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Nuclear Risk-Reduction Measures in Southern Asia

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About the Project

The Henry L. Stimson Center has been working to promote confidence-building measures (CBMs) in regions of tension since 1991. Our CBM Project programming now focuses primarily on India, Pakistan, China, and Japan. We have also carried out workshops and briefings for officials and visitors from Latin America and the Middle East.

The Center's CBM programming has six main components:

- First, we hold a series of meetings on CBMs in Washington for diplomats and military attachés, media, executive and legislative officials, and representatives from nongovernmental organizations. These meetings provide an opportunity to discuss problem-solving ideas in a congenial setting.

- Second, we commission papers to stimulate thinking and problem-solving CBM approaches within regions of interest. We are interested in developing the theory as well as the practice of CBMs. Towards these ends we compare CBM experiences in different regions. We are also interested in collaborations across borders to encourage networking. We publish commissioned work as funding permits.

- Third, with local co-sponsorship, we convene workshops on CBMs within countries of interest, reaching key target audiences: government officials, military officers, journalists, academics, and researchers.

- Fourth, we host a Visiting Fellows program, whereby talented individuals from India, Pakistan, and China carry out research and writing on the theory and practice of CBMs at the Stimson Center.

- Fifth, we publish and distribute widely materials on CBMs. We also place our CBM publications and non-published work on the Stimson Center's website (www.stimson.org).

- Sixth, we moderate a cross-border internet dialogue, known as the Southern Asia Internet Forum, designed to generate open dialogue, and broaden the scope of discussion, among individuals working on security issues in the region.

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List of Abbreviations

APHC	All Parties Hurriyat Conference (India)
ABM	Anti-ballistic missile system
APC	Armored personnel carriers
ATACMS	Army Tactical Missile System (United States)
AEC	Atomic Energy Commission (India)
BSF	Border Security Force (India)
CRPF	Central Reserve Police Force (India)
CTBT	Comprehensive Test Ban Treaty
CBMs	Confidence-building measures
DRDL	Defence Research and Development Laboratory (India)
DRDO	Defence Research and Development Organisation (India)
DGMO	Director General of Military Operations
GSQR	General Staff Quality Requirements
IAF	Indian Air Force
ISRO	Indian Space Research Organisation
IGMDP	Integrated Guided Missile Development Program
ICBM	Inter-continental ballistic missile
ISI	Inter-Services Intelligence Directorate (Pakistan)
INF	Intermediate Nuclear Force Treaty
IRBM	Intermediate-range ballistic missile
JKLF	Jammu & Kashmir Liberation Front
LCA	Light combat aircraft
LAC	Line of Actual Control (Sino–Indian border)
LoC	Line of Control (Indo–Pakistani border in Kashmir)
MBT	Main battle tank
MRBM	Medium-range ballistic missile
MTCR	Missile Technology Cut-off Regime
NATO	North Atlantic Treaty Organization
NRRMs	Nuclear risk-reduction measures
NPT	Nuclear Non-proliferation Treaty
NWS	Nuclear Weapons States
PNE	Peaceful nuclear explosion
PGM	Precision-guided munitions

ROE	Rule of Engagement
SLV	Satellite Launch Vehicle
SAARC	South Asian Association of Regional Cooperation
START	Strategic Arms Reduction treaties
SLBM	Submarine-launched ballistic missile
SAM	Surface-to-air missile
SSM	Surface-to-surface missile
TEL	Transporter-erector-launcher
UNMOGIP	United Nations Military Observer Group in India and Pakistan

Introduction

India and Pakistan have now embraced the language, if not the spirit of confidence-building measures (CBMs). Government officials, media commentators, and researchers now use this term frequently. In China, the language of confidence-building measures is still used sparingly, and mostly with foreigners. Over time, this, too, is likely to change.

CBM accords in southern Asia have been negotiated between India and Pakistan as well as between India and China. Implementation of agreements between India and Pakistan, however, has been spotty, at best. Hotlines installed to ensure open communication channels between political and military leaders regularly fall silent during periods of tension. This problem is particularly evident along the Line of Control (LoC) dividing Kashmir, where the level of violence has grown appreciably in recent years. Both countries claim that a 1991 accord banning airspace incursions by military aircraft is periodically violated. In contrast, implementation of Sino–Indian CBMs has proceeded in a more professional manner, but the pace of progress has been quite slow.

The need for better implementation of existing CBMs—and the negotiation of new accords—in southern Asia has been heightened since May 1998, when India and Pakistan carried out nuclear tests. These tests direct greater attention to ballistic missiles that can carry lethal payloads—missiles that either now reside in Indian, Pakistani, and Chinese inventories or will appear soon enough. Nuclear testing on the subcontinent has also focused international attention on the Kashmir issue, still unresolved after fifty years of rancor, two wars over this territory, and recurring crises.

The term "confidence-building measures" covers much ground. CBMs can usefully encompass economic initiatives, people-to-people and cultural exchanges, as well as security arrangements. In light of the potentially dire repercussions that could result from heightened nuclear dangers in southern Asia, the Stimson Center suggests that more focus be placed on a subset of CBMs dealing directly with the problems at hand—nuclear risk-reduction measures (NRRMs).

The nuclear tests by India and Pakistan have highlighted the triangular nature of security concerns and nuclear dangers in southern Asia. Pakistan's nuclear and missile programs owe much to Chinese support. While Pakistan measures its security requirements against India, India must pursue more complex strategic planning, factoring in China as well

as Pakistan. Measures to reduce nuclear risks in southern Asia must take into account this three-cornered dynamic.

Nuclear dangers can arise from the deployment and flight testing of ballistic missiles, from unusual activities associated with conventional forces, and from the increased violence occurring along the LoC. The three essays in this publication offer specific recommendations for NRRMs to deal with these concerns.

Dr. W.P.S. Sidhu, currently a Visiting Scholar at the Center for International Security and Cooperation at Stanford University, examines the complex dynamics behind ballistic missile development and testing in South Asia. His essay, "India's Security and Nuclear Risk-Reduction Measures," reviews three possible scenarios of missile regimes in the region, concluding that non-deployment with associated NRRMs offers the best possibilities for nuclear safety. Brian Cloughley, a former member of the United Nations Military Observer Group in India and Pakistan, discusses NRRMs along the LoC in Kashmir. His essay, "Nuclear Risk-Reduction Measures in Kashmir," proposes concrete steps to reduce dramatically the level of violence across the Line to foster an atmosphere more conducive to a settlement of the Kashmir dispute. Former ambassadors John H. Hawes and Teresita Schaffer suggest ideas for "open skies" accords for this troubled region in their essay, "Risk Reduction in South Asia: A Role for Cooperative Aerial Observation?" Their recommendations may appear ambitious for southern Asia, but these practices have already proven their worth in other troubled regions, including the Middle East.

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Michael Krepon
Michael Newbill

India's Security and Nuclear Risk-Reduction Measures

W.P.S. Sidhu

South Asia in general, and India and Pakistan in particular, exist in a state of violent peace: a state in which friction points erupt into periodic battles or brief gory conflicts, but there is no war—declared or undeclared.[1] These friction points manifest themselves in different forms, ranging from low intensity conflict and border skirmishes, to a medium intensity conflict in a localized area. This state also exists to some extent between India and China, although it is not overtly violent.

This state of violent peace, and the absence of interstate war, between India and Pakistan has continued since 1971, and has been subsequently attributed to the tacit belief of each side in the other's veiled nuclear weapons capability. This opaque nuclear scenario has been described variously as "recessed deterrence," "nonweaponized deterrence" or even "existential deterrence."[2] However, after the May 1998 tests it could be argued that the demonstrated capability to use nuclear weapons has added a new and unknown element to the existing state of violent peace. Although this perception is primarily premised on the nuclear weapon capability, both missile and aircraft-based delivery systems are also important components of any nuclear arsenal. Thus, the presence of both missile and aircraft-based delivery systems is also regarded as a vital component of the South Asian brand of deterrence and violent peace.

Many optimistic scholars argue that weaponisation of the hitherto unexercised nuclear capability in South Asia is a welcome development, as it will lead to peace and

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[1] This state has also been described as one of "ugly stability" on account of the "inability of both India and Pakistan to attain what may be desired political objectives through war." See Ashley J. Tellis, *Stability in South Asia*, RAND Documented Briefing (Santa Monica, Calif.: RAND Corporation, 1997), 5.

[2] See Devin Hagerty, "Nuclear Deterrence in South Asia: The 1990 Indo–Pakistani Crisis," *International Security*, 20, no. 3 (Winter 1995–96): 87, for "existential deterrence;" George Perkovich, "A Nuclear Third Way in South Asia," *Foreign Policy*, no. 91 (Summer 1993): 86, for "non-weaponized deterrence;" and Air Commodore Jasjit Singh, "Prospects for Nuclear Proliferation," in Serge Sur, ed., *Nuclear Deterrence: Problems and Perspectives in the 1990s* (New York, NY: United Nations Institute for Disarmament Research (UNIDIR), 1993), 66, for "recessed deterrence."

strategic stability.[3] They argue that an overt nuclear status will remove the ambiguity and uncertainty that were implicit in the non-weaponized status of both India and Pakistan. An overt nuclear status would provide both certainty and stability. Moreover, possession of nuclear weapons will eliminate the possibility of war, including conventional war, as both India and Pakistan would be reluctant to launch a conventional war for fear that it may escalate into a nuclear exchange. Thus, Kenneth Waltz asserts, new nuclear states locked in hostile pairs will be forced to deal cautiously with each other.[4] In fact, instead of tension, the nuclear capability will lead to "possibilities for a less worried and more relaxed life."[5] Similarly, Devin Hagerty in his detailed study of the 1990 Indo–Pakistani crisis, argues that the past practice in South Asia "indicates that in the area of crisis stability, the logic of nuclear deterrence is more robust than the logic of nonproliferation."[6] He concludes: "The 1990 Indo–Pakistani crisis lends further support to the already impressive evidence that the chief impact of nuclear weapons is to deter war between their possessors."[7]

After the May 1998 tests, it could be argued that the demonstrated capability to use nuclear weapons has added a new and unknown element to the existing state of violent peace.

This view is not unanimous and has been challenged by other scholars. For instance, Neil Joeck considers that the nuclear weapon capabilities have not created strategic

[3] The optimists have been identified in David J. Karl, "Proliferation Pessimism and Emerging Nuclear Powers," *International Security*, (Winter 1996–97): 88–90. They include Kenneth Waltz in Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York, NY: W.W. Norton and Company, 1995); Martin van Creveld, *Nuclear Proliferation and the Future of Conflict* (New York, NY: Free Press, 1993); Peter R. Lavoy, "Civil–Military Relations, Strategic Conduct, and the Stability of Nuclear Deterrence in South Asia," in Scott Sagan, ed., *Civil–Military Relations and Nuclear Weapons* (Stanford, Calif.: Stanford University Center for International Security and Arms Control, June 1994), 79–109; and Devin Hagerty, "The Power of Suggestion: Opaque Proliferation, Existential Deterrence, and the South Asian Nuclear Arms Competition," in Zachary S. Davis and Benjamin Frankel, eds., *The Proliferation Puzzle: Why Nuclear Weapons Spread (And What Results)*, special issue of *Security Studies* 2, no. 3–4 (Spring–Summer 1993): 256–83 and "Nuclear Deterrence in South Asia."

[4] Sagan and Waltz, *The Spread of Nuclear Weapons*, 10–17.

[5] Ibid., 41.

[6] Hagerty, "Nuclear Deterrence in South Asia," 84.

[7] Ibid., 114.

stability.[8] Similarly, Eric Arnett argues that the continued emphasis on planning for a conventional war is an "indication that Indian military planners do not take the Pakistani nuclear capability seriously."[9] While accepting that the nuclear capabilities may be "deterrence stable," another cautions that they are not "crisis stable." In fact, "nuclear capability on both sides of the border has made the region positively safe for insurgencies aided and abetted by outsiders."[10]

Hence, this group argues that the induction of nuclear-capable missiles and nuclear-capable aircraft (which are also capable of delivering advanced, conventional, precision-guided munitions) are particularly destabilizing for three reasons. First, nuclear capabilities do not help resolve ongoing conflicts. Second, were an attempt made to resolve the conflict with conventional means, the situation might escalate to the nuclear level, particularly as the delivery systems could be used for both conventional and nuclear roles. Third, there is the inherent danger of the inadvertent or accidental use of the nuclear weapon capabilities. While neither stability nor instability arguments can be proven, what does emerge from this debate is that the attempt to move from a non-inducted and non-deployed stage to one where nuclear-capable missiles are inducted and deployed adds a new and unknown dimension to the already tense standoff between India, Pakistan and China, creating a potentially dangerous situation.

Although all three countries possess nuclear-capable aircraft, and the ability to deliver these weapons by air, this essay does not consider aircraft for three reasons. First, nuclear-capable aircraft are not new and there already exists a "library" of their movements, particularly between India and Pakistan. Both sides can predict with some degree of certainty any preparations for a strike, which is evident by the activation of forward air force

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[8] Neil Joeck, *Maintaining Nuclear Stability in South Asia*, Adelphi Paper 312 (Oxford: Oxford University Press for The International Institute for Strategic Studies, 1997), 12.

[9] See Eric Arnett, "Nuclear Stability and Arms Sales to India: Implications for U.S. Policy," *Arms Control Today* 27, no. 5 (August 1997): 8, which looks at the offensive strategy of the Indian Air Force (IAF). More recently, however Arnett has conceded that the IAF's precision-guided munitions and offensive counter-air capability takes the Pakistani nuclear capability seriously and are designed to deny the Pakistan nuclear delivery system. See Arnett, "Conventional Arms Transfer and Nuclear Stability in South Asia," in Arnett, ed., *Nuclear Weapons and Arms Control in South Asia after the Test Ban* (Oxford: Oxford University Press for the Stockholm International Peace Research Institute, 1998), 76–84.

[10] Kanti Bajpai, "Thinking the Unthinkable," *Security, Technology and Arms Control News* 2, no. 3 (February 1996): 2. See also Michael Krepon, "A Highly Damaging Scenario," *The Hindustan Times*, 12 March 1995.

bases.[11] Second, even aircraft in hardened shelters are vulnerable and can be destroyed in a preventive or preemptive attack. This is not the case with missiles, which can be mobilized and fired from unprepared sites, making them harder to detect and destroy. Third, aircraft are relatively easy to detect, thereby facilitating interception. There is no assurance that a nuclear weapon delivered by aircraft will actually reach the target. In contrast, even if missiles are detected, they are almost impossible to intercept given their high speeds, short flight times, and low radar cross-sections.

Even if missiles are detected, they are almost impossible to intercept given their high speeds, short flight times, and low radar cross-sections.

There are three additional reasons to consider the threat posed by the deployment of nuclear-capable missiles. First, these missiles are new weapons and very little is known about their capability or performance. For instance, the *Prithvi* was initially designed to be conventionally armed but has now been declared nuclear capable.[12] Second, how will these missiles be used? Although India has asserted that they will be used only against military targets, both static (such as airfields) and mobile (such as troop concentrations), it is not clear when exactly they would be used in a conflict. While traditional deployment patterns for missiles (particularly with conventional warheads) suggest a proclivity for a preemptive strike doctrine, it is not clear whether Indian doctrine is confined only to early use or whether it considers a late use once the conflict is underway. If it is the former, would the

[11] Attention was paid to this element during the 1986–87 Indian "Brasstacks" exercises and the 1990 crisis that followed the *Zarb-i-Momin* exercises of Pakistan. During the Brasstacks crisis India observed that while Pakistan had concluded its air exercise, code-named "Highmark," some of the satellite airfields remained on alert. Similarly, during the 1990 crisis, one of the indicators that observers used to discount a crisis was the absence of a state of alert of forward air bases. For discussion of the "Brasstacks" exercises, see Kanti Bajpai, P.R. Chari, Pervaiz Iqbal Cheema, Stephen P. Cohen, and Šumit Ganguly, *Brasstacks and Beyond: Perception and Management of Crisis in South Asia* (New Delhi: Manohar, 1995), *passim*, and Inderjit Badhwar and Dilip Bobb, "Game of Brinkmanship," *India Today*, 15 February 1987, 26. For studies of the 1990 crisis, see Hagerty, "Nuclear Deterrence in South Asia," and Michael Krepon and Mishi Faruqee, eds., "Conflict Prevention and Confidence Building Measures in South Asia: The 1990 Crisis," Occasional Paper No. 17 (Washington, D.C.: The Henry L. Stimson Center, April 1994), 13–19.

[12] According to official specifications, the *Prithvi* "is designed to meet the requirements of artillery to engage targets beyond the range of field guns and unguided rockets" and can carry five interchangeable conventional warheads. These include pre-fragmented monolith; bomblet sub-munitions; incendiary; blast-cum-shock sub-munitions; and practice. The *Prithvi* has been compared with the conventionally-armed TOCHKA (USSR) and the ATACMS (USA) tactical surface to surface missiles. See Project Director *Prithvi* DRDL, "Surface to Surface Missile Comes of Age in India," *Artillery Journal* (1990): 54–5. After the tests in May 1998, however, Dr. A. P. J Abdul Kalam declared that *Prithvi* was also nuclear-capable. See Waheguru Pal Singh Sidhu, "India Sees Safety in Nuclear Triad and Second Strike Potential," *Jane's Intelligence Review* 10, no. 7 (July 1998): 23.

movement of the missiles close to the border signal an impending strike, as was perceived by Pakistan in 1997 when the *Prithvis* were "stored" at the frontier town of Jullandhar?[13] Also, would there be a different doctrine of deployment and use for the nuclear-tipped and conventionally-tipped missiles?

Third, since these missiles have never been used, there is no library about their movements, as is the case with other conventional weapon systems. In the case of tanks, for instance, both sides know their exact peacetime, training, and forward locations and can reliably forecast whether the armor is preparing for training or war. Therefore, tanks west of the Indira Gandhi canal cause concern in Islamabad, while a concentration of Pakistani armor in the Shakargarh bulge area set alarm bells ringing in New Delhi. This is not the case with missiles as their peacetime, training, and forward locations are still being worked out and remain unknown to the other side. Also, as both sides have never deployed missiles before, neither side can be sure whether a movement is aggressive or benign. Thus any movement of the missiles, particularly close to the border, signals belligerence, particularly if it is undetected by one side, but observed and publicly revealed by a third party.

While there are many legitimate reasons . . . for India to flight test, move, induct, and deploy missiles, any movement along these lines could also set off a crisis and raise the possibility of conflict.

Herein lies the irony. While there are many legitimate reasons, as we shall see in the next section, for India to flight test, move, induct, and deploy missiles, any movement along these lines could also set off a crisis and raise the possibility of conflict. This is the dilemma that faces India: how to learn more about "using" missiles without unnecessarily escalating regional tensions. This essay argues that India could ideally manage this contradiction and prevent miscalculationby providing its neighbors with reliable monitoring and assessment of missile-related moves. Indeed, it may be in India's national security interest to do so. However, given the current state of acrimony and deep suspicion among the actors in the region, this is unlikely to happen.

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[13] A series of stories published in *The Washington Post* claimed that the Indian *Prithvi* missiles had been moved to storage locations near the city of Jullandhar, in the Punjab, causing concern in Pakistan. R. Jeffrey Smith, "India Moves Missiles Near Pakistani Border," *The Washington Post*, 3 June 1997, and R. Jeffrey Smith, "Pakistan Warns India on Missiles," *The Washington Post*, 4 June 1997. India admitted that the missiles had been moved, but not deployed. See R. Jeffrey Smith, "India Denies It Has Deployed Missiles; Gujral Condemns U.S. Report of Arms Shift to Pakistani Border," *The Washington Post*, 12 June 1997.

This essay begins with an overview of the political, technical, military, and security impetus behind the Indian nuclear missile program. It notes that India's missiles are a symbol of prestige and domestic pride; are driven by a technical impetus; have a valid military rationale; and are a legitimate response to the regional and international situation that has a direct impact on India's security concerns. Based on this overview, the next section outlines three possible scenarios for India's missile program. These include a "cap, roll-back, and eliminate" scenario, an overt deployment scenario, and an induction without deployment scenario. This essay will argue against the first of these two and in favor of the third and most likely scenario. It will then elaborate on the role that nuclear risk-reduction measures (NRRMs) would play in all the scenarios, suggesting that India could use these measures not only to enhance its own security, but also to eliminate the possibility of accidental nuclear escalation.

