”¹⁶ Dispersal may involve different configurations ranging from prepared nuclear weapons integrated with their delivery means to separated nuclear weapon components moving independently from delivery systems.

Pressure on the command system to pre-delegate authority will rise as a crisis spirals. The political release to fire nuclear weapons could be technically controlled by incorporating permissive action links (PALs) in weapons. A PAL is a coded switch that controls the arming of the weapon. PALs require the entry of a code in order to open

¹⁶Michael Quinlan, “How Robust is India-Pakistan Deterrence?” *Survival*, Volume 42, Number 4, Winter 2000-01, p. 148.

circuits that arm the weapon.¹⁷ Even if PALs are used, the decision to delegate authority and release warheads to military units in the field will be excruciatingly difficult for both India and Pakistan.¹⁸

Communication Problems. The essence of command and control is to have several layers of redundant communication to ensure effective assertive control. The absence of assured redundancy and secure communication will remain a prime concern. Overcoming electronic jamming in a conventional war, and electromagnetic pulse (EMP) effects in the event of outbreak of a nuclear war, will be other critical needs.

Need for Physical Security. The possibility of nuclear weapons being stolen is remote, as multiple tiers of security will always be present, but concerns about safety and security will certainly grow during deployment. Deployment will increase the importance of physical control by the command system even if use control systems such as PALs are incorporated.

International Oprobrium. India and Pakistan will face international opprobrium if they opt to deploy nuclear weapons. Although the international community may have reluctantly accepted their possession of nuclear weapons, the transition to operational deployments will likely lead to sanctions and isolation. This factor is unique to South Asia and constrains the implementation of deterrence strategies by Pakistan and India. For example, during the Kargil conflict, reports that both countries had activated and deployed their nuclear missile forces triggered intense international pressure on both countries. National actions, such as signaling, that play a role in deterrence strategy may thus be constrained by international pressure. In contrast, offensive conventional force deployments do not seem to engender the same level of concern in the international community.

¹⁷ Thomas Cochran, William Arkin and Milton Hoenig, *US Nuclear Forces and Capabilities*. (Cambridge, Massachusetts: Ballinger Publishing Company, 1984).

¹⁸ Paul Bracken has defined two levels of control. He refers to *political control* for statecraft and strategy and *provincial control* for efficient use of the armed forces. See *Managing Nuclear Operations*, pp 354-356.

3. Stability/Instability Resulting From Missiles

3.1. Stability and transparency

The United Nations defines transparency as “the systematic provision of information about specific aspects of military activities under formal or informal international arrangements.”¹⁹ Transparency can be unilateral, bilateral or multilateral, and governments do not typically ratify transparency agreements. Sometimes it is in a state’s best interest to act unilaterally to avoid misinterpretation of intent. In practice, there is a role for both transparency and opacity in missile threat perception reduction. Choosing *not* to share certain information can enhance stability. Such information includes system deployment locations, system vulnerabilities, and performance capabilities.

The answer to the problems highlighted in Section 2.0 lies in greater and controlled transparency. Selected transparency in missile-related activities can increase stability by increasing confidence in both sides. Actions to increase military transparency have historically been used to build confidence between adversaries and sometimes to build the foundation for subsequent arms control agreements.

When defining transparency actions for missiles, a matrix of potential information sharing actions and stability/instability impacts needs to be assessed. Figure 1 shows examples of actions that fit the quadrants of a stability/transparency matrix.²⁰ The destabilizing examples emphasize asymmetries in capabilities and failure to reveal important information that could lead to misinterpretation. The stabilizing examples show actions intended to avoid misinterpretation and to minimize vulnerabilities of critical assets.

¹⁹ United Nations Experts Group, *Study on Ways and Means of Promoting Transparency in International Transfers of Conventional Arms*, Report to the Secretary General, UN Document A/46/301, Sept. 9, 1991.

²⁰ Kent Biringer “Missile Threat Reduction and Monitoring in South Asia”, *The Stability- Instability Paradox: Nuclear Weapons and Brinkmanship in South Asia*, Michael Krepon and Chris Cagne, ed., Henry L. Stimson Center Report No 38, June 2001, p 59.

<p>DEMONSTRATE EXPANDED MISSILE RANGE AND PAYLOAD CAPABILITIES <i>(promotes arms race)</i></p>	<p>PROVIDE MISSILE TEST LAUNCH NOTIFICATION <i>(avoids misinterpretation)</i></p>	<p>TRANSPARENT</p>
<p>NO CONSULTATIONS ON MISSILE ALERT STATUS DURING CONVENTIONAL ARMED CONFLICT <i>(risks misinterpretation)</i></p>	<p>WITHHOLD A LIST OF WARHEAD STORAGE LOCATIONS <i>(minimizes vulnerabilities)</i></p>	<p>OPAQUE</p>
<p>DESTABILIZING</p>	<p>STABILIZING</p>	

Figure 1: Example of a Stability/Transparency Matrix

Generally, transparency leads to greater stability when the following criteria are achieved as a result of providing information:

- Increased symmetry of forces and/or capabilities
- Increased warning time or reduced likelihood of preemption success
- Reduced likelihood of misinterpretation of intent
- Reduced vulnerabilities for either side.