ONE MISSILE PROGRAM, MANY TARGETS

Before examining the implications of the induction and deployment of India's nuclear-capable missiles—the *Prithvi* and the *Agni*—it is vital to understand the technical, military and political motives behind the unwavering support for these programs. The Indian missile program, like all similar programs, has evolved from one based on purely technical imperatives to one that has now created a political and military rationale for itself. This evolution was partly the result of the indigenous technical and military imperatives, national prestige, and domestic politics, as well as external factors.

Symbols of International Prestige and Domestic Pride

India regards its nuclear and missile programs as vital symbols of prestige for three reasons. First, they are touted as evidence of the nation's technical prowess and scientific competence, especially when compared with the low level of technology and development in other sectors, such as energy and infrastructure. Thus, according to one account, "[i]n a country where the bullock cart still constitutes a principal mode of transportation, India's space program stands out as a dramatic achievement."[14] This program, as nearly all writers point out, helps to elevate India to the level of the world's leading developed nations. Hence, in 1980 when the *Rohini-I* satellite was placed into orbit by the Satellite Launch Vehicle (SLV)-3, Indian officials and articles made a pointed reference to the fact that India was the sixth to join the "exclusive club" of countries that have orbited satellites with

[14] First Lieutenant Jerrold F. Elkin and Captain Brian Fredricks, "Military Implications of India's Space Program," *Air University Review* (May–June 1983): 56.

indigenously produced launch vehicles.[15] Similarly, following the maiden flight of the *Agni* intermediate-range ballistic missile (IRBM), several articles noted with pride India's entry into the "exclusive" missile club of half-a-dozen countries.[16]

Second, pride in the missile program is even more cherished because these capabilities were developed despite concerted efforts, particularly by the existing members of this exclusive club, to prevent India from acquiring the necessary technology through a series of technology control regimes. Any sign of India succumbing to the opposition is seen as a sign of political weakness, if not an anti-national sellout. For instance, when the third *Agni* flight test was delayed, commentators chided the government for giving in to external pressure.[17] Therefore, the continuous development and improvement of missile technology is not only essential to prove India's technological capability but also to challenge the exclusive nature of the missile club and the technology control regimes, which India considers to be discriminatory. In fact, one of the official mandates for defense research is "to develop critical components, technologies . . . and to reduce the vulnerability of major programs [such as missiles] . . . from various embargoes/denial regimes, instituted by advanced countries."[18] Thus, Indian programs are also designed to reduce the impact of a sanction regime.

The Indian missile program, like all similar programs, has evolved from one based on purely technical imperatives to one that has now created a political and military rationale for itself.

Third, India's fight for membership in the exclusive club has also convinced New Delhi that it is imperative to acquire these technologies and capabilities, and to become a member of the select few in order to be taken seriously. In this context, Indian analysts argue that nuclear weapons (and related missiles) are currencies of power, pointing out that

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[15] Suman Dubey and Amarnath Menon, "Soaring Into the Space Age," *India Today*, 15 August 1980, 70.

[16] Tushar Bhatt and S. Srinivasan, "Trail-Blazing with *Agni*," *The Telegraph*, 28 May 1989; Air Commodore Jasjit Singh, "India's Missile Message," *The Sunday Observer*, 28 May 1989; and Dilip Bobb with Amarnath Menon, "Chariots of Fire," *India Today*, 15 June 1989, 28–32 .

[17] R. Ramchandran, "Cooling With a Cured Cloth," *Economic Times*, 8 January 1994.

[18] *Ministry of Defense Annual Report 1996–97* (New Delhi: Government of India, 1997), 55.

the five permanent members of the UN Security Council (UNSC) are also the five officially-recognized nuclear-weapon states. Unless the proposed expansion of the UNSC proves otherwise, or unless one of the existing permanent members dismantle their arsenal, India is convinced that nuclear weapons are essential to become a permanent member of this crucial executive world body.

India's fight for membership in the exclusive club has also convinced New Delhi that it is imperative to acquire these technologies and capabilities, and to become a member of the select few in order to be taken seriously.

The prestige element of these programs also resonates in domestic politics. For instance, domestic political considerations were primary factors behind Prime Minister Indira Gandhi's decision to give the green signal for the 1974 peaceful nuclear explosion (PNE). Despite the dramatic victory against Pakistan in 1971, Mrs. Gandhi's party witnessed a drop in its popularity in the 1972 general elections.[19] The nuclear test was used to bolster her position by representing it as a major achievement for India, which in turn was identified with the ruling Congress party.[20] Similarly, Rajiv Gandhi's government ran a series of advertisements in the run-up to the 1989 elections, acclaiming India as a great nation capable of manufacturing the *Agni* missile.[21] In another telling incident, politicians accompanying the then-Defense Minister Sharad Pawar to witness the second *Agni* test on 29 May 1992 (which failed to meet the test parameters)

[19] For the role of domestic politics in India's nuclear decision making, see George Perkovich, "India's Ambiguous Bomb" (Ph.D. diss., University of Virginia, 1997); Peter Lavoy, "Learning to Live with the Bomb: India and Nuclear Weapons 1947–74" (Ph.D. diss., University of California at Berkeley, 1997); W.P.S. Sidhu, "The Development of an Indian Nuclear Doctrine Since 1980" (Ph.D. diss., University of Cambridge, 1997); Scott Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security* 18, no. 3 (Winter 1996–97): 54–86, and "The Causes of Nuclear Proliferation," *Current History* 96, no. 109 (April 1997): 153–54; Shyam Bhatia, *India's Nuclear Bomb* (Ghaziabad: Vikas Publications, 1979); and Ashok Kapur, *India's Nuclear Option: Atomic Diplomacy and Decision Making* (New York: Praeger Publishers, 1976).

[20] US officials also endorsed this evaluation. See "Nuclear Proliferation in South Asia: Containing the Threat," Staff Report to the United States Senate Committee on Foreign Relations, (Washington, D.C.: US Government Printing Office, 1988), 2.

[21] *Times of India*, 22 July 1989.

asked the missile scientists to declare the test as a "success" for domestic political consumption. This test was later described as "partially successful" rather than a failure.[22]

Thus, if governments with clear majorities use the achievements in strategic areas to strengthen their domestic political standing, minority governments find it no less important to not only use these symbols of prestige for improving their domestic position, but also to support what is described as "nuclear nationalism."[23] This was evident during the Comprehensive Test Ban Treaty (CTBT) negotiations. Both the P. V. Narasimha Rao and H.D. Deve Gowda governments had to show unwavering support towards India's strategic enclave (and oppose the CTBT) when the opposition parties accused them of compromising national security if they signed the Treaty.[24] Similarly, after the series of tests in May 1998 Prime Minister Atal Behari Vajpayee used the achievement to coin another populist slogan: *Jai Vigyan* (hail science) in line with the *Jai Jawan* (hail the soldier) and *Jai Kisan* (hail the farmer) slogans of Prime Minister Lal Bahadur Shastri after the 1965 Indo–Pakistani War and the success of the green revolution.

The Technical Impetus

If governments with clear majorities used the achievements in strategic areas to strengthen their domestic political standing, minority governments find it no less important to not only use these symbols of prestige for improving their domestic position, but also to support what is described as "nuclear nationalism."

Although the *Prithvi* and *Agni* are now regarded as symbols of the nation's technical prowess and military strength, their origins were humble and even frail. This is evident in the study of the origins and history of the Defence Research and Development Laboratory (DRDL), the birthplace of the *Prithvi* and *Agni* missiles. On 1 January 1958, the Defence Research and Development Organisation (DRDO) was formed through the amalgamation of the Defense Science Organisation and the Technical

[22] Personal interview with senior missile scientists involved in the second *Agni* test, February 1997.

[23] Peter Lavoy, "Nuclear Arms Control in South Asia," in Jeffrey A. Larsen and Gregory J. Rattray, eds., *Arms Control Towards the 21st Century* (Boulder, Colo.: Lynne Rienner Publishers, 1996), 280.

[24] For details see W.P.S. Sidhu, "India and the CTBT," in Michael Clarke, ed., *Brassey's Defense Yearbook 1997* (London: Brassey's, 1997), 310–24.

Development Establishment.[25] At present DRDO comprises fifty laboratories and establishments (including the DRDL), employs about 30,000 people, and conducts research and development in aeronautics, special materials, armaments, electronics, specialized medicine, food, clothing and, of course, missiles.[26] The military missile program was deliberately separated from the civilian Indian Space Research Organization (ISRO) right from its inception. In fact, DRDL, Hyderabad (the primary laboratory involved with missile research) actually pre-dates the civil space program by at least four years.[27] And, according to one US intelligence assessment, the two programs "compete for resources."[28] However, this did not prevent cooperation or transfer of technology and, occasionally, personnel from one program to the other.[29] In the two decades leading up to the early 1980s, DRDL had "established the basic technology required for missile systems in solid and liquid propulsion, control and guidance and precision fabrication."[30] According to one commentator, "In sum,

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[25] See R. G. Matthews, "The Development of India's Defense-Industrial Base," *The Journal of Strategic Studies* no. 4 (December 1987): 422. For a more comprehensive understanding of the development of defense R&D in India as well as decision making related to this area, see also Thomas Graham, "India," in James Everett Katz , ed., *Arms Production in Developing Countries: An Analysis of Decision Making* (Lexington, Mass.: Lexington Books, 1984); Amit Gupta, "Building an Arsenal: The Indian Experience," in Norman Graham, ed., *Seeking Security and Development: The Impact of Military Spending and Arms Transfers* (Boulder, CO.: Lynne Rienner, 1994); P. V. R. Rao, *Defence Without Drift* (Bombay: Popular Prakashan, 1970); and K. Subrahmanyam, *Perspectives in Defense Planning* (New Delhi: Abhinav Publications, 1972). See also Itty Abraham, "Reproducing Defense: Reinterpreting Civil-Military Relations in India," Arms Control, Disarmament and International Security (ACDIS) Occasional Paper (Urbana-Champaign, Ill.: Program in Arms Control, Disarmament, and International Security, March 1992); and "India's 'Strategic Enclave:' Civilian Scientists and Military Technologies," *Armed Forces and Society* 18, no.2 (Winter 1992): 231–52.

[26] For an update, see Rahul Roy-Chaudhury, "Defense Research and Development in India," *Asian Strategic Review 1994–95* (New Delhi: Institute for Defense Studies and Analyses (IDSA), September 1995): 223–55.

[27] The space program in India was formally organized only in 1962 with the establishment of the Indian National Committee for Space Research (INCOSPAR) under the Department of Atomic Energy (DAE). INCOSPAR was reformed as the Indian Space Research Organization (ISRO) only in 1969. See Timothy McCarthy, "India: The Emerging Missile Power," *Defense Journal* no. 9–10 (1993): 61.

[28] McCarthy, "India," 61.

[29] A declassified US Department of State incoming telegram notes: "And though organizations are competitive, it is most natural for scientists and engineers working on similar problems (particularly if working for the same employer-of-last-resort) to discuss problems and successes, sharing information about their projects." U.S. State Department telegraph #31294, December 1987, (Washington, D.C.: National Security Archives), Paragraph 96. This cooperation was best exemplified by Dr A.P.J. Kalam, who began his career in DRDO, was seconded to ISRO to head the SLV-3 program and then moved from ISRO back to DRDO to lead the Integrated Guided Missile Development Program (IGMDP).

[30] Official brochure of the Missile Technology Center, comprising the DRDL and the newly-constructed Research Center, Imarat (RCI).

an indigenous capability exists for developing almost all missile sub-systems, but in isolated pockets. What is now needed is horizontal integration among the various organizations and a determination to utilize the scientific capability available in the country in a planned and systemic way."[31] This "horizontal integration" came in the wake of the successful SLV-3 launch by ISRO and the return of Dr. A.P.J. Abdul Kalam from ISRO to DRDO.

Soon after Dr. Kalam moved to DRDO as director of DRDL in 1982, the laboratory announced the launch of the ambitious Integrated Guided Missile Development Program (IGMDP) to develop five new missiles. These missiles could be divided into two distinct groups—"tactical conventional"and "nuclear-capablestrategic." On the tactical front, there was a proposal to develop an advanced anti-tank guided missile, the *Nag*, and two surface-to-air missiles (SAMs)—the *Trishul* and the *Akash*. The *Trishul* was to meet the requirements of all the three services—the army, the navy and the air force—and was a short-range, quick response SAM. Although the *Akash* was billed as a Patriot-type SAM, it is closer to the Soviet SA-6 "Gainful" missile.[32]

The improved Agni is expected to be road- or rail-mobile and have two solid-fuel stages that will provide greater range leading to the development of a 4,000-kilometer range missile.

On the "nuclear-capable strategic" side, there was the *Agni* technology demonstrator—a two-stage, solid- and liquid-fueled IRBM that was not built to any service requirement. The missile was designed to carry a one ton nuclear warhead to ranges between 1,500 to 2,500 kilometers (km), although in the three tests since its first flight in 1989, its range was much shorter. After an *Agni* flight test in 1994, it was announced that the current testing phase was completed. The second phase of the *Agni* development program was approved shortly before the May 1998 tests. The improved *Agni*, designed to have a greater range, is "in an advanced stage of development and will be modular in construction," Dr. Kalam disclosed. This design would give the flexibility to allow the fuel configuration to be changed using different combinations for different mission requirements. Thus, the

[31] Jairam Ramesh, "India's Defense Research: Need For Sustained Research," *Times of India*, 30 September 1982.

[32] See Duncan Lennox, ed., *Jane's Weapons System 1988–89* (Coulsdon,: UK, 1989), 122.

improved *Agni* is expected to be road- or rail-mobile and have two solid-fuel stages that will provide greater range leading to the development of a 4,000-kilometer range missile.[33]

Finally, there was the *Prithvi* surface-to-surface missile (SSM) described as a "battlefield support missile." Its range—40 km to 250 km—puts it somewhere between the tactical and strategic bracket, especially in the India–Pakistan context.[34] The *Prithvi* is a single-stage, liquid-fuel missile that comes in three versions: the SS–150 with a range of 150 km and a one-ton payload, designed for the army; the SS–250, with a range of 250 km, built for the air force; and the SS–350, which is still under development [35]

The success of the *Prithvi* and *Agni* should not be seen in isolation but in the broader context of the other ambitious DRDO projects, particularly the *Arjun* main battle tank (MBT) and the light combat aircraft (LCA), which have fallen behind schedule considerably. The MBT project was launched in 1974 and the first prototype was planned for 1980. The design, however, was finalized only in July 1996 and the earliest the MBT can enter service is 2002. Similarly, the LCA was commissioned in 1983 with a view to replacing the MiG-21 fleet by the mid-1990s. Its first flight is scheduled for sometime in 1999 and the most optimistic date for its entry into service is between 2005 and 2007. Against this background, the *Prithvi* success was critical for the continued funding and patronage of DRDO by the political establishment. It is no coincidence that the person chosen to succeed Dr. V.S. Arunachalam as the head of DRDO in 1993 was none other than Dr. Kalam, the chief of the IGMDP. With his prior record of success, Dr. Kalam would be in a strong position not only to promote the missiles, but also to ensure support for the other projects.

The Military Impetus

Around the time that the IGMDP was launched, the armed forces were in the process of revising their tactics and doctrines, partly on account of the induction of new equipment, and partly in response to the changing geopolitical scenario in the region. This pattern of

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[33] Sidhu, "India sees safety," 24–5.

[34] One of the most comprehensive semi-official accounts of the missile program available in open literature is Indranil Banerjie, "The Integrated Guided Missile Development Program," *Indian Defense Review* (July 1990): 99–109. For the two strategic missiles, see Major General V. J. Sundaram (Project Director, *Prithvi* DRDL), "Surface to Surface Missiles Come of Age in India," *Artillery Journal* (1990): 53–5, and R. N. Agarwal, "*Agni*," *Artillery Journal* (1990): 56–7.

[35] Andrew Koch and W.P.S. Sidhu, "Subcontinental Missiles," *The Bulletin of the Atomic Scientists* 54, no. 4 (July/August 1988): 45–46.

evolution was evident in all three services in the early 1980s.[36] According to some military experts, this reflected a shift from the traditional passive and reactive doctrines of the Indian armed forces to a more offensive and pre-emptive doctrine. [37]

Two basic nuclear concerns have preoccupied Indian military strategists since 1964: How to counter a nuclear threat—initially from China and then from Pakistan—by conventional means,[38] and the possible role of nuclear weapons in the Indian army, if the weapon option were to be exercised.[39] Indian strategists have tried to evolve new doctrines that would meet both the conventional and nuclear threats with existing hardware. Hence, nuclear doctrines were not seen as separate from conventional doctrines, but as an adjunct to them. Accepting that the effects of nuclear fallout could be minimized even by conventional means, the armed forces also argued that conventional means were not adequate and that nuclear weapons could be effectively deterred only by other nuclear weapons.[40]

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[36] For a hint of this reassessment in all the three services see "India's Defense Policy and Doctrine for 1980s," the keynote address by Chief of Air Staff, Air Chief Marshal Dilbagh Singh at the Second Annual Session of the National Congress for Defense Studies, Poona University, 7 June 1982. The speech was reprinted in the *Poona University Bulletin*, 15 July 1982. Also, see Commander K.R. Menon, "The Pre-Emptive Naval Strike in Limited Wars," *United Services Institute (USI) Journal* 53, no. 452 (January–March 1978): 46–54; and Lieutenant Colonel J. K. Dutt, "Deep Thrust," *USI Journal* 53, no. 452 (January–March 1978): 69–74.

[37] Stephen P. Cohen, "The Military and Indian Democracy," in Atul Kohli, ed., *India's Democracy: An Analysis of Changing State-Society Relations* (Princeton, NJ: Princeton University Press, 1988), 111–12.

[38] Even as early as 1966, military strategists had pondered over the possibility of having to face a nuclear Pakistan, in addition to nuclear China. See, for instance, Major General D. Som Dutt, "India and the Bomb," Adelphi Paper 30 (London: International Institute for Strategic Studies, 1966), 1.

[39] The earliest military writing about nuclear weapons appears in the late 1960s when the tempo for the Indian PNE was building up in the form of a public debate. See Eric A. Vas, "The Bomb," *USI Journal* (October–December 1967): 309–320, and "A Nuclear Policy for India," *USI Journal* (January–March 1969): 27. Subsequently, there has been a spurt of literature on the subject in the 1980s. Prominent among them are Lieutenant General Krishnaswami Sundarji, ed., "Effects of Nuclear Asymmetry On Conventional Deterrence," *Combat Papers* no. 1 (May 1981), and "Nuclear Weapons in Third World Context," *Combat Papers* no. 2 (August 1981), both compilations of a seminar conducted by the then- Commandant of the College of Combat, Mhow, General Sundarji. One of the most comprehensive studies on the shape and size and strategy of a possible Indian nuclear arsenal is Brigadier Vijai K. Nair's *Nuclear India*, (New Delhi: Lancer's International, 1992).

[40] In his introduction to "Effects of Nuclear Asymmetry On Conventional Deterrence," General Sundarji noted "[t]here were only three contributors (out of about 50) who felt that nuclear weapon asymmetry would not degrade conventional deterrence to the extent that producing a nuclear deterrent was called for." (2).

With the start of the *Prithvi* program, the army saw its opportunity. By using it as a test bed, the army would be in a position to induct nuclear weapons. Traditionally armies have acquired nuclear weapons through the acquisition of surface-to-surface guided missiles with an approximate range of over 100 km. This was certainly the case in the US Army, which acquired the *Corporal* surface-to-surface guided missile to deliver either a nuclear or high explosive warhead up to a range of 75 nautical miles. Similarly, by putting out a General Staff Quality Requirement (GSQR) for the *Prithvi* (the army was reportedly the first service to make a bid as early as 1983–84) it also achieved a long-standing desire, first articulated in the mid-1960s, after the Chinese test, for tactical nuclear capability. While the present *Prithvi* configuration is purely conventional, the army version of the SSM has adequate throw weight to mount a one ton nuclear device, paving the way for the induction of nuclear weapons.

Two basic nuclear concerns have preoccupied Indian military strategists since 1964: How to counter a nuclear threat—initially from China and then, from Pakistan—by conventional means, and the possible role of nuclear weapons in the Indian army, if the weapon option were to be exercised.

Although this capability created a host of other tactical problems—such as the inability to acquire real-time targeting information deep across the border and the use of toxic liquid fuel under possible enemy fire—the army remained keen on putting its weight behind the program.[41] This, in turn, exacerbated the rivalry with the Indian Air Force (IAF), which felt that its mandate was being threatened.