3.2. Stability Factors in South Asian Missile Deployment

To apply the stability matrix approach to South Asia, seven significant characteristics of ballistic missiles are analyzed for their stabilizing or destabilizing effects. This analysis is based on the associated level and effects of a chosen characteristic – that is, what is the effect on stability of the missile characteristic if it increases or decreases?

3.2.1. Time of Flight

Ballistic missiles are the fastest means to deliver a warhead to a target at long range. In a matter of a few minutes, a missile can travel hundreds of kilometers. In the South Asian context, missile flight times will generally be under ten minutes. Since geography is fixed, flight times only change as the targets and launch points change. There is some potential for relatively long-range missiles to be used against short-range targets

by flying in a depressed trajectory mode and decrease the typical time of flight by 2 or 3 minutes.²¹ Such use of long-range missiles assumes the country is willing to reduce a long-range missile's survivability by moving it close to its target, and to forgo the use of a scarce military asset against distant strategic targets. Because geography and the physics of flight are fixed, the effect of flight time is neutral. Flight time will always be short and the use of a technique like depressed flight trajectory makes a relatively small difference. The fact that flight times are short does, however, encourage a defending country to contemplate a more ready response posture (discussed in Section 3.2.6) that could include plans for a counter-launch under attack, or a preemptive attack on indication of an impending missile attack.

3.2.2. Range

Short-range missiles are much simpler to develop and cheaper to build than missiles of medium or intercontinental range. A long-range missile requires more powerful engines; a stronger, lighter structure; a more precise guidance system; and more protection against aerodynamic heating than does a short-range missile. Mere extrapolation of short-range rocket technologies is not sufficient.

The ranges of Indian and Pakistani missiles are currently sufficient to cover all the significant high value targets of each country (approximately 1500 – 2500 km). The ranges are also sufficient that each country can be assured of a wide enough dispersal of its missiles to make them secure against a preemptive strike. Future developments, therefore, will probably focus on payload, accuracy, and development of naval platforms. In the Indian and Pakistani dyad, therefore, increasing range has medium positive effect on stability.

What is not clear, however, is whether further increases in range will cause instability. India may seek to increase the range of its missiles to be able to strike deeper into China. This may cause China to focus greater attention on India's missile forces, and target them more aggressively. This may lead to greater numbers of Indian missiles, with a corresponding cascading effect on Pakistan's missile forces.

²¹ M. V. Ramana, R. Rajaraman, Z. Mian; Nuclear Early Warning Issues in South Asia: Problems and Issues, EPW Special Series, January 17, 2004.

3.2.3. Pre-launch Survivability

Missiles can be made difficult to destroy before launch. The US and the Soviet Union protected their ICBMs by installing them in hardened underground silos or by deploying them as submarine-launched ballistic missiles (SLBMs). Other options include basing them in caves or tunnels. Transporter-erector-launchers (TELs) can be used for all but the largest missiles and constitute small, hard-to-find, mobile targets. The most common basing option for regional ballistic missile forces is the TEL. TELs are cheaper than fixed silos and, as was shown in the 1991 Gulf War, quite survivable. Liquid-fuel mobile systems typically require larger support convoys and preparation time, which increase their vulnerability to detection and counter-attack.²² Both India and Pakistan have road-mobile launchers and India has built rail-mobile launchers for its Agni missiles.

Figure 2 illustrates that the survivability of a dispersed mobile missile force is quite high. Overall deterrence is maintained even if the opponent's weapons have a high probability of finding and destroying any single launcher in the dispersed force. The figure graphs the probability of destroying all the missiles in various sizes of a dispersed force versus various probabilities of destruction of a single launcher.²³ The probability of destroying a large proportion of the total number of launchers in all but very small force sizes is quite small.

The conclusion of this analysis is that deployed Indian and Pakistani missile forces are survivable. Consequently, neither is likely to be tempted to conduct a preemptive strike that will disable its enemy. Nor is either country likely to feel that it must launch its own forces on first indications of attack because it fears losing them. Therefore, crisis stability appears to be well established between India and Pakistan with each having a sufficient number of missiles to prevent an adversary from destroying them all (or even from destroying a sufficient number so the attacker's own damage would be lessened). Thus increased pre-launch survivability strongly increases stability.

²² Z. Mian, A.H. Nayyar, M.V Ramama; "Bringing Prithvi Down to Earth: The Capabilities and Potential Effectiveness of India's Prithvi Missile," *Science and Global Security*, Vol. 7, 3, (1998) pp. 333-360.

²³ These results are based on the mathematical analysis that if the probability of finding and destroying a single launcher is p , then the probability of finding and destroying N launchers is p^N .

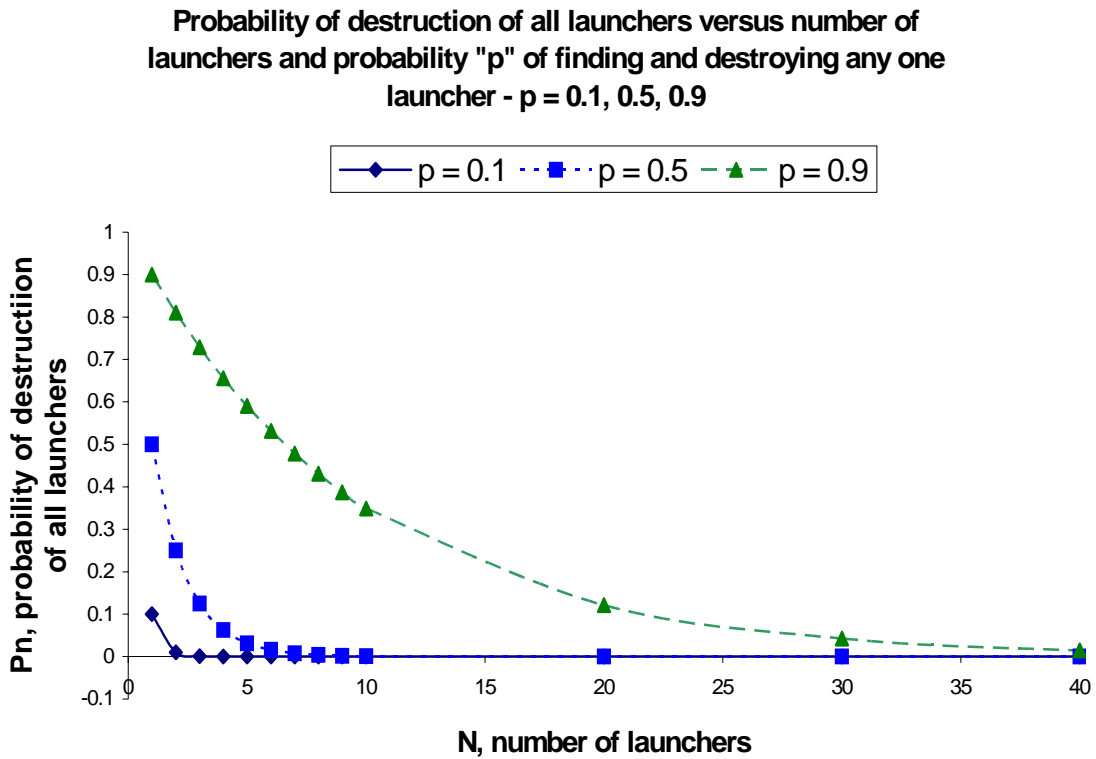


Figure 2: Probability of destruction of all launchers as a function of the number of launchers and probability of finding and destroying any one launcher

3.2.4. Accuracy

Circular error probable (CEP), the most common statistical measure of missile accuracy, is the radius of a circle within which 50 percent of the missiles aimed at the center of the circle will strike. Missiles currently in the stockpiles of regional powers typically have CEPs in the range of 300 to 1000 m. Thus, warheads with relatively large effects radii, such as WMD, are needed to achieve a significant probability of destroying a target. Missiles with low accuracy armed with conventional weapons have limited utility. They can, however, be used as terror weapons to demoralize civilian populations as Iraq did in its war with Iran during in the 1980s.

Advances in guidance technology, including the use of the Global Positioning System (GPS), may reduce CEPs to less than 100 m. Should this occur, the effectiveness of conventional warheads against unhardened tactical military targets (e.g., supply dumps) would be greatly increased. Lower yield nuclear weapons (with less collateral damage)

might also be contemplated. Increasing accuracy, therefore, creates new target options for a medium destabilizing effect.

3.2.5. *Autonomy after Launch*

Once launched, missiles are fully autonomous and cannot be recalled or diverted. The lack of control once a missile is launched means that the reliability of the command and control system is crucial. In contrast, there are cases of manned aircraft being recalled or diverted to other targets in flight. During periods of tension, an unauthorized or accidental launch might precipitate a conflict. Such a launch is quite unlikely however. The combination of autonomy with the potential for an accidental or unauthorized launch has a weak negative effect on stability.