Like the army in the 1980s, the IAF also followed a two-pronged policy with regard to nuclear weapons. One was a conventional defense against nuclear weapons (which included conventional strikes by aircraft and possibly missiles against nuclear installations, nuclear weapon sites, and nuclear delivery systems) and was very much in line with the national policy of keeping the weapon option open. Air Commodore Jasjit Singh, a former fighter pilot and the present director of the Ministry of Defense (MOD)-funded think tank, the Institute for Defense Studies and Analyses (IDSA), elaborated:

[41] See Wing Commander J. P. Joshi, "Employment of *Prithvi* Missiles," *USI Journal* 76, no. 526 (October–December 1996): 463–70; Major General V. K. Madhok, "An Introduction to Tactical Guided Missiles: The New Swords of War," *USI Journal* 66, no. 486 (September–December 1986): 330–35. See also Lieutenant General Satnam Singh, "The Shadow of the Hill," *The Artillery Journal* (1986): 1–4, and Colonel Pushpinder Singh, "Shaping the Battlefield with Artillery," *The Artillery Journal* (1986): 5–11.

> Air Power alone has the attribute of transcending natural and national barriers and apply [*sic*] destructive force at the critical time and place. The air strategy, therefore, must exploit this attribute to the maximum to provide credible, effective deterrence against aggression. This would naturally be based on conventional capabilities in view of the basic national policy with regard to nuclear and chemical weapons. But even at the conventional plane strategic offensive capabilities provide the means of deterrence both through denial as well as punishment.[42]

The IAF also sought to pave the way for the possible induction of nuclear weapons into the service by demanding the creation of a strategic air command or an aerospace command to pool the resources for reconnaissance, target acquisition, and strike. Again, according to Jasjit Singh, "The fundamental basis of the air strategy must remain deterrence. To effectively implement it, there is a need to create a Strategic Air Command of IAF where aircraft (like the Jaguar) missiles (like the *Agni* and *Prithvi*) and strategic reconnaissance and intelligencecollection systems would be possible from within existing resources." Air Chief Marshal S. K. Mehra also echoed this in 1990.[43] Here, too, the debate picked up after the successful launch of the *Prithvi* and *Agni* missiles. However, unlike the army, the IAF debate has remained behind closed doors. There is little public information on the strategy or doctrinal debate within the air force.[44]

The limited public information available in the early 1980s, indicated that while senior IAF officers spoke of deterrence based on the "induction of high-technology," this did

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[42] Air Commodore Jasjit Singh, "Air Strategy and Force Levels required for the Nineties," *Trishul* 2 (January 1990): 79.

[43] Personal interview with Air Commodore Jasjit Singh (Retired), New Delhi, January 1995 and personal interview with Air Chief Marshal S.K. Mehra (Retired), Gurgaon, January 1995. According to Air Chief Marshal Mehra: "I was one of the architects of suggesting that we should have a strategic air command. In fact, we thought of renaming the Central Air Command as the Strategic Air Command or Aerospace Command. . . . You had the IL–76s with you, which is a strategic airlift airplane, . . . then you have strategic reconnaissance aircraft (MiG 25s), . . . you have all these missiles being developed, . . . *Prithvi* and *Agni*. And all these forces were concentrated in the Central sector because these forces would never operate from the forward airfields, . . . and this command would develop strategies, doctrine and procedures. . . . We had written some papers but somehow it never took off."

[44] For instance, the air force did not experience the magazine boom in the 1980s that was evident in the other two services. There was no official, public, intra-service journal for the air force. While their officers did write in other inter-services military journals, such as the *USI Journal*, it was largely on non-doctrinal issues. Occasionally there were responses to doctrinal debates, but even these were rare. The primary source for the air force perspective has remained newspaper articles, coupled with a private magazine called *Vayu*, where some senior retired air force officers wrote on doctrinal issues. Later, the *Indian Defense Review* provided the platform for the expression of the air force views.

not include nuclear-capable missiles and was confined only to modern aircraft.[45] Thus, while the air force made a pitch for and acquired both the MiG–29 and the Mirage 2000, they did not make a bid for the *Prithvi* or *Agni* in the early 1980s. In fact, even after the army had put in their GSQR, and the *Prithvi* had been successful tested in 1988, the IAF had to be virtually coerced into placing orders for the conventionally-armed missile.[46]

The IAF also sought to pave the way for the possible induction of nuclear weapons into the service by demanding the creation of a strategic air command or an aerospace command to pool the resources for reconnaissance, target acquisition, and strike.

There were several reasons for this reluctance. First, the IAF, like most air forces, is dominated by fighter pilots, who hold key decision-making positions. And fighter pilots derive their prized position from flying fighter aircraft. And to that extent, the pilots would be hesitant to shape a force that was based on anything else apart from fighters. This feeling of being sidelined professionally was further accentuated by the government dicta that the cost of the *Prithvi* force would be borne by the service, making the missiles a direct competitor to the fighters. Second, while some scientists and policy makers argued that the cost of hitting a target with a conventionally-armed *Prithvi* missile would be cheaper than using a squadron of aircraft, air force officers have challenged this assertion.[47] They argue that modern precision-guided munitions (PGMs) carried by strike aircraft are not only far more accurate, they are also more economical than the present *Prithvi* missiles. However, the cost factor swings in the favor of *Prithvi* missile if it is nuclear-tipped.

Third, by the time of the *Prithvi* test-flight (1988), India and Pakistan had signed an agreement not to attack each other's nuclear installations, thereby removing the one obvious class of targets against which a *Prithvi* armed with a conventional warhead could

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[45] Singh, "India's Defense Policy and Doctrine for 1980s," *op. cit.*

[46] A senior air force officer disclosed that the Air Staff Requirement (ASR) for the *Prithvi* was made in late 1980s to fit the *Prithvi*. Interview with the author, January 1995.

[47] See for instance, Air Vice Marshal C. V. Gole, "The *Prithvi*—Facts and Fancies," *Vayu* 4 (1994): 23–30. He calculates the cost of delivering a one-ton bomb load over a distance of 250 kilometers and concludes that the cost when using aircraft would be Rs. 8.25 million, while the cost of using the *Prithvi* would work out to Rs. 16 million, nearly twice the cost of an aircraft-based attack.

be used. Hence, there was no urgency to acquire the missile. Finally, the *Prithvi* is a "Pakistan specific" missile, and the current IAF fleet provides relative strategic parity, if not superiority, against Pakistan's air force. However, the IAF lacks similar capability vis-à-vis China and could use a long-range missile, such as the *Agni* in its arsenal. Yet, the *Agni* is some way from being an operational system.

The External Impetus

Although the IGMDP was initially launched on account of indigenous factors, the program was also influenced by the deployment and use of similar missiles—particularly the conventionally armed SSMs—in the Arab–Israeli and Iran–Iraq wars. This was the first time that armed forces similar to the Indian military had employed missiles. Although Germay had used missiles in World War Two, it had done so primarily to strike terror among civilians, rather than to destroy military targets. In the 1973 Arab–Israeli War, an attempt was made to use these missiles in a military role. Similarly, even during the Iran–Iraq War, missiles were originally used against military targets. Although their effectiveness as weapons of war has been questioned, there are indications that in at least some cases SSMs armed with conventional warheads could prove decisive in a battle.[48] For instance, in the Afghan civil war in the 1990s, the barrage of SCUD missiles used by the government forces may have been instrumental in breaking the siege of Jalalabad, held by rebel forces. Similarly, during Operation Desert Storm in 1991, the United States effectively used thirty-two Army Tactical Missile System (ATACMS) missiles against Iraqi SAM sites, logistic sites, artillery and rocket battery positions, and tactical bridges.[49] The use of the Tomahawk cruise missiles in August 1998 against suspected terrorist training camps in Afghanistan validated the capability of such weapons against a variety of targets.

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[48] See Karp, "The Maturation of Ballistic Missile Proliferation," 7–9.

[49] See US Army, Redstone Arsenal, "Army TACMs," (Internet Publication), [http://www.redstone.army.mil/history/systems/ARMYTACMS.html] for a history of the ATACMS program.

Similar targets have been identified for the *Prithvi* and other improved missiles. Indeed, the designers of *Prithvi* have consistently compared the Indian missile to the ATACMS and the Russian TOCHKA missile system, arguing that the accuracy of the *Prithvi* is comparable to these systems.[50] In fact, some military analysts have argued that neither the ATACMS nor the M-11 has shown the same accuracy in test firing as the *Prithvi*.[51] Even if this is an exaggerated claim, there is no doubt that with an improvement in its accuracy, the *Prithvi* would be accurate enough to take on the role assigned to the ATACMS during Operation Desert Storm. In order to improve its performance and accuracy, however, the *Prithvi* will have to be further developed and tested. The same is true of the *Agni* missile. While the *Agni* is not likely to be an effective conventional weapon in 1998, an intense program of development and testing could improve its accuracy to this end.

Conventionally-armed missiles may have political as well as military purposes. This was illustrated in 1996 at the time of the Taiwanese Presidential elections when China fired several missiles towards Taiwan as part of a military exercise. Although this move did not affect the outcome of the elections, it did make the new leadership cautious about declaring independence from China. Moreover, the monetary incentive of exporting missiles is equally tempting. For instance, China earned an estimated US $2.5 to $3.5 billion for supplying DF–3 intermediate-range ballistic missiles (IRBMs) to Saudi Arabia. The sale of 100 SCUDs to Iran by North Korea earned Pyongyang approximately $500 million.[52] Thus, selling similar missiles could be an important external impetus for hard-currency strapped countries like India, particularly if the present economic reforms come to a standstill.

Finally, there is another role that India's missile capability could play in the international arena—that of a bargaining chip. This strategy is reflected in the writing of some Indian strategists. For instance, Air Commodore Jasjit Singh, argues:

> . . . [I]t [India] should not hesitate to forego development and deployment of the *Agni* if states in the Asia-Pacific region initially, and in the world ultimately, are prepared to eliminate

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[50] Sundaram, "Surface to Surface Missile," 55.

[51] Joshi, "Employment of *Prithvi* Missiles," 465.

[52] Karp, "The Maturation of Ballistic Missile Proliferation," 11.

> this class of weapons. This would be a far more effective and equitable approach than . . . the MTCR.[53]

Although this comment specifically refers to the *Agni*, a similar case is also plausible for the *Prithvi* in the Indo–Pakistani context. And to that extent, the presence of the missiles, although seen as a part of the problem, might also have within them the seed of a solution.

The Pakistan Factor

Pakistan first introduced different types of missiles into the battlefield.[54] India began to seriously examine the SSMs only after their use in the Iran–Iraq War and the reported interest that Pakistan had showed in similar missiles, tipped with chemical warheads. Some senior Pakistani military officials, such as former army chief General Mirza Aslam Beg, have argued that the Indian program is, in fact, in response to the Pakistani missiles.[55] However, given the gestation period of five to eight years for missiles, such as the *Prithvi* and *Hatf*, and the appearance of the two in the late 1980s, seems to suggest that the two missile programs may have been launched around the same time—in the early 1980s. Although statements by Prime Minister Benazir Bhutto at the time of the successful launch of the 80 km range *Hatf*-I and the 300 km range *Hatf*-II in early 1989 seem to indicate that

While both the missile programs may have been initially driven by domestic, technical impetus—and possibly the knowledge of the other side's nascent missile quest—the appearance of similar missiles on the other side of the border certainly provided the post-facto rational for the indigenous missile program.

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[53] Jasjit Singh, "Arms Control and the Proliferation of High-technology Weapons in South Asia and the Middle East: A View from India," in Shelley A. Stahl and Geoffrey Kemp, eds., *Arms Control and Weapons Proliferation in the Middle East and South Asia* (New York: St. Martin's Press, 1992), 133.

[54] Shekhar Gupta, "Nuclear Weapons in the Subcontinent," in "Defense and Insecurity in Southern Asia: The Conventional and Nuclear Dimensions," Occasional Paper No. 21 (Washington, D.C.: The Henry L. Stimson Center, May 1995), 45–6. Gupta argues that the Pakistanis were the first to deploy the Sidewinder air-to-air missiles (AAMs), which came with the F-104s, along with the first anti-tank missiles and air-to-surface PGMs.

[55] According to General Beg: "It (the *Prithvi*) is in response to what we have on our side. We have *Hatf*, which is a similar program, which we deployed some about three years back. And at that time they had nothing on the ground. So, they have deployed in response to that. We don't blame them. And I don't think their *Prithvi* can carry a nuclear warhead, neither can our *Hatf*. I think it is just to maintain the balance." Interview with General Mirza Aslam Beg by Michael Krepon, Rawalpindi, May 1994.

they were the fruition of a missile project initiated by her father, Zulfikar Bhutto in 1974 on a "priority basis," in all likelihood, they were taken up in earnest only in the early 1980s.[56] And to that extent, the indigenous Pakistani missile program almost mirrors that of India's in its chronology.

While both the missile programs may have been initially driven by domestic, technical impetus—and possibly the knowledge of the other side's nascent missile quest—the appearance of similar missiles on the other side of the border certainly provided the post-facto rational for the indigenous missile program. In the Indian case, this rationale took on a more strident tone after the reported transfer of Chinese M-11 missiles to Pakistan. This is apparent in the assertion made by General Beg. It is also made explicit in the *Ministry of Defense Annual Report, 1997–98*. According to the report, "China's assistance to Pakistan's nuclear weapons programme and the sale of missiles and missile technology to Pakistan also directly affects India's security."[57]

Simply put, the armed forces argue that nuclear weapons can best be deterred by nuclear weapons and as a logical corollary, missiles can deter missiles.

Thus, the appearance of missiles across the border was the perfect peg to hang the domestic quest for missiles. All the concerned parties—the defense scientists, the military, and politicians—used this external impetus to rationalize induction and justify a doctrine for missile deployment. The doctrine that the armed forces appear to be promoting is an extension of their doctrine regarding nuclear weapons. Simply put, the armed forces argue that nuclear weapons can best be deterred by nuclear weapons, and as a logical corollary, missiles can deter missiles.

The China Factor

The China factor has been a critical and constant element in the Indian security equation since the time of the 1962 Sino–Indian War, through the first Chinese nuclear test

[56] Benazir Bhutto's statement reported in *The Muslim*, 6 February 1989.

[57] *Ministry of Defense Annual Report 1997–98* (New Delhi: Government of India, 1998), 2.

in 1964, and up through India's Defense Minister George Fernandes' assertion that China is India's "potential threat number one."[58] In the 1960s, soon after the Sino–Indian War and the start of the Chinese nuclear weapon program, China was considered the primary threat, preoccupying Indian strategists and politicians. This led India to embark on the subterranean nuclear explosion project (SNEP) which culminated in the 1974 PNE. In the 1970s and in most of the 1980s, the Chinese threat was considered to be relatively dormant and was rarely raised by Indian officals who concentrated on the more immediate threat posed by Pakistan's emerging nuclear weapon program. In the late 1980s and 1990s, the China threat once again came to the forefront for a variety of reasons, even though India was relatively circumspect about highlighting it publicly.[59] Thus, while the China threat has always been in the background, it has been articulated with varying degree and intensity. This has depended on a number of factors, ranging from the Indian perception of the immediacy of the threat, which is based on intrusions and skirmishes along the Line of Actual Control (LAC), and reports of Chinese nuclear and missile activity (including missile transfers) that have a direct bearing on India's security, to the dynamics of the political personalities of the time.

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The China threat can be divided into direct and indirect categories. China's own missiles and arsenals, particularly those capable of striking targets in India, pose the direct threat. The indirect threat is posed by China's supply of missiles to countries in India's neighborhood, such as Pakistan and Saudi Arabia; its technical assistance in the missile-related area, particularly to Pakistan; and the creation of bases and monitoring stations in other countries, such as Myanmar.

From India's point of view, Chinese missiles located in Tibet pose the most serious direct threat. The first nuclear weapons were reportedly brought onto the Tibetan plateau

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[58] John F. Burns, "India's New Defense Chief Sees Military Threat," *The New York Times (NYT)*, 5 May 1998.

[59] For a broad overview of the genesis and evolution of the Indian threat perception vis-à-vis China see W. P. S. Sidhu, "Enhancing Indo–US Strategic Cooperation," Adelphi Paper 313 (Oxford: Oxford University Press for The International Institute for Strategic Studies, 1997), 15–18.

in 1971 and stationed in the Tsaidam (or Qaidam) basin in northern Amdo.[60] The earliest reports about nuclear missiles in Tibet were made by TASS (the Soviet News Agency) in 1974. It noted that "China has deployed radar and missiles with ranges from 600 to 2,500 miles in areas bordering India, thus putting most of India's towns, industrial centers and dams within range of Chinese missiles."[61] Another report identified these as the CSS-1 (Dong Feng (DF)-2) medium-range ballistic missiles (MRBMs) and CSS-2 (DF-3) IRBMs which were first deployed in the mountainous caves and valleys of the Tibetan Autonomous Region in 1974.[62] According to later reports, by 1977 China had deployed some 70 CSS-1 MRBMs with a range of 950 km and 20 CSS-2 IRBMs with a range of 2,400 km at Nagchu (or Nagchukha), about 320 km northeast of Lhasa, Tibet's capital. These missiles were transportedto this base in ten wheeled transporter-erector-launcher (TEL) vehicles. This base had the capability of destroying targets in Irkutsk, Mongolia, as well as New Delhi and other cities in India. Reports in the early 1980s revealed that Beijing soon intended to deploy inter-continental ballistic missiles (ICBMs) on this base.[63]

Subsequent reports revealed that the CSS-3 (DF-4)—China's first ICBM—had been located in the Tsaidam basin. The Tsaidam sites reportedly have two missiles stored horizontally in tunnels near the launch pad. Fuel and oxidizer is stored in separate tunnels with lines to the launch pad. Another missile base in the area is located at Delingha and reportedly houses four CSS-4 (DF-5) missiles.[64] According to another estimate, three missile divisions have been deployed in the Lanzhou-Chengdu region.[65] In addition, an

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[60] John Ackerly, *Nuclear Tibet* (Washington, D.C.: International Campaign for Tibet, June 1993).

[61] Cited in *New York Times*, 29 September 1974.

[62] R. R. Subramanian, "Missile Equation in South Asia," *The Pioneer* (New Delhi), 1 October 1997.

[63] See British Broadcasting Corporation (BBC), Summary of World Broadcasts (SWB), SU/6024/A3/4, 24 January 1979; BBC/SWB/ FE/6343/BII/14, 12 February 1980, citing *Kyodo* (Japanese News Agency); BBC/SWB/SU/6346/A3/4, 15 February 1980, citing Hong Kong and Japanese media reports; BBC/SWB /SU/6373/A3/4, 18 March 1980 monitoring "Radio Peace and Progress;" BBC/SWB/SU/6735/A3/5, 29 May 1981, citing TASS; BBC/SWB/SU/7059/A3/1, 23 June 1982; BBC/SWB/SU/7091/A3/1, 30 July 1982. See also Tinley Nyandak, "Tibet for the Tibetans, Not China's Arms," *NYT* 18 September 1982, which refers to a report in the Hong Kong newspaper *Shih Bao*, and "Chinese Deployment of Nuclear Missiles in Tibet," *International Defense Review (IDR)*, (1 November 1987): 1454.

[64] See Government of Tibet in Exile (London), "Militarisation and Regional Peace," (Internet publication), [http://www.tibet.com/WhitePaper/white10.html].

[65] International Institute for Strategic Studies (IISS), *The Military Balance 1988–89*, (London: Brassey's for the IISS, 1989), 149.

authoritative study of the Chinese nuclear and missile program identified Datong and Kunming as bases for the CSS-5 (DF–21) missiles.[66] Subsequent US intelligence reports confirm this.[67]

China, however, has consistently denied the presence of missiles in Tibet. In one such denial in 1987, the Chinese Foreign Ministry spokesman retorted that the report about China deploying medium-range missiles in Tibet against India, and about the alleged death of many Tibetans in work camps, was "nothing but a fabrication concocted with ulterior motives, not worth refuting at all."[68] Some Indian analysts have also questioned India's concerns about the Chinese missiles in Tibet. For instance, one argued that though the DF–3 has the range to hit India, they were "targeted at United States bases in the Philippines" and noted that these "missiles are now obsolete."[69] This analyst also asserted that the plan to develop the DF-25 with a range of 1,700 km to replace the DF-3 has been abandoned.[70]

The lack of transparency makes it difficult to ascertain China's missile deployment and to assess the extent of the threat China poses to India.

The lack of transparency makes it difficult to ascertain China's missile deployment and to assess the extent of the threat China poses to India. Once the DF-3s were supplemented with the DF-4s, did the former missiles still target US bases in the Philippines, or were they re-targeted against India? Is the DF-3 really obsolete, as some claim? If the DF-3 were truly obsolete, why would Saudi Arabia pay billions for it? Are the DF-4s and the DF-21s used to target India?

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[66] Robert S. Norris, Andrew S. Burrows and Richard W. Fieldhouse, *Nuclear Weapons Databook Volume V: British, French and Chinese Nuclear Weapons* (Boulder, CO: Westview Press, 1994), 338–41; fig 6.10, 346–7.

[67] Ramesh Chandran, "New Chinese Missiles Target India: US Daily," *Times of India*, 11 July 1997.

[68] See BBC/SWB/FE/8627/I, 23 July 1987.

[69] Achin Vinaik, "Mystery of the Reorient," *The Telegraph*, 31 March 1997.

[70] Ibid.

Clearly, it is difficult to assess accurately the direct threat posed by Chinese missiles based in Tibet for a number of reasons. First, China has never publicized either the strength of its missile force nor its location. On the contrary, Beijing has been "very effective in keeping secret the details" and "there remains uncertainty about the number of ballistic missiles deployed," which must be based on "best estimates."[71] Second, the Tibetan plateau, full of natural caves and manmade tunnels, is ideal to conceal missiles, most of which are TEL-based and have been moved around to make them difficult to track or target. Third, India has not had the national technical means to track these missiles or pinpoint their locations, particularly in Tibet. India has had to depend on human intelligence, particularly Tibetan refugees or resistance fighters, who may have their own vested interest in over- or underestimating missile strengths. Finally, in the absence of a verification regime, there is no means of checking whether the missiles that China claims have been decommissioned have indeed been retired or simply redeployed and re-targeted.

Ironically, the indirect threats posed by China are easier to enumerate for three reasons. First, the transfer of men and material outside China is easier to track, especially when the final destination is Pakistan where the level of Indian intelligence gathering is better than in Tibet. Second, China's missile-related exports are also monitored by other countries such as the United States that have far superior surveillance capabilities and are bound to track violations of the Missile Technology Cut-off Regime (MTCR). Finally, while China may be discrete with its transfers, the recipient countries may be tempted to boast about them.

China's assistance to Pakistan's nuclear and missile programs is well documented.[72] It has also been publicly acknowledged by the Central Intelligence Agency (CIA). In his testimony before the US Congress in 1993, the then-Director of the CIA, James Woolsey, noted:

> Beijing has consistently regarded a nuclear-armed Pakistan as a crucial regional ally and vital counterweight to India's

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[71] National Resources Defense Council, NRDC Nuclear Program Nuclear Data, "Table of Chinese Nuclear Forces, end 1996," (Internet Publication), [http://www.nrdc.org/nrdcpro/nudb/datab17.html].

[72] Simon Henderson, "Pakistan's Atomic Bomb," *Foreign Report*, 12 January 1989; David Albright and Mark Hibbs, "Pakistan's Bomb: Out of the Closet," *Bulletin of Atomic Scientists* 48, no. 4 (July–August 1992): 38–43; Bill Gertz, "Pakistan–China Deal for Missiles Exposed," *Washington Times*, 7 September 1994; R. Jeffrey Smith and Thomas W. Lippman, "Pakistan M-11 Funding is Reported," *Washington Post*, 8 September 1994; Michael Klare, *Rouge States and Nuclear Outlaws* (New York: Hill and Wang, 1995), 152, 191.

> growing military capabilities. . . . Beijing, prior to joining the NPT in 1992, probably provided some nuclear weapons-related assistance to Islamabad.[73]

Subsequent reports suggest that Beijing may have also supplied additional components for the nuclear-capable M-11 missiles even after 1992. In fact, according to US observers, Beijing may have transferred an entire M-11 production plant to Pakistan.[74] In August 1995, the Lok Sabha's Standing Committee on Defense acknowledged the importance of these developments for India's national security. The Committee noted that "China is the main source of missiles and allied technologies for Pakistan. With both these countries we have unsettled boundary disputes," and therefore, "India has no option but to continue to develop and upgrade its missile capability."[75]

Although Indian officials have been particularly subdued in their response to the test of the *Ghauri* missile by Pakistan in April 1998, arguing that the *Prithvi* missile was adequate to deter Pakistan, they were quick in accusing China for its alleged assistance. Defense Minister Fernandes felt compelled to declare that "China is the mother of this missile" when he learnt that the *Ghauri* missile, the latest of the Pakistani *Hatf* series, had been flight tested.[76] Although it is likely that the *Ghauri* missile has a North Korean lineage, Chinese assistance in either facilitating the transfer or providing some critical components, such as the guidance system, have not been ruled out by Indian officials and analysts. Following the *Ghauri* test, India did not announce a retaliatory series of *Prithvi* tests, which is considered to be a "Pakistan specific" weapon. Instead it reaffirmed its decision to

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[73] James Woolsey's testimony before the Senate Governmental Affairs Committee, 24 February 1993.

[74] R. Jeffrey Smith and David B. Ottaway, "Spy Photo Suggest China Missile Trade," *Washington Post*, 3 July 1995; R. Jeffrey Smith, "China Linked to Pakistani Missile Plant," *Washington Post*, 23 August 1996; and Douglas Waller, "The Secret Missile Deal," *Time*, 30 June 1997, 58.

[75] *Ministry of Defense Annual Report 1996-97*, 2.

[76] "Fernandes Sees No Threat From Ghauri," *The Hindu*, 10 April 1998.

upgrade the *Agni* missile which is regarded as a crucial component of any future missile-based deterrent system to counter Chinese nuclear weapon capabilities.[77]

Thus, the Indian missile program has clearly evolved from a shaky start in the early 1980s to a state of near induction in the mid-1990s. This evolution has been neither smooth nor straightforward. Prestige, technological impetus, domestic politics and external security considerations (in that order of importance) have driven it, accompanied by a vociferous debate both within the Indian establishment and without. This debate has not only examined the political implications of the induction and deployment but also the military advantages and disadvantages of the weapon system. That may explain why even nine years after the first *Prithvi* flight, the missile had not entered active service. On the other hand, the missile, and the debate surrounding it, has created a consensus that would make any attempt to cap or roll back the program virtually impossible. The debate within India does not focus on whether it is necessary to have a missile program or not, but whether to deploy or not to deploy. While the resolution of this debate will decide the ultimate fate of the missiles and the program, it is possible to postulate at least two likely—and one unlikely—scenario for their future. The most unlikely scenario is to cap, rollback, and eliminate the missiles. The two most likely scenarios are an overt weaponized deployment, or alternatively, a scenario in which the missiles are inducted, but not deployed. These scenarios will be elaborated on in the following section.

THREE OPTIONS FOR INDIA'S MISSILE PROGRAMS

There are three possible directions that the Indian strategic missile program could take in the future. The first is to follow a deliberate policy to cap, roll-back, and eventually eliminate the missiles. This scenario would constitute a South Asian version of the Intermediate Nuclear Force (INF) Treaty. The second option is to carry out an overt induction *and* deployment of missiles with a view to making them fully operational and placing them on high alert. The third approach would be to embark on a cautious, and possibly negotiated, induction of the missiles along with a series of NRRMs that would prevent their accidental or inadvertent use while protecting the various interests served by induction. This scenario may take the form of full induction without deployment—a virtual de-alert status.

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[77] Sishir Gupta, "Govt. Decides to Develop Missile System," *Hindustan Times*, 5 May 1998; "Go-ahead for *Agni* Second Phase?" *The Hindu*, 4 May 1998; and "Govt. Okays *Agni*'s Upgradation," *The Indian Express*, 4 May 1998.

Cap, Roll-back, and Eliminate

Some Western scholars have suggested that instead of running through the entire gamut of induction, testing and deployment of missiles, which is fraught with the danger of inadvertent escalation, both India and Pakistan should reach an agreement, similar to the INF Treaty, to eliminate their missiles even before they are inducted and deployed.[78] This Treaty led to the eventual elimination of a whole class of weapons from Europe—the intermediate-range missiles—that could hit targets up to a range of 5,000 km. In all over 2,600 missiles were eliminated under the Treaty.[79]

In theory, the INF Treaty would appear to be applicable to the South Asian situation. However, a study of the salient features of the INF Treaty reveals significant differences that do not make this Treaty practical and viable in the South Asian setting. First, the INF Treaty began as a classic bilateral arms control and disarmament treaty and not a non-proliferation treaty. Its aim was to eliminate an existing weapon system rather than to prevent the emergence of one. Ironically, in South Asia, the treaty would be regarded as an instrument of non-proliferation, as it would aim to prohibit the deployment of missiles even before they have been developed. This perception would be strengthened by successful US efforts to multilateralize the INF Treaty and extend it to the successor states of the former Soviet Union as a non-proliferation measure.

Ironically, in South Asia, an INF-like treaty would be regarded as an instrument of non-proliferation, as it would aim to prohibit the deployment of missiles even before they have been developed.

Second, a significant factor in the evolution of the INF Treaty was the "dual track" approach, which was based on a policy of deployment *and* negotiations. Negotiations were held under the threat of deployment; successful negotiations might not have occurred had the threat to deploy not been carried out. In the case of South Asia, given external pressures and internal constraints, there is no clear deployment policy. In fact, not only does deployment appear to have been deferred, it has not been explicitly linked to negotiations.

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[78] Kathleen Bailey and Satoshi Morimoto, "A Proposal for a South Asian Intermediate Nuclear Forces Treaty," *Comparative Strategy* 17 (1998): 185–95.

[79] Details of the background to the Treaty, its evolution ,and its implementation can be found at the website of the U.S. Arms Control & Disarmament Agency, [http://www.acda.gov/treaties/inf1.htm].

Third, strong domestic peace movements in each of the European countries that received the US missiles resisted missile deployments. These demonstrations primarily called for unilateral disarmament and put pressure on their national governments. In fact, Chancellor Helmut Kohl's unilateral decision to eliminate the missiles in Germany was most probably the result of the domestic public opinion rather than his concern for arms control. Nevertheless, the German leader's decision clearly also made an impact on the US and Soviet negotiators. In the South Asian case, the peace movements that have emerged after the tests in May 1998 are unlikely to succeed in exerting domestic pressure to either disarm unilaterally or to negotiate in the short term. On the contrary, the national domestic consensus appears to be in favor of continued testing, induction, and deployment of these nuclear-capable missiles. Fourth, even though the INF Treaty eliminated US missiles located in other countries, it was originally negotiated and signed as a bilateral treaty.

While the Indian nuclear-capable missiles are indigenous, it is not clear whether all the missiles in the Pakistani arsenal are actually manufactured in Pakistan.

In South Asia, the case is even more complicated. While the Indian nuclear-capable missiles are indigenous, it is not clear whether all the missiles in the Pakistani arsenal are actually manufactured in Pakistan. This situation has been compounded by the covert nature of their acquisition. Thus it would appear that India would have to negotiate not only with Pakistan, which is merely a recipient of the long-range, nuclear-capable missiles, but also with China, which is a primary supplier. However, unless China is willing to admit responsibility for its role in missile proliferation in the region, there can be no INF-type of negotiations. Similarly, if North Korea were indeed the supplier of the *Ghauri,* then India would have to conduct negotiations with that country, as well as Pakistan. Another option would be if Pakistan, like Germany, would unilaterally dismantle these foreign- supplied missiles. This, however, is unlikely because Pakistan regards these missiles as crucial for its security.

Finally, even though the United States and the Soviet Union signed the INF Treaty, there was no compromise in their national security or that of their allies, which continued to be protected by other missiles and weapon systems. For instance, the Soviet Union compensated for the elimination of the INF forces by re-targeting other strategic and tactical nuclear delivery systems. The SS-11 and SS-19 ICBMs, as well as all submarine-launched ballistic missiles (SLBMs) deployed in Soviet-protected bastions, in addition to aviation assets, provided target coverage. Similarly, Chancellor Kohl could afford to give up these missiles and still be protected by the US nuclear guarantee. While a nuclear umbrella might

provide such security to India, New Delhi is now unwilling to accept and unlikely to expect such a guarantee.

In addition, an INF-inspired cap, roll-back, and eliminate approach does not take into consideration other factors unique to India, which have been elaborated in the previous section. Abandoning the program would be a major blow to India's international prestige and domestic pride, particularly with a staunchly nationalist government at the helm. It might also slow down the technological impetus that has been built up by investing in the cadre of missile technologists and the state-of-the-art laboratories, not to mention the possibility of "brain drain" of the best and the brightest. It might further deny India the possibility of entering a highly lucrative export market for earning much-needed foreign exchange. It would also leave India without any viable deterrent capability vis-à-vis the other missile powers in the region, and it would certainly be left out of any eventual negotiations to control or limit strategic missiles either in the region or internationally.

By accepting a cap, roll-back, and eliminate option, India would acquiesce to what it has consistently argued were discriminatory technology control regimes. All India is likely to gain is a lonely position on moral high ground and a minor reduction (less than five per cent) in its defense spending. In contrast, having built missiles despite limited, initial domestic support and stiff opposition from abroad, the domestic political stakes in the program are far too high for it to be abandoned now. Missiles might also have created a limited form of deterrence, contributing to the absence of war during a period of violent peace in the region. Moreover, maintaining the program is perhaps more cost-effective than either trying to shut it down, or revamping it entirely to cater to civilian requirements.

This form of institutional inertia is not unique to India. In the United Kingdom, where popular opinion is against nuclear weapons *per se*, there does not appear to be support for incurring the additional expenditure required to dismantle the recently acquired *Trident* system. Having already paid for *Trident*, there is a logic to keeping it. Besides, by retaining the *Trident*, Great Britain also ensures being invited to participate in negotiations to eliminate nuclear weapons, if and when that happens. Similarly, for India the benefits of retaining the program far outweigh the disadvantages of giving it up. Thus, a cap, roll-back, and eliminate approach is likely to work only if India perceives that its status, security, access to technology, and economic well-being will improve dramatically as a result. So far, there are no indications of benefits if India gives up the missile program unilaterally. However, were conditions conducive for a process of cap, roll-back, and eliminate, there would have to be a series of confidence-building measures, leading up to a highly intrusive

inspection and verification regime. In this scenario, the provisions of the INF model would be of relevance.

Overt Deployment

After the series of tests in May 1998, Defense Minister George Fernandes asserted that Indian missiles would be nuclear-tipped.[80] Although it may appear to some that the deployment of the *Prithvi* and *Agni* missiles is a foregone conclusion, and that "weaponisation is inevitable," these goals are far from becoming a reality.[81] Deployment, as it is generally practiced by other nuclear weapons states, would entail making the missiles fully operational, moving them forward, taking them off the current de-alerted status, and putting them on high alert. While technically the *Prithvi* may be closer to this stage than the *Agni*, there are still several hurdles—both institutional and operational—that need to be crossed before both these missiles could be considered ready for operational deployment. These include economic costs, tactical command-and-control issues, and the international repercussions of an overt deployment. Moreover, it is not clear whether Fernandes was speaking only on behalf of the armed forces or whether he was expressing the consensus view of the Indian government. The indications are that he was representing the former rather than the latter.

A cap, roll-back, and eliminate approach is likely to work only if India perceives that its status, security, access to technology, and economic well-being will improve dramatically as a result.

There are, however, several advantages that could accrue from an overt deployed posture. One advantage is that there would be no confusion about the role of the missiles: that of deterring the use of missiles by the other side. In this case, deployment could lead to a mutually-assured deterrence status. Second, this posture would remove any tension arising out of the movement of missiles from peace locations to forward locations. The declared intention to deploy nuclear armed missiles after the May 1998 tests might also remove five obstacles to negotiation that resulted from India's non-weaponized and non-

[80] "Missiles Will Carry Nuclear Warheads, Says George," *Indian Express*, 27 May 1998, and "Indian Nuclear Weapons Are Inevitable—Minister," *Reuters*, 26 May 1998.

[81] "Indian Nuclear Weapons Are Inevitable."

deployed status: (1) a preoccupation with missile disarmament rather than missile restraint; (2) a reluctance to acknowledge the military purpose of the other side's missiles (which precludes a realistic debate about the reasonable limits of a missile force); (3) an unwillingness to pursue arms control as part of a strategy to ensure national security; (4) an inability to transform the dialogue from tacit to explicit bargaining; and (5) an inherent resentment and defiance against the other side.[82] Indeed senior Indian leaders hope that as both India and Pakistan have validated their nuclear weapon capability, they should be able to "settle their differences . . . peacefully and through negotiations."[83]

On the other hand, deployment might also accentuate nuclear instability, if India tried to create a state of nuclear superiority vis-à-vis Pakistan. This move could be attempted in three ways. First, by building up the nuclear arsenal and creating a second strike capability, even if this meant going down the path of escalation. Second, by maintaining a second strike capability by dispersing the missiles either beyond the range of the other side's strike capability, by making them truly mobile, or by storing them in hardened shelters at a variety of locations. A third method would be to build a defensive anti-ballistic missile system that would presumably provide protection by preventing the enemy's missiles from getting through.

Deployment might also accentuate nuclear instability, if India tried to create a state of nuclear superiority vis-à-vis Pakistan.

The second approach is already being practiced to some extent by India, which has kept its *Prithvi* missile at Secundrabad—a considerable distance from the border. Although the latest Pakistani missile, *Ghauri*, can strike Secundrabad, it is still not operational, and it is likely that in the meantime India may shift the *Prithvi*s from Secundrabad to another undisclosed location. This new location could be close to the border if the doctrine were one of deployment and maintaining a high state of readiness. If the doctrine were based on a non-deployed and low-readiness posture, then the missiles could be located far from the border and preferably out of range of the other side's missiles. Many Indian and Western analysts have expressed serious reservations about anti-ballistic missile (ABM) systems.

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[82] These are drawn from Lavoy, "Nuclear Arms Control in South Asia," 273–4. Although these were developed in the context of nuclear weapons, they are equally applicable to nuclear-capable missiles.

[83] "Make Nehruvian Dream a Reality," *The Hindu*, 14 August 1998.

According to one assessment, "India's acquisition of missile defenses could upset the delicate nuclear balance" that is based on "a non-weaponized, largely untested and non-deployed nuclear capability," especially if an ABM system is introduced unilaterally.[84] Moreover, the cost of a state-of-the-art ABM system may prove to be economically unaffordable.

If Indian strategists felt the need to match the missiles, economic considerations could change dramatically. . . . While India's economy is likely to remain stronger than Pakistan's, it might lose out to an economically resurgent China.

Even without an ABM system, in pure economic terms, the *Prithvi* and *Agni* are not cheap weapon systems. At a cost of $1 million per *Prithvi* missile, the current order of 100 missiles (75 for the army and 25 for the air force) will cost $100 million. However, to be really effective as a conventional weapon system (with its present accuracy) an estimated 300 missiles would be needed. This translates into $300 million and does not include the command and control systems or the operation and maintenance costs of the missiles. Similarly, the *Agni* is estimated to cost $8.5 million.[85] Although this price tag could be justified for a nuclear-tipped *Agni*, a nuclear force of a dozen *Agni*s would cost over a $100 million, and closer to $500 million.[86] This expense represents a significant part of the defense budget and would come at the cost of other equipment that the armed forces feel is of greater importance. Moreover, these figures are based on a unilateral Indian requirement for a minimal force structure. Would these numbers remain valid if China or Pakistan embarked on a missile arms race with India? If Indian strategists felt the need to match the missiles, economic considerations could change dramatically. The Soviet Union encountered this obstacle when it attempted to match the United States missile for missile. While India's economy is likely to remain stronger than Pakistan's, it might lose out to an economically resurgent China.

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[84] Gregory Koblentz, "Theater Missile Defense and South Asia: A Volatile Mix," *The Nonproliferation Review* (Spring–Summer 1997): 59–60. Air Commodore Jasjit Singh has also endorsed this view in an interview with the author, January 1995.

[85] Pravin Sawhney, "Standing Alone: India's Nuclear Imperative," *Jane's International Defense Review* (November 1996): 28.

[86] Raj Chengappa and Manoj Joshi, "Future Fire," *India Today*, 25 May 1998, 22–24.