3.2.6. *Response Time*

Given that missile flight times are always short (see Section 3.2.1), warning times are less, due to the time required for sensors to detect and identify an attacking missile. Response times are further reduced by the delay in communicating information to decision makers, assessing information, making decisions, and finally giving orders on how to respond. A strategic response might be to adopt a launch-on-warning posture. Missiles can be kept in various stages of readiness. They may be kept ready for firing within minutes, although continual maintenance must be performed. The risk with this strategy is that a country may respond prematurely as a result of not having time to fully assess the warning information received. During the Cold War, a number of incidents involved accidents and misinterpretations related to nuclear weapons and delivery systems.

India has declared a policy of assured yet delayed response modeled on China's approach. Pakistan's policy is more ambiguous but probably similar. Both strategies probably reflect the nations' relatively rudimentary command and control systems. Given missile flight times, decreasing response times to the level where it makes a difference would require a massive restructuring of command and control systems. It may not be technically feasible to achieve this goal. The requirement for the highest reliability would place extreme stress on the systems. Furthermore, the deployment strategy for missiles would have to be completely restructured resulting in a continuing armed and ready-to-launch status with commensurate requirements for reliability and safety. Consequently, a launch-on-warning strategy would be destabilizing.

3.2.7. Ambiguity about the Type of Warhead

Government statements frequently describe a missile system as “nuclear-capable.” This has resulted in the perception that ballistic missiles in the inventories of India and Pakistan have both conventional and nuclear warheads. Even if this is not the reality, the assumption on the receiving end will likely be that “any missile launched against it must be carrying a nuclear warhead.”²⁴ Aircraft have been used in a conventional role on South Asian battlefields historically while ballistic missiles have never been used in any role. Thus aircraft, even if capable of carrying a nuclear warhead (such as a Jaguar or F-16), do not carry the same danger of misperception once detected. Ambiguity regarding the nature of the warhead is exacerbated by the operational requirement for opaqueness regarding the number and location of missiles. Short-range, conventionally armed ballistic missiles could quite conceivably be used within the context of a limited war doctrine.²⁵ A dual nuclear-conventional capable system is therefore quite destabilizing because the opposing command systems will likely have little reliable information about its mission or nature of its warhead. Therefore, ambiguity about the type of a missile warhead strongly decreases stability.

3.2.8. Stability Features of Various Missile Characteristics in South Asia

Figure 3 presents a graphical summary of stability effects of the seven characteristics of missiles for South Asia. The direction of the arrow indicates whether a characteristic is stabilizing or destabilizing and the length indicates the relative extent to which it causes that effect. The lengths of the arrows are intended to be purely qualitative, signifying a strong, medium, or weak effect.

²⁴ Naeem Ahmad Salik, “Missile Issues in South Asia,” *The Nonproliferation Review*, Summer 2002, Volume 9, Number 2, pp. 47-48.

²⁵ Several analysts have written about the concept of limited war. See V. R. Raghavan, “Limited War and Nuclear Escalation in South Asia,” *The Nonproliferation Review*, Fall-Winter 2001, pp. 82-98.