Economics apart, there are critical operational and tactical issues that remain unresolved, particularly with regard to the deployment, command and control, and even the military efficiency of both these missiles. Although the first *Prithvi* regiment—the 333rd Missile Regiment—has worked out some of these issues, it is not clear whether the results are satisfactory.[87] While it is clear that in some scenarios, particularly that of preemption, the missile would be militarily useful, it is equally clear that precisely this scenario creates the greatest alarm both within the region and abroad. Thus, the very movement of the missile unit anywhere close to the front could signal the possibility of a pre-emptive attack. This step, in turn, is likely to inhibit the role of the *Prithvi* missile as a weapon of preemption. This constraint is not the case with other weapon systems. For instance, strike aircraft routinely move to forward bases for training purposes without causing undue concern.

Economics apart, there are critical operational and tactical issues that remain unresolved, particularly with regard to the deployment, command and control, and even the military efficiency of both these missiles.

On account of all the above reasons, deployment, at least as it is understood in the military doctrines of the nuclear weapons states, does not appear to be a foregone conclusion. Public discussions on the crucial issues of command and control reflect this approach. While the armed forces are keen on weaponisation, mating the warhead to the delivery system, and retaining control of the nuclear weapons, others—particularly the civilian bureaucrats of the MOD and scientists of the Atomic Energy Commission (AEC)—appear to unwilling to hand over charge of the warheads to the military. The result is likely to be a "divided control" with the delivery system (such as the *Prithvi* missile) being under the charge of the armed forces and the warhead being kept by a separate establishment.[88] This arrangement reveals a preference for a non-deployed and de-alerted

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[87] For a detailed discussion of these issues, see Gole, "The *Prithvi*, 23–30; Harbir K. Mannshaiya, "India's *Prithvi*: Government Held Hostage to its Own Missile," *Jane's International Defense Review*, (August 1995): 23–5; Greg J. Gerardi, "India's 333rd *Prithvi* Missile Group," *Jane's Intelligence Review* 7, no. 8 (August 1995): 361–64; Joshi , "Employment of *Prithvi* Missile," 463–70; Sawhney, "Standing Alone," 28; Gaurav Kampani, "*Prithvi*: The Case for 'No-First-Deployment,'" *Rediff on the Net*, (Internet Publication), 10 July 1998, [http://www.rediff.co.in/news/jul/10kamp.htm]; and Zia Mian, A. H. Nayyar and M.V. Ramana, "Bringing *Prithvi* Down to Earth: The Capabilities and Potential Effectiveness of India's *Prithvi* Missile," (unpublished paper, 1997), found at the website of the Institute for Peace and Conflict Studies, New Delhi, [http://www.ipcs.org/issues/articles/084-sas-ramana.html].

[88] Raj Chengappa, "Worrying over Broken Arrows," *India Today*, 14 July 1998, [http://www.india-today.com/itoday/13071998/defence.html].

status rather than for an overt and high alert deployed status. Thus, any move to overt deployment would have to overcome significant institutional resistance.

While overt deployment would clearly resolve the uncertainty arising out of the movement of missiles back and forth, and the related dilemma that this creates for India, it could also create its own momentum which could lead to crises, escalation, and instability, and contribute to a dangerous arms race if arms control does not occur.

Induction Without Deployment

A third alternative scenario for India's nuclear-capable missiles could be a policy of induction without deployment. This plan would allow India to develop, test, and even induct the missiles without actually deploying them in an operational mode, a virtual de-alerted status. Indeed, it could be argued that the scenario in South Asia in 1998 is precisely this. While both India and Pakistan are in the early part of the test, induct, and deploy cycle, they simply do not have the technical means to maintain nuclear weapons (coupled with missiles) in a state of high alert. In particular, the *Agni* missile, which, in 1998, is in the development phase, takes a long time to prepare for firing, is cumbersome to maintain, and can be launched from only one site. Thus, any attempt to operationalize the nuclear force around the *Agni* would make it highly visible and vulnerable to a decapitating first strike. Similarly, while the *Prithvi* could be made operational and deployed on a hair-trigger alert, its liquid fuel makes it difficult to handle and cumbersome to maintain over a long period of time. In addition, to use the missile effectively, particularly against moving military targets such as troop or armored concentrations, and to protect it against preemptive strikes, would require real-time surveillance capability and reliable C^3I and early-warning systems, which India does not possess.

While overt deployment would clearly resolve the uncertainty arising out of the movement of missiles back and forth and the related dilemma that this creates for India, it could also create its own momentum which could lead to crises, escalation, and instability, and contribute to a dangerous arms race spiral if arms control does not occur.

Additionally, India would have to incur high economic costs to design, build, and maintain a robust alert regime. Although several Indian defense experts have asserted that

the economic costs would be manageable, and would raise the defense budget by a mere three percent, this estimate appears to be optimistic and does not take into account the high operation and maintenance costs associated with an alert posture. Thus, it could be argued that the Indian de-alerted status makes a virtue out of a necessity.

It appears, however, that India, and perhaps Pakistan, have followed a deliberate policy to maintain a de-alerted status in order to minimize the possibility of an accidental or inadvertent launch, and to adhere to a delayed launch procedure strategy. This effort has been attempted in two ways. First, by making a clear distinction between induction and deployment. Induction indicates a peacetime, non-belligerent activity of acquiring a new weapon system and training with it at the unit level. Deployment implies a more warlike posture in which the weapons are actually placed on launchers and are kept ready for operational use at a forward location. This option is particularly relevant to short-range ballistic missiles, such as the *Prithvi*. In the case of longer-range missiles, such as the *Agni*, it could mean that the missile is made operational at a location from where it would not have the range to strike targets.

While both India and Pakistan are in the early part of the test, induct, and deploy cycle, they simply do not have the technical means to maintain nuclear weapons (coupled with missiles) in a state of high alert.

India is not the only army to make this distinction, as demonstrated by the history of other armies equipped with missile forces. For instance, although a total of twelve *Corporal* battalions had been "activated" (a US Army term that connoted induction) in June 1956, only six were deployed in Europe.[89] A similar practice was followed with *Pershing II* deployments. Only 108 missiles were deployed in Europe although the US Army had a much larger number of these missiles in service.

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[89] The *Corporal* was the first battlefield nuclear missile to be inducted into the U.S. Army. For details, see US Army, Redstone Arsenal, "Corporal," (Internet Publication), [http://www.redstone.army.mil/history/systems/corporal/welcome.html].

It appears that India, and perhaps Pakistan, have followed a deliberate policy to maintain a de-alerted status in order to minimize the possibility of an accidental or inadvertent launch and to adhere to a delayed launch procedure strategy.

The second method is to stretch the time between induction and deployment by delaying the deployment for as long as possible. Again, India is by no means unique in this respect. For example, the 1st Guided Missile Battalion of the US Army was activated in October 1945 at Fort Bliss, Texas. However, the *Corporal* I missile was issued to them only in July 1954, and it was another ten months before the 1st Guided Missile Battalion was deployed in Europe.[90] Although in some cases this delay may have been dictated by technical glitches or budgetary constraints, it might also have been a deliberate decision to avoid unnecessary provocation, as India's intention appears to be.

This policy may explain the long delay by the Indian armed forces to induct and deploy the *Prithvi* even though there is military utility in doing so. Although the missile was first successfully test fired in 1988, the 333rd Missile Group was not raised until 1993, the missile was not displayed on Republic Day until January 1994, and the Indian Army placed orders for 75 SS-150s only in May 1994.[91] Consequently, the *Prithvi* was inducted only in late 1994.[92] Moreover, if the shifting of some missiles to a storage site at Jullandhar in 1997 indicates deployment, as some have argued, (though the missiles were subsequently moved back to Secundrabad, the home base of the 333rd Missile group), the gap between induction and deployment was at least three years.

A state of virtual de-alert in South Asia also provides a relatively economical method of protecting the nuclear arsenal. Were the nuclear arsenal effectively deployed and on high alert, it would have to be protected either by building hardened silos or by attempting to create an elaborate ballistic missile defense system, coupled with a sophisticated early warning system. Not mating the warhead with the delivery system

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[90] Ibid. Interestingly, once it was deployed, the service life of the *Corporal* proved to be remarkably short—a mere nine years—from 1955 to 1964. On 1 July 1964, it was declared obsolete.

[91] There are three variants of the *Prithvi*: the SS–150 with a range of 150 km for the army; the SS–250 with a 250km range for the air force and an SS–350 that is still in development. See Raj Chengappa, "Boosting the Arsenal," *India Today*, 29 February 1996, 98–9.

[92] For details, see Gerardi, "India's 333rd *Prithvi* Missile Group," 361–4, Mannshaiya, "India's *Prithvi*," 23–5, and Chengappa, "Boosting the Arsenal."

would allow for the components to be dispersed and would also ensure a degree of survival against a preemptive attack. It would also resolve some of the command and control problems that New Delhi faces. Thus, the current scenario of induction without deployment appears to be the most likely to continue rather than either the cap, roll-back, and eliminate option or the deployment option.

The present scenario could be formalized in the course of prospective bilateral dialogue between Islamabad and New Delhi. The chances of such a bilateral agreement would be increased if it were linked to a global de-alert regime which covers all the other five nuclear weapon states (NWS). A global de-alert regime would be an important step towards a universal no-first-use regime. Thus, this pattern of delayed induction, storage, and deployment, and the adoption of a virtual de-alert status in South Asia, could be exemplary for the other nuclear powers. This step would be acceptable to India, as it covers not only Pakistan, but China as well. However, if a global treaty does not materialize, then it would be important for New Delhi to formalize such an agreement with Beijing as well as with Islamabad.[93]

The current scenario of induction without deployment appears to be the most likely to continue rather than either the cap, roll-back, and eliminate option or the deployment option.

MISSILES AND NUCLEAR RISK-REDUCTION MEASURES

While it is difficult to say at this juncture precisely which of the three scenarios outlined earlier the Indian missile program will eventually follow, nuclear risk-reduction measures are clearly relevant to all three scenarios. However, in the absence of any agreements suited to its unusual position, India has had to learn from experience and create its own brand of crisis management and NRRMs to deal with crises in South Asia. These arrangements, like those between the United States and the former Soviet Union, have emerged from a series of crises. The Indian experience, however, is a marked departure

[93] An attempt in this direction appears to have been made in Article III of the "Agreement between the Government of the Republic of India and the Government of The People's Republic of China on Confidence-Building Measures in the Military Field Along the Line of Actual Control in the India–China Border Areas." See Michael Krepon, Khurshid Khoja, Michael Newbill and Jenny S. Drezin, eds., *Global Confidence Building* (New York: St. Martin's Press, forthcoming). See also remarks made by Dr. Li Bin, Director, Arms Control Research Division, Institute of Applied Physics and Computational Mathematics, Beijing (speech at the Defense Special Weapons Agency International Conference on Controlling Arms, Philadelphia, Penn., 11 June 1998).

from that of the United States and the former Soviet Union, in that both of these countries were able to induct and deploy nuclear missiles at the tactical level soon after the end of World War II with a minimum of fuss, debate, or international opprobrium.

In contrast, India has had to proceed with the rest of the world watching its every move. However, this experience provides some indicators for the future shape of missile-related NRRMs. Here it is important to distinguish between the Indo–Pakistani and the Sino–Indian experiences, for New Delhi's encounters with Islamabad have been quite different from its dealings with Beijing. Thus, the following section will look at the moves that eventually led to two bilateral agreements: the "Agreement on the Non-Attack of Nuclear Facilities between India and Pakistan" and the "Sino–Indian Confidence-Building Measures in the Military Field Along the Line of Actual Control in the India–China Border Areas."

The Indo-Pakistani Experience with Confidence-Building Measures

The Indian approach of tacit bargaining and *real politik* was evident in the crises leading up to the "Agreement on the Non-Attack of Nuclear Facilities between Indian and Pakistan." This agreement was first verbally mooted in 1985, formally signed in 1988, and finally ratified in 1991.[94] In 1983–84, as details of the Pakistani nuclear weapons program began to emerge, India seriously considered an air strike on the enrichment facility at Kahuta (along the lines of the one conducted by the Israelis against the reactor at Osiraq in 1981). However, Indian government officials felt that such a strike could only be carried out as part of a bigger military operation or a full-scale war, and not as an isolated attack. Pakistan, too, planned for a retaliatory strike on Indian nuclear installations.

The crisis peaked in September–October 1984. On 16 September, US Ambassador to Pakistan Dean Hinton told Pakistani president General Zia-ul-Huq that if the United States were to see signs that India was preparing for an attack, they would notify Pakistan immediately.[95] On 22 September, a reliable source from a foreign country reported to the Pakistani top brass that there was the possibility of an air strike.[96] ABC television also

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[94] Sony Devabhaktuni and Matthew C. J. Rudolph, "Key Developments in the Indo–Pak CBM Process," in Krepon, *et al.*, *A Global Survey*.

[95] Bajpai, *et al.*, *Brasstacks and Beyond*, 74.

[96] Lieutenant General K. M. Arif, *Working with Zia: Pakistan's Power Politics 1977–88* (Karachi: Oxford University Press, 1995), 362–3. This 'reliable source' was probably the CIA Director, William Casey, as suggested by William Burrows and Robert Windrem, *Critical Mass* (New York: Simon and Schuster, 1994), 73, 349.

reported that a preemptive Indian attack on Pakistani nuclear facilities was imminent. This report was based on a briefing made by the CIA to a US Senate intelligence subcommittee which stated that US spy satellites had been unable to locate two of India's Jaguar squadrons and assumed that they were about to launch an attack.[97] In the wake of this crisis, India reconsidered the option of going to war and attacking Kahuta, but concluded that this was not feasible.

At this point, K. Subrahmanyam, then-director of IDSA, proposed a non-attack agreement as part of a process of nuclear confidence building between India and Pakistan.[98] This agreement was later proposed by then-Prime Minister Rajiv Gandhi to General Zia who verbally agreed to adhere to it. However, it was not formally signed, possibly for two reasons. First, Rajiv Gandhi, who had just won the election by the biggest margin in India's history, might not have been keen on entering into an agreement with an undemocratic military dictator who clearly did not have a popular mandate. Second, India was perhaps still considering the possibility of attacking Kahuta, which was just becoming operational and clearly housed the Pakistani nuclear weapon capability.

The 1983–84 crisis was followed by the 1986–87 "Exercise Brasstacks" crisis. When these exercises escalated to *Operation Trident*, there was a distinct possibility that India and Pakistan could have gone to war. Had a war broken out at this juncture, one of India's objectives would certainly have been the destruction of Kahuta, a legitimate military target. Strategists believe that a strike on Kahuta between 1984 and 1987 would have retarded Pakistan's nuclear weapon program because the enrichment process of fissile material was still at an early stage. However, by the end of the crisis in early 1987, Pakistan might have enriched enough uranium to build a device and might have moved this material out of Kahuta.

Some scholars believe that Pakistan brandished the nuclear option toward the end of this crisis, perhaps to signal that it had now enriched adequate material to make the weapon and, therefore, an Indian attack on Kahuta would be futile. This perception was

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[97] See BBC/SWB/FE/7751/A3/8-9, 18 September 1984. This has also been corroborated by former senior US State Department officials, who described it as a "made in Washington crisis." Interviews with State Department officials in Washington, D.C., 26 November 1994.

[98] K. Subrahmanyam, "Building Trust on the Bomb: What India and Pakistan Can Do," *The Times of India*, 30 July 1985. See also Subrahmanyam's article, "Indian Nuclear Policy—1964–98 (A personal recollection)," in Air Commodore Jasjit Singh, ed., *Nuclear India* (New Delhi: Knowledge World, in association with the Institute for Defence Studies and Analyses, 1998), 39–44.

certainly shared by some of the senior Indian officials involved in the crisis and might have been the primary reason behind the signing of the Non-attack Agreement in 1988. Another factor could have been the death of General Zia and the election of Benazir Bhutto as prime minister. Although the agreement had been signed, it was not ratified, possibly because both governments were occupied with other more pressing matters—Rajiv Gandhi with the Bofors scandal and Benazir Bhutto with civil-military relations.

However, the spring 1990 crisis, following the escalation of tensions in the Kashmir Valley, also carried the possibility of war and made leaders on both sides realize that in the absence of a ratified treaty, nuclear facilities were legitimate targets. Although such attacks might not have affected the nuclear weapon capability of either country at this point, it would have created a significant amount of fallout and escalated the war, possibly to the nuclear level. Consequently, the Agreement was finally ratified in 1991. India subsequently wanted to extend this agreement to cover non-attack on civilian and economic targets.[99] However, despite repeated attempts by New Delhi to extend this agreement, Islamabad has not been willing to consider such an extension.

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The non-attack on nuclear facilities agreement might well have been acceptable because it lacked a verification component. Both sides were simply obliged to voluntarily provide a list of coordinates of their various nuclear facilities. Although neither side has put all their facilities on the list (and appear to have left out one enrichment facility each), they have been diligent in exchanging the lists every year since 1 January 1992 when the agreement officially entered into force.[100]

This agreement appeared to provide mutual reassurances as long as each side maintained its non-weaponized status. However, India's nuclear tests in May 1998 clearly changed that balance and might have led Pakistan to question India's adherence. There

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[99] Indian non-paper on confidence-building measures presented to Pakistan in January 1994 (unpublished paper, Ministry of External Affairs (MEA), New Delhi, 19 January 1994). See also Rakesh Sood, "Implementing Confidence Building Measures—India and her neighbors," paper presented at the Ninth Regional Disarmament Meeting in the Asia–Pacific Region, Kathmandu, Nepal, 24–26 February 1997: 7.

[100] Devabhaktuni and Rudolph, "Key Developments in the Indo–Pak CBM Process."

were, for example, a series of reports in Pakistan suggesting that a joint Indo–Israeli strike of the nuclear facilities at Kahuta was imminent. This was not confined to the media. On the morning of Pakistan's first nuclear test, Pakistan's diplomats, particularly in Europe and the United States, expressed their concerns to the foreign ministries of their host countries. While Pakistan's claims have been described as "confused fabrication," US observers have nonetheless pointed out that the Pakistan Air Force had been put on alert in the days leading up to Pakistan's series of tests.[101] On the other hand, there is no evidence that either the Indian or the Israeli air force was on alert or that they were planning a preventive strike. Moreover, in a public meeting following Pakistan's nuclear tests, Foreign Secretary Shamshad Ahmed argued that the non-attack agreement was valid in a non-weaponized scenario and could no longer be considered binding on either party.[102]

Just as there was direct correlation between the agreement not to attack nuclear installations and Indo–Pakistani crises, so, too, might a series of missile-related crises in South Asia pave the way for NRRMs. Once both sides feel obliged to enter into NRRMs, they could chose from a variety of available options. These could range from prior notification of flight-tests, to declaratory measures of no first deployment, no-first-use, and non-attack of civilian targets. Perhaps some provisions from the Conventional Forces in Europe (CFE) Treaty might be suitably adapted to South Asia. Additional NRRMs could entail concrete and verifiable steps to ensure that both parties were adhering to the agreements reached. This would depend on the perception of both sides about the danger posed by missiles. Perhaps initial arrangements that do not insist on verification are most likely to succeed, as was the case with the "Agreement on the Non-Attack of Nuclear Facilities." The critical question is how to manage missile-related crises that might occur before effective NRRMs are in place.

One of the best means to do this is to communicate the perceptions of a crisis to the other side, either directly or indirectly. In 1986–7, there was no direct bilateral communication for a crucial forty-five days, exacerbating the crisis. During the 1990 crisis, both India and Pakistan were in constant touch with developments on the other side

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[101] Michael Krepon, "Fateful Decisions Ahead for India, Pak," *The Hindu*, 3 June 1998.

[102] Remarks made by Pakistan Foreign Secretary, Shamshad Ahmed at a breakfast meeting at the Asia Society, New York, 7 July 1998.

indirectly through the respective US ambassadors.[103] This contact helped provide a relatively accurate perception of the intentions of the other side.

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A second option is to resolve the crisis as soon as it appears to be reaching a flashpoint. This has been the trend with all the major recent crises in South Asia. For instance, even though the "Brasstacks" crisis took a long time to brew, it was probably resolved in a single day (23 January 1987) through a flurry of diplomatic activity in New Delhi and Islamabad.[104] Similarly, the 1990 crisis was well on its way to a resolution in April—weeks before the mission of US Deputy National Security Advisor Robert Gates visited both capitals in May. And in 1997, a crisis over the reported storage of *Prithvi* missiles in the Punjab near the Pakistani border was also resolved quickly when India decided to remove the missiles and send them back to Secundrabad.[105] Thus, while crisis prevention appears to be difficult, crisis resolution appears to take place with alacrity, at least in the Indo–Pakistani context. To that extent, there may be a strong case to formalize the crisis resolution mechanism rather than the crisis prevention arrangements.

The Sino–Indian CBM Experience

There are two significant differences that distinguish the Sino–Indian CBM experience from the Indo–Pakistani experience. While there was relative parity between the Indian and Pakistani nuclear status, there was a clear distinction between a weaponized China and a non-weaponized India. Hence, as an undeclared nuclear weapon state, India felt constrained in offering a no-first-use guarantee to nuclear China. However, even after the nuclear tests, this disparity remains as China is a recognized nuclear weapon state under the Nuclear Non-proliferation Treaty (NPT) and India is not. Moreover, despite India's new status, China is unwilling to engage in no-first-use negotiations. For instance, on 9 July

[103] Krepon and Faruqee, eds., "Conflict Prevention," 13–19.

[104] Bajpai, *et. al.*, *Brasstacks and Beyond*, 34–35.

[105] Smith, "India Denies It Has Deployed Missiles."

1998, New Delhi proposed a no-first-use pact with China, but Beijing suggested that India should first abandon its nuclear weapons project and sign the CTBT and NPT unconditionally.[106]

The empirical evidence for the cause-effect linkage between crises and CBMs in the case of India and China is limited. There was only one serious crisis arising out of a border confrontation in the Sumdorong Chu Valley in 1986.[107] While this clash may have led to Rajiv Gandhi's subsequent visit to China in 1988, and the eventual signing of the 1993 "Agreement on the Maintenance of Peace and Tranquility Along the Line of Actual Control in the India–China Border Areas," it is not clear if there is a direct correlation between the two events.[108] It is clear that it paved the way for the Sino–Indian "Agreement on Confidence Building Measures in the Military Field along the Line of Actual Control in the India–China Border Areas" in 1996. Article III of this agreement stipulates the non-use of military capability and requires the reduction or limitation of the number of missiles (both SSMs and SAMs) along the border areas to a level "mutually agreed upon."[109]

The empirical evidence for the cause-effect linkage between crises and CBMs in the case of India and China is limited.

While this agreement is an important start, it is limited on two grounds. First, it does not address the issue of the reported Chinese nuclear missiles based in Tibet, away from the immediate border area, but capable of striking India. Second, it does not take into account the supply of Chinese missiles to Pakistan. Although some Chinese scholars and

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[106] Ming Zhang, "India's Blasts and China's Reaction," remarks at the conference on "The Impact of the South Asia Nuclear Crisis On the Non-Proliferation Regime," hosted by the Carnegie Endowment for International Peace (Washington, D.C., 16 July 1998). Available at the Carnegie Endowment's website, [http://www.ceip.org/programs/npp/zhang.htm].

[107] See, for instance, R. G. Sutter and Richard Cronin, "China–India Border Friction: Background Information and Possible Implications," Congressional Research Service (CRS) report for Congress, (Washington, D.C.: Congress Research Service, 19 June 1987).

[108] See Krepon, *et al. Global Confidence Building*, for details of the agreement.

[109] Ibid.

officials have privately acknowledged these supplies, Beijing has been reluctant to accept responsibility for these transfers.[110]

However, it is possible that both the missiles in Tibet and the *Agni* could be brought under the provisions of Article III of the above agreement.[111] Such a treaty would also require an intrusive verification component to be truly effective, which China is likely to resist. Alternatively, if India and China could agree on the distinction between missiles inducted but not deployed, then, perhaps, it would be possible to negotiate NRRMs for the missiles in Tibet and the *Agni*. These NRRMs could be in the form of a non-verifiable agreement not to deploy missiles on high alert in Tibet or close to the border. It could also take the form of a verifiable agreement at a later stage with a possible "open skies" component, in which both sides could over fly the other's border to verify the non-deployment of missiles.[112] So far both countries have been reluctant to engage in such talks.

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However, were India and China to agree on a missile-related NRRMs, there are several options to choose from. These range from flight-test bans (which would be unacceptable to India, given the development status of the *Agni* missiles); deployment limitations and the creation of "demissilized" zones (particularly in Tibet); range limitations; and numerical ceilings.[113] Alternatively, India and China could pursue a more ambitious set of controls such as a regional partial flight-test ban or even a regional comprehensive flight-test ban treaty.[114] These, however, would be acceptable to India only if they could be linked to a global, comprehensive ban on the flight-test of long-range missiles. This treaty would

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[110] Personal communications with senior scholars from the Beijing-based China Institute for International Strategic Studies, the think-tank of the Chinese People's Liberation Army.

[111] Some Chinese scholars have also supported a Sino–Indian ban on short-range nuclear-capable missiles along their border. See the remarks made by Dr. Li Bin, *op.cit.*

[112] See the essay by Teresita Schaffer and John Hawes in this volume.

[113] These have been suggested by Janne E. Nolan, *Trappings of Power: Ballistic Missiles in the Third World* (Washington, D.C.: The Brookings Institution, 1991), 156–9.

[114] See Lora Lumpe, "A Flight Test Ban as a Tool for Curbing Ballistic Missile Proliferation," in Peter Hayes, ed., *Space Power Interests* (Boulder, Colo.: Westview Press, 1996), 159–164.

be possible only if China were willing to enter into negotiations and agree to its verification. Such a ban would alleviate India's security concerns vis-à-vis China and would be in line with its policy of linking regional arms control agreements with international arms control and disarmament agreements. Additionally, it would provide the seasoned Indian missile scientists an opportunity to participate in the onerous task of verifying missile flight-tests, not only in southern Asia but all over the world. Thus a global missile flight-test ban treaty would be an ideal alternative to support the creative energies of the missile scientists. The benefits of such a treaty would be similar to India simultaneously signing a regional chemical weapon convention with Pakistan and joining the global chemical weapon convention.

The above NRRMs are bilateral or multilateral in nature. Some could be formal in nature and others informal. There are, however, unilateral NRRMs that India could enact to provide reassurance and reduce tensions arising out of missile tests and missile movements. Such movements are particularly alarming when one side fails to pick up the movement but learns about it from a story in a Western newspaper, as was the case in 1997 when Pakistan learned that some *Prithvi* missiles had been moved to Jullandhar and stored there from a report appearing in the *Washington Post*. The same is also true with regard to missile flight tests. Although there is no international or Western regime that prohibits missile testing or their movements within a nation's own territory, there appears to be a growing international norm against testing without prior notification. While the movement and flight testing of missiles within one's own territory is a legitimate right of any sovereign nation, this step could sound alarm bells. This development could be particularly alarming when test preparations have been detected without prior notification, and the weapons are considered to be nuclear-capable and part of a preemptive strategy. An Indian government sensitive to international opinion responded by reversing the move, which might have been designed merely to train the unit in the operational aspects of the weapon system at the actual forward locations. This was the primary reason why the *Prithvi* missiles returned to their home base in Secundrabad. In doing so, India might have compromised its legitimate right to flight-test and induct missiles that it considers critical for its security. Given the international response to a move made during peacetime, one can only imagine the kind of pressure that could be brought to bear

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on India if such a move occurred during times of tension. Nevertheless, the problem remains to distinguish between missile training and readiness to fire, particularly during periods of tension in South Asia.

One unilateral NRRM to assuage this situation could simply be to inform Pakistan (and China) about either an impending missile flight or movement related to induction, as is occasionally done by the IAF when aircraft squadrons shift bases. This, however, is an unpopular option with the Indian Army, which is reluctant to share information that would reveal the operational and tactical maneuvers of their newest unit. This revelation would be tantamount to giving Pakistan (and China) information that either or both might not otherwise have and would provide an opportunity to study the movements closely—information useful for a preemptive attack. Along this rationale, the Indian Army leadership initially declined to invite Pakistani observers to witness the "Brasstacks" exercises. However, the realization that a response to an unannounced missile test or movement is likely to be more unpredictable than the reaction to a pre-notified test or movement might yet convince the Indian army of the need for unilateral prior notification.

Another possible NRRM is for India to clearly identify training areas and distinguish them from deployment areas within a range of targets. This norm has been achieved to a great extent in the case of both strike aircraft and tanks, but has not been achieved with missiles. Thus, India could unilaterally declare that missiles test-fired from the Interim Test Range at Chandipur-on-Sea, or even the ranges at Pokhran, are purely for testing and training purposes. This declaration would help to validate the distinction that India has diligently made between induction, training, and deployment.

CONCLUSION

India has a legitimate case for creating a ballistic missile capability. Although primarily driven by issues of prestige and status, this effort is also in response to security concerns arising out of the presence of other nuclear-capable missiles in India's immediate vicinity. The situation is complicated by the fact that some of these missiles have been supplied by other countries. Therefore, any regime to eliminate India's nuclear-capable ballistic missiles would have to address these core issues.

There are three possible scenarios for India's nuclear missile program in future. The first and most unlikely option would be to follow the traditional non-proliferation path: to cap, roll-back, and eliminate the missiles before they become operational. The second option, still distant, would be to overtly deploy these missiles before going down the traditional arms control path leading to their eventual elimination, as was the case with the INF treaty. This essay favors a third option under which the missiles are inducted, but not deployed. Whatever option India finally chooses, this essay argues that a regime of missile stabilization measures and NRRMs, which are likely to emerge out of India's experience in previous nuclear-related crises, would be essential to provide reassurance and crisis stability. NRRMs would enable India to retain missile capabilities and serve several legitimate domestic and security interests, while ensuring that they are not used inadvertently or do not lead to a nuclear conflict. Specific and non-verifiable NRRMs, coupled with maintaining the current state of non-deployment, offer the best start for this process. While these measures would ensure a modicum of stability even if these missiles were eventually deployed, the real challenge would be to manage any crises that arise in the interim. A series of innovative NRRMs are required for this purpose.

NRRMs would enable India to retain missile capabilities and serve several legitimate domestic and security interests, while ensuring that they are not used inadvertently or do not lead to a nuclear conflict.

Nuclear Risk-Reduction Measures in Kashmir

Brian Cloughley

Since India and Pakistan gained independence in 1947, the former princely state of Kashmir has been a continuing source of dispute between the two countries. India and Pakistan first fought over possession of the Kashmir region soon after partition. In 1949, the United Nations (UN)-sponsored cease-fire left the state unequally divided between the two countries, but it was hoped that the two newly-independent states could reach an agreement on the state's final status.[1]

Despite hopes that a solution to this conflict would ensure peace in the region, there has been no settlement of the Kashmir dispute, and dissonance continues. The temporary cease-fire line established in 1949 has remained the unofficial border between the two countries, and become, in recent years, a source of frequent exchanges of fire and heavy artillery, with significant loss of life and damage to property. As early as 1950, the Australian jurist Sir Owen Dixon decried the "continued maintenance of two armies facing one another across a cease-fire line," maintaining that "a danger to peace must exist while this state of things continues."[2]

During the period 1950–1958, Dixon was one of four UN interlocutors who were charged with assessing conditions for a peaceful and timely solution to the Kashmir conflict, and whose reports are still considered masterful.[3] Dixon's acute and agile mind was combined with elegant expression. The authors of these reports were also conscious of the

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[1] "Truce Terms transmitted to the Governments of India and Pakistan by the UN Commission for India and Pakistan," (S/AC.12/195, 28 April 1949), established a cease-fire line "based on the factual positions occupied on 1 January 1949 by the forces under the control of the Indian and Pakistani High Command." In K. Sarwar Hasan, ed., *The Kashmir Question*, Documents on the Foreign Relations of Pakistan (Karachi: Pakistan Institute of International Affairs, 1966), 215.

[2] United Nations Security Council, "Report of Sir Owen Dixon, United Nations Representative for India and Pakistan, to the Security Council," General S/1791, incorporating S/1791/Add.1 (15 September 1950). See H.S. Gururaj Rao, *Legal Aspects of the Kashmir Problem* (Bombay: Asia Publishing House, 1967), Appendix XXII, and Hasan, *The Kashmir Question*, 249–279.

[3] See *Reports on Kashmir by UN Representatives* (Karachi: Government of Pakistan, 1962). In chronological order these were General A.G.L. McNaughton (Canada), Sir Owen Dixon (Australia), Dr. Frank Graham (United States), and Mr. Gunnar Jarring (Sweden). Dr. Graham submitted the final report in the series, dated 31 March 1958.

deep relevance the Kashmir dispute held for the political future of the South Asian region. In his final report, Dr. Frank P. Graham struck an apposite and resonant note in commenting that "some of the noblest spirits of our time are born of the spiritual heritage and democratic hopes of the peoples of the South Asian subcontinent," and was hopeful that there might be an "early settlement of the Kashmir dispute in the advancement of the cooperative progress of two great peoples and the peace of the world."[4]

Since the 1949 cease-fire, India and Pakistan have fought two conventional wars (in 1965 and 1971), but violence in the state of Kashmir has thus far proved containable.[5] Beginning in 1989, however, violence in the Valley of Kashmir and nearby areas, the involvement of innocents in turbulence, and the continuing disagreements among the major parties involved, have served to highlight the growing seriousness of this dispute. The May 1998 nuclear tests by India and Pakistan have given conflict within the state an even more disturbing significance. It is apparent that the peace of the world may be more directly affected by the Kashmir problem in the nuclear era in the subcontinent than it was in the time of Dr. Graham and his associates.

The introduction of overt nuclear capabilities in South Asia emphasizes the need to diminish or, preferably, erase tension before an unmanageable escalation might take place.

The introduction of overt nuclear capabilities in South Asia emphasizes the need to diminish or, preferably, erase tension before an unmanageable escalation takes place. Nuclear risk-reduction measures (NRRMs) are especially relevant to Kashmir, given the risks associated with the manufacture and deployment of nuclear weapons. The absence of reliable command and control structures makes escalations in violence, increases in cross-border activity in Kashmir, or misreadings of the other side's intentions potentially far more dangerous. As one commentator wrote, "where America and the Soviet Union had elaborate

[4] Ibid, 85. The sentiments expressed were in the context of the death of the Pakistani prime minister Liaquat Ali Khan by the hand of an assassin.

[5] There was fighting in Kashmir in 1971, but the dispute was not itself the cause of war. See Šumit Ganguly, *The Origins of War in South Asia* (Boulder, Colo.: Westview Press, 1994), and Richard Sisson and Leo E. Rose, *War and Succession: Pakistan, India, and the Creation of Bangladesh* (Berkeley, Calif.: University of California Press, 1990) for discussions of the 1971 War.

safeguards against the sort of miscalculation that could trigger a nuclear exchange, Indian and Pakistani procedures are rudimentary and often ignored."[6]

The opportunity is ripe for India and Pakistan to adopt measures in Kashmir that would have the initial effect of reducing tension, perhaps leading to conditions in which peaceful solution of the Kashmir problem could be negotiated without rancor. Accordingly, this essay describes the Kashmir region, covers the dynamics of insecurity along the Line of Control (LoC), and outlines the aims of NRRMs in Kashmir. This essay will also discuss in detail specific NRRMs that seek to curtail LoC firing and cross-border infiltration, serving as a starting point for confidence building and cooperation between India and Pakistan.

TERRAIN AND MILITARY FORCES

The total area of the former princely state of Kashmir is 86,023 square miles, or about the size of the Korean Peninsula, Kansas or Great Britain. The territory is divided by a LoC established in 1972 following the 1971 conflict between India and Pakistan. The LoC replaced the former cease-fire line of 1949. India administers 53,665 square miles and Pakistan 32,358 square miles. The LoC stretches approximately 450 miles from grid reference NW 605 550, at the termination of the international border thirty five miles west of Jammu, to NJ 980 420 in the Karakoram Range sixty-five miles southeast of Mount K2 and twelve miles north of the Shyok River.[7] There is no definition of the LoC from that point northward toward Chinese territory. The terrain varies from flatland, hills and semi-tropical growth in the south, through increasingly steeper areas and the temperate vegetation of the Pir Panjal Range (with occupied military positions up to 14,000 feet) until, north of the Jhelum River, the higher ranges begin. The west-east section of the Line lies along and across mountain ridges, some over 18,000 feet, where any kind of movement is difficult and dangerous.

India and Pakistan maintain large armed forces in the areas under their administration. Along the LoC in "Azad" ("Free") Kashmir, administered by Pakistan, there are some 90,000 troops. Opposing them are about 170,000 Indian army soldiers in the

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[6] "India and Pakistan: Can They Arrange a Cold War?" *The Economist*, 3 October 1998, 102.

[7] See "Delineation of the Line of Control in Jammu and Kashmir Resulting from the Cease-fire of 17 December 1971 in accordance with the Simla Agreement of 2 July 1972," signed by representatives of the two armies on 11 December 1972. The text of the Simla Agreement is available in the appendix of Michael Krepon and Amit Sevak, eds., *Crisis Prevention, Confidence Building, and Reconciliation in South Asia* (New Delhi: Manohar, 1996), 251.

Indian state of "Jammu and Kashmir" ("J & K").[8] Both sides can move large numbers of reinforcements to the area within hours.[9] There are no advanced fixed-wing combat aircraft (*e.g.* Pakistani F-16s or Indian Su-30s) stationed in the region, but both countries have major airfields within a few minutes flying time. Similarly, armed helicopters are based within easy reach of the troops they would support in the event of conflict. There are large quantities of heavy weapons, from 81mm mortars to 155mm medium guns, many of which are positioned close to the Line. The ground along the LoC is in general unsuitable for tanks, save for fifty miles at its southern extremity, near which there are bases for several armored units. There are minefields and wire obstacles in many areas.

In some defended localities, opposing troops are within a stone's throw of each other, and cross-line firing is common.

Kashmir bristles with weaponry. The LoC is under constant patrol and surveillance by both sides. In some defended localities, opposing troops are within a stone's throw of each other, and cross-line firing is common. Formal rules of engagement (ROE) exist and, although obviously unsatisfactory in terms of discouraging escalation from small arms fire to artillery exchanges, they may have contributed to avoiding further escalation into another major conflict. The paucity of UN officers makes it difficult to assess the precise number of cease-fire violations.[10]

In no area on the Indian side are civilians permitted to move close to the LoC. Pakistan allows cultivation right up to the LoC on its side, and residents can move freely for

[8] Use of these terms does not imply acceptance or otherwise of any claims made by India or Pakistan concerning the territory of Kashmir. The countries also refer to "Pakistan Occupied Kashmir" or "POK" and its concomitant, "IOK."

[9] India has a further 250,000 paramilitary troops in and around the Kashmir Valley, most involved in internal security duties. One such element, the Border Security Force (see below), assists the regular army in manning positions along the LoC. Indian troop figures are obviously contentious, and estimates vary. Some recent estimates come from Chaitanya Kalbag, "Kashmir Might Spark N-war—Separatist," *Reuters*, 8 July 1998, and R. Jeffrey Smith, "Miscalculation Feared in Foes' Kashmir Moves," *Washington Post*, 5 June 1998. The numbers in this essay are an independent assessment.

[10] The UN Military Observer group in India and Pakistan (UNMOGIP) has 44 military officers of whom half are available at any one time to investigate violations of the cease-fire. Investigations are carried out only on the Pakistani side of the LoC. For an authoritative study of UNMOGIP, see Pauline Dawson, *The Peacekeepers of Kashmir: The UN Military Observer Group in India and Pakistan* (London: Hurst & Company, 1994). Also see Robert G. Wirsing, *India, Pakistan and the Kashmir Dispute* (New York: St. Martin's Press, 1994), 68–75.

wood-gathering, control of livestock, water-acquisition and travel.[11] Before the escalation of violence in Indian-administered Kashmir in 1989, it was not uncommon for civilians to make their way, illegally, across the Line for social gatherings (especially weddings involving members of families split by the LoC) and for the time-honored and generally harmless purpose of smuggling. Although cross-LoC movement continues, it is largely associated with the activities of various militant organizations confronting Indian forces in Jammu & Kashmir.

CIVIL ADMINISTRATION

The civil authorities in both Azad Kashmir and Jammu & Kashmir play no part in military plans relevant to the Line of Control; these are the concerns of the Army and the Ministry of Defense (MOD). The military responsibilities of the territories' governments are confined to advice and cooperation on domestic matters, and, in Jammu & Kashmir, to liaison with the military on intelligence and physical measures involved in combating insurgency. The Jammu & Kashmir Police Force contains an element known as the Special Operations Group which conducts operations against militants.[12] The Government of India has stated that responsibility for law and order in some towns, including Srinagar, the summer administrative center of the region, has been returned to the civil police.