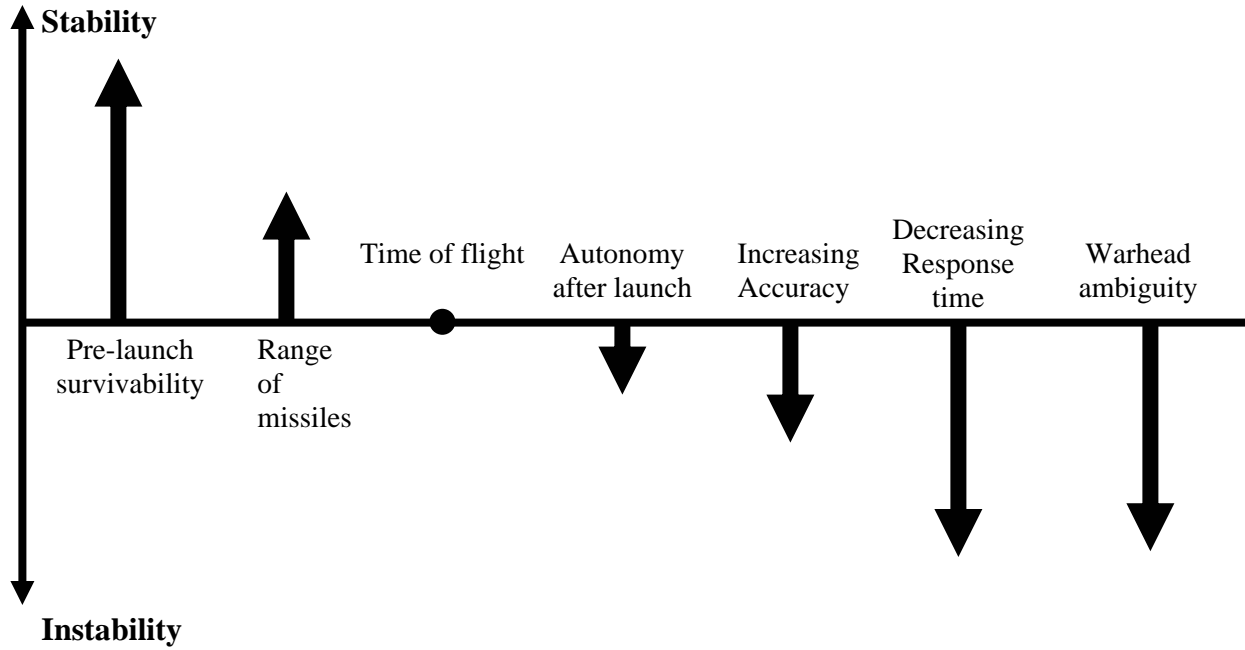


Figure 3: A qualitative comparison of the stabilizing/ destabilizing effects of various missile characteristics in South Asia

4. The Way Forward

4.1. Indo-Pak Cooperation and the Current Environment

Decreasing threat perceptions associated with missiles and decreasing the resultant incentives for an arms race in South Asia are daunting goals. Tensions between Pakistan and India have generally been high, and the last five years have been among the most difficult since independence. Recent events have raised trust back to the level where bilateral discussions are possible (the bilateral process effectively stopped after the Kargil conflict).

Missiles and nuclear weapons are not going to go away from South Asia in the foreseeable future. Their presence must thus be managed in a way that does not add to their destabilizing features while preserving the elements of deterrence. The purpose of the conceptual restraint regime presented in the following sections is to:

- Decrease the overall perception of threats created by missile development, induction, and deployment
- Remove the ambiguity created by missiles capable of delivering both conventional and nuclear warheads
- Decrease the risk of an unintentional exchange of missiles
- Increase the time for communication and consultation during a crisis
- Avoid a missile race by capping the ability to develop new classes of missiles while maintaining the existing capability for deterrence.

The following sections describe a set of options, both unilateral and bilateral, that could contribute to rebuilding the India-Pakistan relationship and prepare the ground for subsequent steps in structural arms control. The purpose of this report is to stimulate thinking and constructive discussion about what kinds of initial steps towards restraint might be taken in South Asia. Current bilateral relations are not yet ready to accept cooperative forms of technical monitoring. Consequently, many of the initial steps in the following conceptual regime are declaratory and unilateral. Some have features that can be verified by ongoing national intelligence activities. All have the potential to expand into bilateral cooperative actions.

4.2. A Phased Approach

Recognizing the difficulty in rebuilding India-Pakistan relations, we have attempted to craft a phased approach made up of three distinct phases.

Phase 1: Tension Reduction Measures

Given that relations have been poor in the recent past, a series of unilateral and bilateral measures are proposed to reduce tensions and reinforce recent moves toward a constructive bilateral dialogue. Several bilateral military-to-military initiatives are also proposed.

Phase 2: Confidence Building Measures

Once relations have begun to normalize, the process of confidence building should begin. This phase formalizes bilateral understandings developed in Phase 1.

Phase 3: Arms Control

When confidence increases to the point where credible security commitments can be made, arms control agreements should be negotiated.

In the next section, details of how such a phased approach could be implemented are presented. The options are intended to be mutually reinforcing. Although all options contribute to the establishment of a stabilization regime, benefits can still be derived from a regime that selectively incorporates these concepts.

5. Lighting the Way

5.1. Phase 1 – Tension Reducing Unilateral and Bilateral Measures

The first phase would consist of measures that are designed to be tension reducing, politically acceptable and operationally simple to implement. All measures, whether unilateral or bilateral, would be in the self-interest of the party undertaking them.

5.1.1. Unilateral Measures

The list of measures presented here is not meant to be exhaustive. Rather, we seek to illustrate the types of measures that could form a part of this phase.

- *Exercise restraint in public statements and displays of missiles.* Official statements boast of the power of the nation's missiles and imply that the government is ready to use them. These actions contribute to unrealistic public expectations about the national ability to use missiles that could make defusing a crisis problematic. Official statements should be carefully worded to inform rather than threaten (e.g., name a targeted country). Missile displays should be restricted to military facilities. National Day parades should not emphasize missiles as exceptional weapons.²⁶
- *Reinvigorate existing agreements on notifications of military exercises.* Existing agreements on notifications of military exercises, frozen for several years, should be reaffirmed and restarted. The existing agreements are, by definition, bilateral but restarting their implementation could be unilateral. For example, one country could unilaterally make its declarations under the agreement even if the other did not respond at the same time. A unilateral step hopefully, would lead to reciprocity at some time and eventually a full bilateral resumption of the agreement.
- *Declare no use of artillery rockets across the Line of Control in Kashmir or the Actual Ground Position Line in the Siachen Glacier.* Both India and Pakistan possess unguided artillery rockets whose range (typically 50 km) exceeds that of conventional artillery (typically 20 km). The use of artillery rockets raises the risk they might be mistaken for a ballistic missile launch and thus escalate a conflict. Disavowing their use would reinforce the ceasefire declared in November 2003.