The civil authorities in both Azad Kashmir and Jammu & Kashmir play no part in military plans relevant to the Line of Control; these are the concerns of the army and the ministry of defense.

Indian civil armed forces involved in anti-guerrilla tasks include the Border Security Force (BSF) and the Central Reserve Police Force (CRPF) which are subordinate to the Home Ministry. Similar functions are performed by the Rashtriya Rifles under the MOD. Paramilitary forces number around 250,000 in Jammu & Kashmir where they are under operational control (or command, in the case of the Rashtriya Rifles) of the Indian Army.

[11] Observation by the author.

[12] See Amnesty International, "Human Rights Abuses in the Election Period in Jammu and Kashmir," Amnesty International Report, ASA 20/39/96 (September 1996), [http://www.amnesty.org/ailib/aipub/1996/ASA/32003996.htm]. Also Shujaat Bukhari, "New Allegations Against the Police," *The Hindu,* 4 July 1998.

Elected assemblies govern the separate regions. Central governmental oversight for Pakistani-held portions of Kashmir is housed in the "Ministry of State for Northern Areas, Frontier Regions and Kashmir Affairs." In May 1998, the Indian Minister of Home Affairs was "given charge of the Department of Jammu and Kashmir Affairs," which had hitherto been a separate entity.[13]

MILITANCY IN JAMMU & KASHMIR

Since 1989 there has been a state of insurrection in Jammu & Kashmir.[14] Muslim militants seeking to gain independence, accession to Pakistan or, at least, bilaterally-recognized autonomy for Kashmir, have conducted a guerrilla campaign against Indian security forces. India alleges that these groups have been given aid and physical assistance, including weapons, by Pakistan. Pakistan denies this allegation, claiming that its activities are confined to moral and political support. India further claims that these militant groups include Afghans and other foreigners whose entry to Jammu & Kashmir can be only across the LoC.[15] There is evidence that foreigners are present in armed opposition groups, but it is not known in what numbers.[16] By the Indian government's account, some 20,000 deaths have been caused in the region in a decade.[17] Independent observers have commented that in 1997 "abuses by militant groups in [Indian-administered] Kashmir also continued" and that these elements indulged in "arbitrary killings of noncombatants." Human Rights

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[13] "Advani Given Charge of J&K Affairs," *Times of India*, 24 May 1998.

[14] For a good account of the insurgency, see Wirsing, *India, Pakistan and the Kashmir Dispute*, chap. 4.

[15] "Security forces have already killed around 185 Afghan insurgents in the State." From "Islamisation Cause for Concern: Army Chief," *The Hindu*, 1 September 1998. Also, "Taliban Making its Presence Felt in Kashmir," *The Nation* (Pakistan), 10 September 1998.

[16] Lt. Gen Krishan Pal, Commander 15 Corps, HQ Srinagar, stated on 14 September 1998 that the "number of militants operating in the Valley would not be over 1,000 and the foreign elements among them is 60 to 70 per cent." "Militancy Waning in Jammu and Kashmir," *The Hindu*, 15 September 1998. The General added that "the number of foreign militants will increase."

[17] John F. Burns, "Gunmen Kill 25 Hindus in Kashmir Attacks," *New York Times*, 20 June 1998. Also Agence France-Presse, "Held Kashmir," *Dawn* (Pakistan), 14 September 1998: "A total of 19,866 people have died in the anti-India campaign launched in the occupied Kashmir since January 1990, the Press Trust of India (PTI) reported on Sunday. The victims included 9,123 Kashmiri guerrillas, 6,673 civilians allegedly killed by the militants, and 2,477 civilians killed by Indian security forces as well as 1,593 security personnel . . . . A total of 40,031 violent incidents were reported during this period."

Watch/Asia stated, *inter alia*, that Indian forces "engaged in extrajudicial executions and torture."[18]

The long-term goal of the Indian military in Kashmir is the eradication of separatist groups.[19] As of 1998, the Army had no policy of seeking dialogue with militant groups, their task being solely the conduct of neutralization operations.[20] Human rights organizations have expressed some concern about these operations, and have questioned the commitment of the state and federal government to address these concerns. One noted that "on August 8 [1997] the Jammu and Kashmir state government appointed a human rights commission to investigate complaints of abuse but gave it no jurisdiction over the army or other federal forces."[21]

In Jammu & Kashmir there are pro-Indian government groups of armed irregulars whose numbers, remit, and methods of operations are not divulged officially.[22] These groups appear to be composed of former guerrillas. Human Rights Watch/Asia has stated that they are "organized, armed and protected by the Indian army" and has recommended that "the government of India . . . disarm all state-sponsored militias not established and regulated by law. . . ."[23] One Pakistani senior military officer averred that, while in general sympathetic to the activities of their co-religionists in what they regard as a fight for freedom, the Pakistani Army is increasingly reluctant to permit cross-LoC activity by the more extremist groups whose members they consider vicious, ill-disciplined and

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[18] Human Rights Watch/Asia, "India," in *World Report 1998* (July 1998), {http://www.hrw.org/hrw/worldreport/Asia-06.htm#P563_147545]. Regarding the confirmation of these claims, the US Department of State has written, "UN Special rapporteurs on Torture and Extrajudicial Killings renewed their requests to visit Jammu and Kashmir to the [Indian] Government in 1997, but they were not permitted to do so." US Department of State, "India," in *Country Reports on Human Rights Practices for 1997* (Washington, D.C.: Bureau of Democracy, Human Rights and Labor, 30 January 1998), [http://www.state.gov/www/global/human_rights/1997_hrp_report/india.html].

[19] Brigadier (now Major General) G.K. Duggal, Indian Army, informed the author in May 1994 that India's efforts to crush the dissidents would "go on for as long as it takes and as much as it takes."

[20] Harish Khare, "Roll Back Proxy War, Pak Told," *The Hindu*, 19 May 1998: "The Home Minister [L.K. Advani] categorically asserted that 'talks [involving militants] were not on the agenda.'"

[21] Human Rights Watch, "India."

[22] See "Landmine Kills Five in India's Kashmir," *Reuters*, 21 June 1998.

[23] *India's Secret Army in Kashmir: New Patterns of Abuse Emerge in the Conflict*, Human Rights Watch Country Report (New York: Human Rights Watch, 1996), 2.

increasingly likely to display intentions that conflict with the policies of the Pakistani government.[24]

Nonetheless, Pakistan's Inter-Services Intelligence Directorate (ISI) is responsible for monitoring activities of guerrilla groups based in Pakistan and Afghanistan.[25] It is apparent that the line between supervision and support is a fine one, and it would be difficult to find anyone in India (or Pakistan) who believes that Pakistan, in the shape of its major intelligence service, is not wholeheartedly—and physically—supporting the dissidents. Fueling speculation on this issue during the period of intensified cross-Line exchanges of fire in August 1998, then-Pakistani foreign minister Gohar Ayub Khan stated that "the freedom movement in occupied [Indian-administered] Kashmir would have to be stepped-up and Pakistan would have to give more political and diplomatic support to the freedom fighters."[26]

There are approximately a dozen separatist groups operating in Jammu & Kashmir of which only a handful have political credibility.

There are approximately a dozen separatist groups operating in Jammu & Kashmir of which only a handful have political credibility.[27] One aim of some of the dissidents is conveyed by the statements of the Jammu & Kashmir Liberation Front (JKLF—itself in two factions), that "the best solution of the issue is to reunite the divided Jammu Kashmir State and make it a fully independent and truly democratic sovereign State" having independent

[24] Interview with the author, April 1998.

[25] India states categorically that the ISI trains and equips members of dissident groups. The Home Minister, L.K. Advani, has said that "Pakistani sponsored terrorism will have to be crushed at all costs," (*The Hindu*, 24 June 1998) and that "Pakistan is fermenting insurgency through a 'proxy war' in Jammu and Kashmir." (*Dawn*, 2 August 1998).

[26] "Gohar Fears War with India," *Dawn*, 3 August 1998.

[27] "The governor [of Indian-administered Kashmir, G.C. Saxena] placed the number of local militants at 1,000. Only three outfits—*Hizbul Muzahideen*, *Lashkar-e-Toiba* and *Harkat-ul-Ansar*—were active now." See Inder Sawhney, "J&K Foresees No Threat From Taliban," *The Times of India*, 9 September 1998. Most of the militant groups are small and many more have been ephemeral. On occasion, their activities far outweigh the mainstream groups in effect, as when there is killing of inhabitants of the region who have no connection with or interest in government or politics. For example, the murder by an extremist organization of 25 male Hindu wedding guests. See "Centre To Take 'Pro-active' Steps in J&K," *Asian Age*, 21 June 1998.

status for fifteen years "under the supervision of international forces" with its final status being determined by plebiscite.[28] Not all groups subscribe to this aim.

The All Parties Hurriyat Conference (APHC—a political combine of former militant groups, including members of the JKLF, that advocates a non-violent campaign) seeks to speak with a single voice on their aspirations concerning a UN-supervised plebiscite to "choose a political future."[29] The APHC appears to speak for a number of elements, but some dissident movements decline central control and may not even be linked one with another. At least three main associations espouse accession to Pakistan and have a loose alliance with that objective in mind.[30]

It is difficult to determine the political objectives of some groups because their activities appear to be based solely on terrorism.[31] The inhabitants of Jammu & Kashmir are increasingly targeted by gangs whose murders have caused revulsion in the region. Some militants have concentrated on their co-religionists, especially those who would seek dialogue concerning the plight of the territory, and also on apolitical and uncommitted members of the public whom they seek to influence against any move toward rapprochement.[32] Some groups receive support from religious organizations based in Pakistan.[33] The author visited the headquarters of one such organization near Rawalpindi where it was made clear that assistance was given to Kashmiri militant groups, albeit, they claimed, of the non-military kind. It does appear, however, that the indigenous insurrection

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[28] "JKLF Writes to World Leaders," *Dawn* (Lahore), 29 June 1998.

[29] Mehmood Ahmad Sagar, *All Parties Hurriet Conference Jammu and Kashmir, A Profile* (Muzaffarabad, "Azad" Jammu and Kashmir: APHC, 7 May 1994). This organization at one time had an email address but facilities were withdrawn by the Indian authorities.

[30] Political loyalties, however, and not always firm. One band, the *Ikhwan ul-Musalmeen*, having at one time favored accession, declared allegiance to India in 1995 and has since acted in support of the security forces against other militant groups. Five members of the *Ikhwan* were killed when their vehicle was blown up on 21 June 1998 by a mine planted by separatist guerrillas. "Landmine Kills Five."

[31] *India's Secret Army in Kashmir*, chap. 7.

[32] "[L]ast month saw the emergence of a previously unheard-of separatist group here [Srinagar] called the *Taliban-i-Kashmir*, which warned Muslim women to start wearing veils by 10 September or face 'action.'" "Taliban Making its Presence Felt in Kashmir," *The Nation* (*Agence France-Presse*), 10 September 1998. See also Amnesty International, "Human Rights Abuses," *op. cit.*

[33] *India's Secret Army*, chap. 7. See also Wirsing, *India, Pakistan and the Kashmir Dispute*, 120.

may be on the wane, with involvement by Pakistani, Afghan and Arab "freelance" militants increasingly common.

Regardless of the points of view or contentions concerning militants' activities, it cannot be denied that they cross the LoC, a violation of international law.[34] Both India and Pakistan consider illegal any crossing of the Line of Control save that by UN personnel in pursuit of their duties.[35] Further, it is, by convention, incumbent on parties sharing a frontier that they divide responsibility for its integrity. In spite of the fact—perhaps especially *because* of the fact—that the LoC is not an international border, border access from one side to another is more sensitive than for many other regions.

The creation of refugees is a burden to the economy, a cruel disruption to those concerned, and an indication of the degree of security provided for citizens of Indian-administered Kashmir.

From both an economic and humanitarian standpoint, India is also concerned about the existence of a significant diaspora of Kashmiri Pandit refugees from, and within, Jammu & Kashmir who have fled the state in fear of the predominantly Muslim-led militancy. The costs to the government of supporting these refugees have been assessed at close to Rs. 3 billion for the years 1989–1998. The authorities state that 16,977 houses have been vacated by these recent residents of the valley and its surrounding areas, together with 2,101 acres of land.[36] The creation of refugees is a burden to the economy, a cruel disruption to those concerned, and an indication of the degree of security provided for citizens of Indian-administered Kashmir.

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[34] See Rao, *Legal Aspects of the Kashmir Problem*, chap. 16.

[35] UN Military Observers and International civilian staff members may cross the Line at any of the points jointly recognized by India and Pakistan. These UN members are afforded every courtesy by both countries. It is thus evident that their presence—and the mandate of the UN—is endorsed by the two governments. Were it not, then UN personnel would be denied the facility to enter and exit on each side using only UN identification cards.

[36] "J&K Govt Under Pressure to Hike Relief for Migrants," *The Hindu*, 3 September 1998. In mid-1998, the US dollar would buy 42 rupees at the official rate of exchange. Pandits are high caste Hindus, but the term is sometimes used to denote Kashmiri Hindus of any caste. (Prime Minister Jawaharlal Nehru came from Kashmiri Pandit stock.)

From the above it can be appreciated that the difficulties faced by India, Pakistan and the peoples of Kashmir are immense. There is, however, an opportunity to open the way to trust and tranquillity in the subcontinent. The creation and sustenance of mutual credibility in order to pave the way to prosperity lies partly—perhaps mainly—in establishing sound, practical NRRMs based and built on the fact that both nations wish, above all else, to live in harmony.

THE DYNAMICS OF INSECURITY ALONG THE LINE OF CONTROL

The civil insurrection in Kashmir cannot be de-linked from the military confrontation along the LoC, although these conflicts are separate manifestations of patterns of mistrust. The dangers to peace noted by Sir Owen Dixon in 1950 have not been constant. Since the creation of the cease-fire line in 1949, tension between India and Pakistan has fluctuated between quietude and violent conflict. Incidents of violence, however, have become considerably more common since the 1965 war, in which Kashmir was the basic cause of conflict between India and Pakistan.

In 1967, the two armies discussed and agreed to a series of confidence-building measures under the auspices of their governments and the good offices of United Nations Military Observer Group in India and Pakistan (UNMOGIP). The provisions relevant to contemporary conditions are:

- Avoidance of misunderstandings concerning intentions by exchanging information about military exercises; and

- Preventing "avoidable incidents" through "local commanders resort[ing] to the agreed method of solving disputes/disagreement by holding joint meetings at various levels through the good offices of the UN Observers."[37]

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[37] United Nations, "Extracts from Record of Discussions held between Commander-in-Chief Pakistan Army and Chief of Army Staff, India," *UN Observers Manual*, Amendment 20 (1969), Annex F to Chap. 1, 1. Other sections dealt with adjustments to the Line, the flight of light aircraft in the region, and the evacuation of defended localities or 'picquets' by both sides. CBMs concerning high-level military contact, exercises, and air movement have been translated into wider agreements so far as the international border between India and Pakistan is concerned. For a discussion of these agreements, see Šumit Ganguly, "Mending Fences," in Krepon, ed., *Crisis Prevention*, 11–24 and Sony Devabhaktuni and Matthew C. J. Rudolph, "Key Developments in the Indo–Pak CBM Process," in Michael Krepon, Khurshid Khoja, Michael Newbill and Jenny S. Drezin, eds., *A Global Survey of Confidence-Building Measures* (New York: St. Martin's Press, forthcoming).

Observance of the measures was interrupted by the 1971 war which again brought fighting to the region (as distinct from "routine" exchanges of fire). Thereafter, mutual accords served to reduce tension considerably for the next seventeen years, until the insurgency in the Kashmir Valley introduced violence of a new and different kind. Accordingly, as Robert Wirsing has noted, the number of clashes increased measurably "with the onset of the insurgency [in 1989]; and by late spring 1991, when [exchanges] began to include prolonged heavy mortar and artillery bombardments, so their ferocity [increased]."[38]

Nevertheless, control could be exercised over LoC firing, when desired. Heavy firing ceased almost entirely during the summer of 1992, signifying that higher direction had been given to this effect.[39] For six years after the pause in firing of 1992, incidents of firing across the LoC varied in number and type and, although serious, did not often reach the level of prolonged (six hours and over) or heavy (involving more than six artillery pieces) on either side.[40] Following the explosion of nuclear devices by India and Pakistan in May 1998, however, the number and level of exchanges of fire increased. US Ambassador to India Richard Celeste observed in mid-1998 that "there is firing almost daily on the LoC in Kashmir," giving rise to concern that the countries were "closer to a war than the Soviet Union and the United States ever were [during the Cold War]."[41]

The civil insurrection in Kashmir cannot be de-linked from the military confrontation along the LoC, although these conflicts are separate manifestations of patterns of mistrust.

[38] Wirsing, *India, Pakistan and the Kashmir Dispute*, 150.

[39] Ibid., 151. It cannot be claimed that local commanders or even their military superiors can initiate major exchanges of fire involving heavy weapons. Were that so, it would indicate that the armed forces of both sides were permitted to move events independently of their governments, or that control over the military had broken down. Neither is the case, and both countries would reject any such presumption.

[40] Personal information. There were incidents in which more serious engagements took place. These may have been caused by specific interpretations of circumstances by one side or the other, leading to escalating exchanges that ceased after a day or so, on occasion by mutual arrangement.

[41] "Indo–Pak Tension Beats Cold War: Celeste," *Indian Express*, 1 August 1998.

In the years before the demonstration of an overt nuclear capability, tension between India and Pakistan over the Kashmir situation could have (and on one occasion did, in 1965) become dangerous to the point of causing general hostilities. Some observers of South Asia have argued that more extensive exchanges of fire across the LoC might lead not only to wider conflict, but to a war involving nuclear weapons. The former—and familiar—parameters of danger in Kashmir have been altered by introduction of the nuclear factor—and given local commanders more freedom to fire.[42] Further dangers exist. NATO and the Warsaw Pact evolved finely-tuned systems for the command and control of nuclear weapons over several decades—and even then, they were far from foolproof. India and Pakistan are in the nascent stages of such development. Moreover, in Europe, NRRMs and command and control systems grew together symbiotically. In the subcontinent, no such mechanisms to control or de-escalate high tensions exist. Neither India nor Pakistan can assess with confidence how far their neighbor can go before there may be pressing or even irresistible internal demands to threaten the use of nuclear weapons. Furthermore, it is not clear whether, as one commentator muses, Indian and Pakistani leaders "can avoid using Kashmir as a bargaining chip in domestic politics—and nuclear threats as a lever in Kashmir."[43]

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COMMON GROUND FOR RISK-REDUCTION MEASURES

India and Pakistan disagree on a number of regional and bilateral issues pertaining to each country's respective security concerns. Intertwined with these concerns are deeper issues salient to each country's national identity, governance, domestic political culture, and military posture. There is room, however, for agreement between the two countries, based both on the 1972 Simla Accord, and on subsequent statements and policy positions on military and political issues. It is from these points of convergence that the two countries might begin to think about designing and implementing a range of NRRMs, contributing

[42] Lt. Gen. Krishan Pal in interview, "Militancy Waning." "The ground situation [in Kashmir] has changed in the wake of nuclear tests by India and Pakistan."

[43] "India and Pakistan: Can They Arrange a Cold War?"

significantly to the establishment of a zone of peace and tranquillity in Kashmir, and serving wider objectives concerning bilateral understanding.

Both countries accept that the Kashmir situation is unsatisfactory, and that another war between them would be catastrophic. The "Agreement On Bilateral Relations Between the Government of India and the Government of Pakistan" signed at Simla on 2 July 1972 ostensibly placed the countries on a path to reconciliation following their conflict of the previous year. It was intended that:

- "the two countries put an end to the conflict and confrontation that have hitherto marred their relations and work for the promotion of a friendly and harmonious relationship and the establishment of durable peace in the sub-continent . . . ."

- "In order to initiate the process of establishment of durable peace, both Governments agree [in the context of Kashmir] that:

> (ii) . . . the Line of Control resulting from the cease-fire of December 17, 1971 shall be respected by both sides without prejudice to the recognised position of either side. Neither side shall seek to alter it unilaterally, irrespective of mutual differences and legal interpretations. Both sides further undertake to refrain from the threat or the use of force in violation of this Line."