²⁶ Some missile monuments in Islamabad were taken down for a regional summit of South Asian leaders in January 2004. This unilateral step by the host was seen by many observers as tension reduction step which augured well for making the atmosphere conducive for the momentous event

- *Declare that no nuclear warheads are routinely mated to missiles.* An official declaration to this effect would decrease tensions by reducing ambiguity.
- *Agree not to conduct flight tests during crises.* Although ballistic missile flight-tests are essential to validate technical designs, both India and Pakistan have created a process in which the timing of missile tests and related actions is used as an instrument of strategy. In the Compound Crises of 2001-2002, missile flight-tests and accompanying rhetoric were used as tools to send political signals of strategic deterrence and resolve.²⁷ This process was disparagingly termed as “missile antics” by an Indian official spokesperson, although India has responded in a tit-for-tat fashion to Pakistan’s missile tests.²⁸
- *Continue and reinforce the practice of advance announcement of missile tests.* Announcements of missile tests have been made informally after the Lahore Memorandum of Understanding (MOU). The notification process is somewhat ad hoc without a clearly established prior notification period. India and Pakistan typically provide 2 to 3 days notice – an increase to 7 days notice will help to decouple tests from political events and still provide flexibility for technical development. Each side would be better prepared to observe and track the other’s tests when they occur, eliminating the possibility of hostile misperception, and providing limited transparency about missile capabilities. If a test were cancelled for technical reasons, that announcement would also be a confidence building measure. In a parallel move, each side should declare their missile test sites. The culture of security associated with missile development may resist declarations about test sites. However, the other side learns this information after a test so there is no substantive change in the status quo. The declaration would remove ambiguity, and lead to better observation of each other’s tests. These steps could be initiated unilaterally, and later converted into a formal bilateral measure.

²⁷ The December 2001 attack on the Indian Parliament led to a massive military mobilization by India (matched by Pakistan) and a confrontation along their borders, including naval deployments, that came perilously close to war when a second attack occurred in May 2002 at Kaluchak, Kashmir.

²⁸ India’s External Ministry spokeswoman said in a televised statement on May 28, 2002 that “India was not impressed with such missile antics by Pakistan.”

5.1.2. Bilateral Measures

- *Institutionalize a forum to review and improve the implementation of existing CBMs.* This forum should be established first at the bilateral level. It could be constituted with the assistance of interested third parties ready to support CBMs.
- *Strengthen existing agreements on notifications of military exercises.* Existing agreements on notifications of military exercises could be strengthened by reducing the force levels at which notifications are needed, as well as increasing the distance from the border at which troop movements need to be identified. Notifications of ballistic missile units participating in military exercises could be an important component of enhanced agreements.
- *Increase cooperation in international treaties and organizations.* India and Pakistan should cooperate in the implementation of international treaties to which they are both parties. They should also cooperate in the development of new global norms in the Conference on Disarmament.
- *Initiate official military-to-military contacts.* Military-to-military measures that would facilitate mutual understanding. Although these options are not directly related to missiles, increased contacts between the militaries would build experience in bilateral relations that facilitates future bilateral security discussions.
 - Initiate joint training for search and rescue or anti-piracy missions. International agreements provide a framework for such cooperation.
 - Encourage out-of-region joint peacekeeping. There are precedents for Indian and Pakistani cooperation in Somalia and Sierra Leone.
 - Encourage joint participation in foreign military schools. Such interaction already occurs informally under unplanned circumstances.

5.2. Phase 2 – Confidence Building Measures

The aim of the second phase of the proposed process is to establish strategic restraint. Starting from agreements and understandings reached at the summits in Lahore in 1999 and Agra in 2001, and with an increase in civility brought about by previous tension reducing measures, this phase will seek to reinforce, develop, and formalize the unilateral and bilateral measures instituted previously.

Actions taken in this phase could involve the following.

- *Developing joint delegations to various international bodies.* Joint delegations could be sent as observers to international bodies with oversight of arms control agreements, such as the Organization for Security Cooperation in Europe (OSCE).
- *Declare some elements of the national missile command and control structure.* The lack of knowledge by one side of the other's missile command and control structure increases concerns about unauthorized or accidental launches. The Lahore Declaration recognized this risk.²⁹ This topic obviously contains sensitive national security information but some declarations can still be made. An example of such limited transparency could be the establishment and announcement of a personnel reliability program for missile and nuclear weapon crews.
- *Formalize a bilateral missile test notification agreement.* Unilateral declarations on missile test flights and test sites from Phase 1 should be formalized into a bilateral agreement. The Lahore MOU called for, but did not create, a formal mechanism requiring advance test notification.³⁰
- *Invite observers to missile tests or military exercises.* These observers could be from third countries, media, and/or from the other country. The observers would increase transparency regarding capabilities and thereby enhance stability. The concept of inviting observers may be controversial. However, visitors from friendly countries are currently invited to observe tests and national media televises tests for later broadcast. Concern about exchanging observers will center on the potential loss of national security information and risk of loss of national prestige if a test fails. Neither of these concerns is sufficiently significant to block an exchange. There is a large body of experience from international inspections in how to conduct on-site inspections such that unrelated sensitive information is not compromised. A test that fails catastrophically will be obvious to national technical means (NTM) systems so the presence of observers will not change perceptions.

²⁹ It stated: "The respective governments ... shall take immediate steps for reducing the risk of accidental or unauthorized use of nuclear weapons and discuss concepts and doctrines with a view to elaborating measures for confidence building in the nuclear and conventional fields, aimed at the prevention of conflict."

³⁰ The text states: "The two sides undertake to provide each other with advance notification in respect of ballistic missile flight tests, and shall conclude a bilateral agreement in this regard."

- *Bilaterally declare that missiles with less than 150 km range are non-nuclear systems.* Short-range missiles have primarily tactical, war-fighting applications. Official government statements have described a “nuclear capability” for these missiles. There is much ambiguity about whether nuclear weapons actually exist for these systems and, if so, whether there are plans to use them in both conventional and nuclear roles. Consequently, the movement of any missile of this type for any reason becomes provocative. If a conventional conflict does break out, the use of these systems in a conventional role could be mistaken for nuclear operations. Eliminating ambiguity about the type of warhead carried by these missiles would be a stabilizing measure. This option would set a precedent by declaring that the shortest range ballistic missiles in each national force (the Pakistani Hatf-1 and the Indian Prithvi-1) are non-nuclear. These missiles have limited potential as nuclear delivery systems because of their short range.
- *Establish new consultative lines of communication between command authorities* The Director General of Military Operations (DGMO) hotline has functioned for some time. This hotline is somewhat limited in regard to potential activities of concern conducted by missile and air forces. This option is intended to increase transparency in activities that might be perceived as threatening. New hotlines could also be established between Air Force and Navy DGMOs. This cooperation implies that officials are always willing to communicate during an emergency.
- *Establish “Risk Reduction Centers” at the National Command Authorities.* The US and the USSR created *Nuclear Risk Reduction Centers* (NRRCs) to facilitate communication and implement arms control and security agreements. India and Pakistan could establish a similar institution modified to account for South Asian conditions.³¹ The Centers would serve as a tangible way to build mutual trust and reassurance and prevent misperceptions.

³¹ This author has proposed the establishment of “New Communication Mechanism” in a separate initiative by the Center for Strategic and International Studies (CSIS) to be published in 2004. For a similar proposal see Colonel Rafi uz Zaman Khan, “Pakistan and India: Can NRRCs Help Strengthen Peace?” Occasional Paper No. 49 (Washington DC: Stimson Center, 2002).

- *Initiate additional military-to-military contacts.* There are several areas where military-to-military contacts could be undertaken. Such interactions could also include personnel from civilian defense organizations.
 - Coordinate responses in hijacking, piracy, smuggling or other border incidents.
 - Cooperation in non-sensitive military-related technical topics such as the disposal of hazardous chemicals or obsolete munitions.

5.3. Phase 3 – Structural Arms Control

Once confidence has been increased, arms control agreements could be sought. Arms control regimes could involve placing operational restraints on missile forces or reducing numbers of weapons systems. Potential arms control agreements include the following.

- *Limit the number and frequencies of missile tests.* The missile test notification agreement proposed in Phase 2 could evolve into an arms control agreement by limiting certain test activities. New developmental systems require more frequent tests. A limit would serve to slow or cap development of new, potentially destabilizing systems, while enabling each side to maintain the safety and reliability of their existing missile forces. A missile test limitation agreement (including sea-launched types) could include some or all the following features:
 - Declare national test sites and restrict testing activity to these locations
 - Declare annual plan for testing and limited numbers of tests
 - Limit test frequency
 - Limit flight direction and/or range.
- *Declare or establish an agreement that no missile garrisons will be located within a specified distance from the border.* This declaration would prevent battlefield short-range missiles from being placed in a high-alert status. Missiles are normally stored and maintained in garrisons. By keeping missiles a significant distance (e.g., 75-100 km) from the border relative to their range, missiles will be unable to launch in place and have to move to firing sites closer to their targets. This adds stabilizing delay to a crisis. Verification might be conducted unilaterally using national intelligence systems, however inspection visits to declared garrisons by national representatives, third parties, or international media could be conducted as

well. The successful Intermediate Range Nuclear Forces (INF) Treaty between the US and USSR contains useful precedents for inspections.

- *Establish a bilateral agreement to declare missiles with ranges between 150 and 250 km range as non-nuclear systems.* The bilateral declarations made in Phase 2 regarding the non-nuclear status of specific short-range missiles should be formalized into an agreement and expanded to systems with up to 250 km range. This would include the Pakistani Hatf-2 and the Indian Prithvi-2.
- *Establish an agreement to eliminate ballistic missiles with less than 150 km range.* Once short-range missiles have been assigned a solely conventional role, the elimination of the shortest range systems should be considered. The conventional efficacy of such systems is limited as they have fairly large CEPs. Elimination could be verified using monitoring techniques from the INF and START Treaties.
- *Establish a bilateral nuclear test ban.* New or improved missiles will likely require different warhead capabilities (e.g., yield, physical size, weight). Achieving these capabilities is significantly easier if nuclear tests are conducted. Both India and Pakistan have been observing an informal nuclear test moratorium. This moratorium was cited in the Lahore MOU.³² A bilateral agreement would be independent of the Comprehensive Nuclear Test Ban Treaty and does not imply a change in national positions on that treaty. A bilateral test ban would preserve the two nations' existing nuclear deterrent while decreasing the potential for an expensive missile and nuclear arms race. Verification of the test ban can be conducted by remote seismic and radiochemical monitoring from locations within the respective national territories. The two countries could share nationally collected seismic and geophysical data. An additional measure, that would have significant potential as a confidence building measure, is to permit each side to establish seismic monitoring stations within the territory of the other. These seismic stations, not be located in or even near national nuclear test sites, would serve to confirm measurements made from outside the country.

³² The text states: "The two sides shall continue to abide by their respective unilateral moratorium on conducting further nuclear test explosions unless either side, in exercise of its national sovereignty decides that extraordinary events have jeopardized its supreme interests."

6. Conclusions

Missiles are now a fact of life in the security dynamic between India and Pakistan. Their entry into the subcontinent is a result of the chronic political and military conflict since independence. While serving a useful role as a stabilizing nuclear and conventional deterrent to aggression, they also have destabilizing effects such as being a tool for public propaganda, stimulating an arms race, raising concerns about plans for pre-emptive strikes, blurring the distinction between conventional and nuclear weapons, and risking escalation as a result of loss of control during a conflict. There are a number of actions, however, that can improve current conditions and head off future problems.

The remedy for this instability lies in mutual restraint for missile-related activities facilitated by selective transparency. This paper has presented a conceptual restraint regime for India and Pakistan that assumes a low initial level of confidence and evolves over time. Significant early steps are possible that build on precedents and do not require extensive cooperation. The initial goal of the regime is to make missiles a security topic for bilateral discussion, initiate unilateral steps that are substantive and build confidence, and set the precedent for limited bilateral cooperation. A mid-term phase could expand transparency measures, formalize bilateral understandings, and begin discussion and experimentation with monitoring procedures. A long-term phase could include bilateral agreements limiting or reducing some characteristics of national missile forces with the cooperative incorporation of monitoring and verification.

The steps presented to increase stability support the concept of minimum credible deterrence advocated by both countries. In order to be most effective, the options presented should be integrated into a system, or regime, for stability. Public confidence in these initiatives is important. Public confidence drives politics, which, in turn, defines the acceptability of cooperation. The benefit of strategic stability needs to be made clear to the respective publics. The process of building a restraint regime of stability can evolve over time as confidence and experience increase.

About the Authors

Brigadier General (retired) Feroz Khan served with the Pakistani Army for 30 years. He served domestically and abroad with numerous assignments in the United States, Europe, and South Asia. He has experienced combat action and command on active fronts on the Line of Control in Siachin Glacier and Kashmir. He held the post of Director, Arms Control and Disarmament Affairs, within the Strategic Plans Division, Joint Services Headquarters till 2001. Among his academic degrees, he holds a M.A. from the Nitze School of Advanced International Studies.

Since the mid 1990's he has been making key contributions in formulating and advocating Pakistan's security policy on nuclear and conventional arms control and strategic stability and restraint in South Asia. He has produced recommendations for the Ministry of Foreign Affairs and represented Pakistan in several multilateral and bilateral arms control negotiations. He has written and participated in several security related national and international conferences and seminars and has also been teaching as a visiting faculty at the Department of the Defense and Strategic Studies, Quaid-e-Azam University, Islamabad.

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