India and Pakistan continue to state that the Simla Accord should govern their relations. They differ, however, in their interpretation of the place of bilateralism in their negotiations. Attempts to resolve the dispute through dialogue have failed to achieve even modest advances towards harmony. Since India referred the dispute to the United Nations in January 1948, the two countries have met dozens of times to discuss the Kashmir problem.[44] None of these meetings have produced more than a reiteration of each country's well-known stance, agreeing, at best, only to meet again. For example, Pakistan has proposed Indian troop withdrawals from the Valley without establishing that it would offer any meaningful *quid pro quo.*[45] Similarly, India accuses Pakistan of fostering cross-line movement by extremists, while making it clear that neutral observation of the LoC to

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[44] "Letter of the Representative of India addressed to the President of the Security Council, 1 January 1948," (S/628) in Hasan, *The Kashmir Question*, 107.

[45] John Chalmers, "Dialogue of the Deaf Raises Stakes on Subcontinent," *Reuters*, 1 August 1998.

discourage or assist in prevention of such activity—or, at least, to convincingly confirm or otherwise that it is taking place—should not be permitted.[46]

Maximalist claims over the state of Kashmir have made it impossible to construct an approach to conciliation without adopting an attitude—or creating an impression—that is almost certain to deflect the establishment of trust and the creation of an ambience through which progress can be made towards lasting rapprochement. These contradictions do not represent minor divergences of opinion; they are at the foundation of seemingly irreconcilable views that profoundly affect the countries' genuine desire to reduce tensions.

Both countries agree that firing across the LoC is undesirable. Each accuses the other of initiating incidents, however, and claims that the return of fire is justifiable in the context of provocation.[47] India has stated that Pakistani artillery fire is used to cover infiltration or exfiltration of militants across the LoC, while Pakistan has stated that Indian fire is "indiscriminate." Neither claim on its own is entirely convincing. It would be a poor commander who, if wishing to disguise clandestine movement, created an easily detectable pattern of activity that would, by definition, betray his own aims or the objectives of those to whom support might be supposed to exist. Similarly, "indiscriminate" fire is without value in military terms. Random and non-selective firing is undertaken only by unprofessional quasi-military elements, into which category neither the Pakistan nor the Indian armies fall. As both countries deplore each other's firing across the LoC, this would seem to be common ground for construction of a medial position—with the confidence-building aim of preventing further exchanges of fire.

Another issue of contention concerns the international status of the LoC. In a letter to the UN Security Council in 1950, Sir Owen Dixon suggested turning the cease-fire line into the international boundary, arguing:

> The State of Jammu and Kashmir is not really a unit geographically, demographically or economically. It is an agglomeration of territories brought under the political power of one Maharaja. That is the unity it possesses. If as the result of an overall plebiscite the State as an entirety passed to India, there would

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[46] "Let me say this loud and clear: there is no place for any third party involvement in this process [of dialogue concerning Kashmir]." (Prime Minister A.B. Vajpayee) "India Rejects Mandela's Call on J&K," *The Times of India*, 4 September 1998.

[47] Shujaat Bukhari, "Four Jawans Killed in Pak Firing," *The Hindu*, 31 July 1998; Tariq Naqash, "Indian Firing Across LoC Claims 13 Lives," *Dawn*, 31 July 1998.

> be large movements of Muslims and another refugee problem would arise for Pakistan, which would be expected to receive them in very great numbers. If the result favoured Pakistan, a refugee problem, although not of such dimensions, would arise for India, because of the movement of Hindus and Sikhs. Almost all this would be avoided by partition. . . . The difficulty in partitioning the State is to form a sound judgement where the line should be drawn.[48]

India and Pakistan have so far refused to publicly consider proposals to turn the LoC into the international border.[49] Instead, both countries contend that the area administered by the other should be surrendered.

It might be thought that the imperative of economic development would act as a spur to establishing a regime of trust, if only because the plight of the poor and underprivileged in the subcontinent is such that any reduction in non-productive expenditure would be welcomed. There are few more debilitating or economically demanding pursuits than counter-insurgency warfare, or the manning of defended localities in a region in which infiltration or incursion is a daily event. The presence in Jammu and elsewhere of some 300,000 refugees from the Kashmir Valley is a significant budgetary strain. Nevertheless, economic considerations in both countries play but a minor part in determining policy concerning their mutual, but dichotomous, disquiet about Kashmir.

There are few more debilitating or economically demanding pursuits than counter-insurgency warfare, or the manning of defended localities in a region in which infiltration or incursion is a daily event.

Another important common factor is the presence of a growing number of foreign guerrillas in the Valley of Kashmir and its environs, a major source of the violence now confronting India's security forces in the state. Pakistan denies that it provides military support to these militants (or any others). Both nations, aware of the necessity to alleviate some of their differences, might agree that these foreign armed elements are undesirable and responsible for much of the tension in the region. They might also agree that these elements are detrimental to the welfare of Kashmiri people. These positions should serve as a starting point to a positive approach to confidence building.

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[48] "Report of Sir Owen Dixon," in Hasan, *The Kashmir Question*, 277.

[49] Privately, however, many Indian and Pakistani officials concede that turning the LoC into the *de jure* international boundary is the only practical solution to the Kashmir dispute.

It does not yet appear, however, that the people of Kashmir will have a predominant role to play in determining the long-term future of their region. India and Pakistan claim that the governments of Azad Kashmir and Jammu & Kashmir are fully representative and that the natural progression would be governance of the entire region rather than the entities now forming the respective polities. It is beyond the scope of this essay to address the positions of either government concerning the sovereignty of Kashmir. Nevertheless, neither country would claim that the present state of affairs, which contributes to wider and deeper suspicion of each other's motives in the region, is in the best interests of the subcontinent as a whole, or the Kashmiri peoples in particular. Confidence building would have to be consistent with this perception if both countries intend to remove this significant irritant to bilateral relations—and it is this relationship, overall, whose equilibrium is of paramount importance to the security of the subcontinent.

The matter of sovereignty in Kashmir is, and will remain, contentious. This discord, however, need not deflect or deter the governments from considering means of reducing tension and establishing trust. There is an opening available, albeit initially a narrow one, to the wider regions of mutually beneficial stability. The approach to creation of bilateral trust demands confidence and resolution: confidence that one's government is able to effect compromise, perhaps at the cost of temporary and even dramatic internal troubles; and resolution to go that extra mile in the cause of lasting peace that would benefit future generations. It is in the cause of stability, tranquillity and social development that NRRMs are advocated.

THE CORE OBJECTIVES OF NUCLEAR RISK-REDUCTION MEASURES

Flowing from the desire of both India and Pakistan for a lasting peace in the subcontinent, and observing the paramount importance of avoiding loss of lives as a consequence of the dispute in Kashmir, the core objectives of NRRMs should be to:

- Minimize hostile activity along the LoC;
- Encourage and put in place a regimen through which impending escalation of minor conflict along the LoC can be contained;
- Create a "Zone of Peace and Tranquillity" in the region; and
- Lead to dialogue on the basis that "hostile nationalism" would be avoided and an approach to solution of the Kashmir problem be considered.

NRRMs would therefore be designed to reduce cross-line artillery firing and to create conditions in which cross-line firing can be eradicated completely. Consistent with such measures would be the establishment of transparency concerning illegal passage across the LoC which has of itself contributed significantly to exchanges of fire across the line. This objective could be accompanied by dialogue between local commanders in accordance with long-established confidence-building measures that have been permitted to fall into disuse. Additional NRRMs would therefore include:

- Cooperation in mutually-agreed surveillance of various types;
- Open lines of communication between the sides (rather than hotlines, by definition to be used only in emergencies);
- Re-deployment consistent with the Simla Accord in order to reduce and, eventually, avoid employment of force as a first resort in solution of local or national differences; and
- Eradication of illegal line-crossing, with associated monitoring capabilities.

NRRMs could be adopted to meliorate a tense and sensitive situation without infringing on the sovereignty of the nations involved, while adhering to the principles and purposes of the UN Charter in letter and spirit.

Certainly, sovereignty claims are complex, but political intricacies need not preclude initiatives, such as permitting passage of resident Kashmiris from one side to the other by a system of local registration and supervision. Trade would also benefit (albeit modestly in overall terms), in accordance with the stated objective of the South Asian Association for Regional Cooperation (SAARC) to establish a free trade throughout the subcontinent.

Together, the above proposals would contribute to reducing tension in the area of the LoC, leading to conditions in which progress could be made towards the creation of amicable trust along its length. Indian prime minister Atal Behari Vajpayee expressed his commitment to these goals at the SAARC summit in Colombo in July 1998:

> We [the South Asian nations] represent great civilisations, ancient yet vibrant and alive, and yet we are amongst the poorest in the world . . . . Enough of sterile ideology. Enough of hostile nationalism. Enough of conflict on the basis of

religion and creed. Enough of poverty and backwardness. Let us grow rich together.[50]

THE PRACTICALITIES OF NUCLEAR RISK-REDUCTION MEASURES

NRRMs could be adopted to meliorate a tense and sensitive situation without infringing on the sovereignty of the nations involved, while adhering to the principles and purposes of the UN Charter in letter and spirit. The first major step would be to minimize hostile activity along the LoC. Illegal line-crossing routinely sparks the exchange of small arms or artillery fire. India claims that Pakistani troops open fire to disguise or cover infiltration/exfiltration, an allegation Pakistan denies. To counter this line-crossing, the artillery of the Indian Army targets likely approaches and ambush escape-routes by "defensive fire" tasks. These are, by definition, close to the LoC. The initiation of firing can lead to retaliation should there be sighting or other technical errors that cause rounds to impact away from the target on which they are directed. There may be other reasons for heavy weapons' engagements along the Line, not the least being retaliation for casualties caused during exchanges of rifle or machine-gun fire. Both sides state that such activity is unhelpful to engagement in dialogue and hold that the tenets of the Simla Accord should guide their relations, in that their differences should be settled "by peaceful means."

It is therefore important that the causes of initiation of firing be minimized. This can be effected by:

- Publication of and adherence to verifiable Rules of Engagement on both sides of the Line of Control. This effort would involve bilateral meetings to discuss practicalities and modalities concerning ROE for light and heavy weapons. The meetings themselves would form part of the confidence-building process. Verification without involving UN Observers would be dependant on such procedures as radio and land-line monitoring to establish precisely the course of events. Verification with UN observers would be preferable.

- Continuous scheduled and unscheduled visits to forward areas by national and other journalists, representatives of national and international human rights organizations,

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[50] John F. Burns, "At South Asia Summit: an Annual Economic Lament," *New York Times*, 3 August 1998.

diplomats, defense attachés and UN Military Observers.[51] These visits would foster general confidence that the sides were adhering to international norms concerning conflict avoidance. Administration of such activity would be the responsibility of the two armies under the guidance and central control of the appropriate area of government. There would be consultation between the sides to achieve cooperation in managing visits to the LoC and informing each other of impending activity. Respective "Visitors and Observers Bureaus" would be in direct and scheduled contact at an appropriate level by land-line or any other means agreed by the participants. It is envisaged that the officers commanding these bureaus would have regular meetings.[52]

- Re-establishment of regular "Flag Meetings" between military representatives of Pakistani and Indian forces along the Line of Control. These meetings would be, initially, at brigade commander level (one star), with the intention of arranging meetings at lower levels at increasingly shorter intervals. The final objective, to be attained within an agreed period (suggested as six months), would be to have daily meetings of company commander level at no fewer than two localities within each sector of the LoC.[53] The effect of these meetings would be to reduce tension at the level of "picquets" (minor defended localities).

- Daily use, staff officer to staff officer, of an open telephone link between mutually-selected brigade headquarters *on each side of the Line*.[54] The intention of this link is to encourage the exchange of courtesies and to avoid misunderstandings over local activity along the Line. Maintenance of the land-line link would be conducted by parties of signalers based in accommodation at the junction of respective sides' cables, thus encouraging further cooperation and trust.

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[51] "Scheduled" visits could be by prior arrangement for travel to a particular sector at a mutually-agreed time and date. "Unscheduled" visits would be permitted at shorter notice and would take place within a defined period of days, but at an unspecified time.

[52] For example, daily at 0700 and 1900 hours.

[53] Each side's sectors do not have matching boundaries but are known in detail by one another. It would be a simple matter to reach agreement concerning in which company areas meetings should be arranged.

[54] The senior staff officer in a brigade HQ is usually the 'Brigade Major' who is (or should be) too busy to be tied down to a regular arrangement such as this. It is important that the nominated officer be of the same rank on both sides and that in the absence of one, an officer of equal rank be notified in advance to the other side.

- Installation of ground-based surveillance devices. These devices would detect illegal movement at a specified distance along the Line.[55] The requirement is for a bilaterally-operated (preferably neutrally-supervised) set of devices placed at intervals along the LoC. These could include activity sensors, ground radars and electronic barriers. A control center in each sector would monitor the devices and would have the remit to activate forces on whichever side of the Line infiltration might be detected. Rules of Engagement would dictate levels of counter-penetration reaction, which would require total cooperation between the two armies. Provision of the devices would be the responsibility of a mutually-agreed third party, consistent with the terms of the Simla Accord.[56]

This last measure will be particularly difficult to negotiate or constitute. Technical, legal, administrative, and political problems can be expected. But to dismiss proposals for the installation of surveillance devices would be neither constructive nor in the spirit of the UN Charter. India states that infiltration across the LoC should cease. Pakistan states that it is not affording physical assistance to those who would seek to cross the Line. On this basis it would appear appropriate for the sides to investigate *all* means whereby peaceful resolution and confirmation of national claims might be achieved. A major benefit of establishing well-publicized, high-technology bilateral surveillance would be the diminution—and possible cessation—of attempts to cross the LoC. Even were the countries to fail to agree on these measures, enhanced unilateral surveillance (again, given a high public profile), possibly on the basis of equipment provided by a third party on request, would go far in reducing the number of attempts to cross the Line.

In this context it must be observed that surveillance along the LoC is conducted with some assiduity and precision by other nations. The location of every communications device (and surveillance device) is known, as are those of artillery pieces; forward ammunition storage facilities; forward, main and rear headquarters; and much else. The movement of reinforcements, relocation of artillery, visits by senior officers in helicopters—indeed every aspect of activity along the LoC—can be detected by intelligence methods, day or night. The potential of such Open Skies information in the cause of peace is great but—for the moment, at least—unlikely to be countenanced by either government,

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[55] Both armies have such equipment in place for their own particular purposes, but it would be inappropriate to dwell on their technical specifications, deployment, or efficacy.

[56] ". . . the two countries are resolved to settle their differences by peaceful means through bilateral negotiations *or by any other peaceful means mutually agreed upon between them.*" (Emphasis added), "The Simla Agreement," *op. cit.*

given their urgent internal political imperatives.[57] The fact remains, however, that warning of major conflict in Kashmir will in all probability be obtained by third parties, and could serve to attract notice to the desirability of neutralizing provocation and reducing ferment.

Information concerning all of these initiatives could be placed on a Kashmir Website, a joint Indo–Pakistan enterprise aimed at informing citizens of both countries and the world at large of the efforts being made to reconcile differences over Kashmir and to reduce tension. The emphasis would be on positive measures being taken to encourage rapprochement rather than on historical matters, in accordance with the nations' enunciated desire to avoid hostile propaganda.

ESCALATION CONTROL MEASURES

The above measures could be regarded as a prelude to more substantive initiatives intended to contain or avoid escalation of conflict. To assist in the progression of confidence building, consideration could be given to means which would be not only consistent with the countries' desire to remain at peace, but would also be comparatively simple to achieve and verify. These are suggested as:

- *Relocation of heavy weapons.* There is compelling evidence that a major cause of tension-escalation is the firing of major weapons (mainly mortars and artillery pieces) across the Line.[58] Most of this equipment is located close to the LoC; some, indeed, with ranges of 15,000 meters and more, are positioned within five kilometers of the Line. There are mortar baseplates within a thousand meters.[59] Heavy weapons are the catalysts of escalation. Were these equipments to be placed in positions from which their bombs or shells could not fall across the LoC (by virtue of lack of range), it would be impossible for either side to cause destruction across the Line. It would not be difficult for the professionals of the Indian and Pakistani armies' artillery arm to redeploy their equipments to achieve this aim. In essence, it would involve little *ab initio* effort, because both sides already have secondary gun areas to the rear of present

[57] See the essay by John H. Hawes and Teresita C. Schaffer in this Report.

[58] There have been instances of anti-tank weapons being fired, but the main cause of tension escalation is the use of indirect fire weapons—artillery and mortars—whose locations are not within line of sight of their targets. They fire at targets chosen by result of reconnaissance or that are "acquired" (identified and located) by observers in positions close to the area to be fired upon.

[59] Indicative ranges of mortars are: 81mm (Pakistan)/82mm (India)—3 km; 120mm (both)—5–6 km; 160mm (India)—10 km. The range of a 105mm gun is about 15 km, depending on type.

locations, reconnoitered and surveyed, ready to accommodate guns or mortars should there be a tactical requirement to so place them. A 155mm gun can fire up to the LoC from a 30 km range, but it would not in every area be necessary or practicable to withdraw these pieces to such a distance due to problems concerning "crest clearance" and other arcane artillery technicalities that might confound their employment even within their given range. In short, redeploying military forces from positions likely to exacerbate political tensions can be achieved without major technical or tactical disruptions, should the Indian and Pakistani governments wish to do so.

- *Verification of Procedures*. There would, of course, be a requirement to assure the other side that mortars and artillery pieces had been withdrawn to areas from which their bombs or shells could not impact across the LoC. Again, this is a comparatively simple procedure, as every weapon has a template that maps its maximum range.[60] The actual sites of relocated equipments could be detected by high-resolution imagery provided by a third country (which would detect them, in any event), or by stand-off reconnaissance by national air forces' reconnaissance aircraft, combined with other intelligence means.[61]

- *Reassurance of Participants*. It would be necessary to make it clear that the movement of equipment does not preclude their use in national defense measures. Thus, the original artillery or mortar positions in forward areas would not be rendered physically unusable, and forward ammunition depots would remain intact. The two parties could design a regime for replacing or rotating ammunition, involving notification of ammunition convoys.[62] The very fact that such notification would be given, involving meetings and discussions, would of itself enhance trust and mutual esteem.

Relocating heavy weapons is an initiative that would most significantly diminish tension along the LoC. The civilian populations on both sides of the Line have been subjected to shellfire and general disruption and, by any tenets, this is inappropriate and undesirable. It is incumbent on both sides to restore normalcy to the lives of their citizens living close to this border. Removing heavy artillery, the prime cause of death and destruction, would be widely seen as a positive move.

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[60] There are such things as "non-standard conditions"— meteorology, rotation of the earth, ammunition characteristics, and so forth—that can alter the range of a gun by perhaps a few hundred meters at particular times. These would be taken into account by technical experts.

[61] For an elaboration of these possibilities, see Hawes and Schaffer, in this Report.

[62] Vehicles carrying ammunition are readily identifiable from various "signatures."

The actual sites of relocated equipments could be detected by high-resolution imagery provided by a third country (which would detect them, in any event), or by stand-off reconnaissance by national air forces' reconnaissance aircraft, combined with other intelligence means.

Furthermore, restoring travel rights for Kashmiris in their eponymous region would be a marked step forward in encouraging the populace to regard India and Pakistan as being supportive of their well-being. It would not be impossible to design a system whereby residents of Kashmir could be permitted to travel across the LoC. The difficulties are immense, especially in ascertaining who might be considered a Kashmiri, issuing and controlling documentation, and devising mutually acceptable customs procedures. In due course, consideration should be given to this important aspect of civil infrastructure and governance.

CONCLUSION

For over half a century, the story of Kashmir has been marked by vicissitudes, overhung by irreconcilable differences, and misunderstanding, and stained by bloodshed. The dispute over Kashmir will not go away on its own accord, and its continued existence poses a grave danger to reconciliation in the subcontinent. But it is not too late to regard these pages of dissonance as a palimpsest. India and Pakistan agree that the way ahead to prosperity is to embrace amity. There could be no better approach than to consider NRRMS in Kashmir designed to build trust and confidence, and to reduce tension, between countries in possession of nuclear weapons. These suggestions by no means exhaust the number of possible NRRMS, but given goodwill on both sides, they are practical and could be realized in the near future.

The fact that little progress has been made in the past to foster confidence or encourage trust along the LoC, or concerning Kashmir as a whole, is not altogether deleterious to future initiatives. Leaders of both nations are aware that the Kashmir question cannot be ignored. There have been some efforts intended to cover general and specific confidence-building. While it can be argued that more should have been done, it is also worth noting that existing postures are not immutable.

Dr. Frank Graham's final report on the Kashmiri dispute, written 1958, still rings true:

> However wide the differences and deep the distrust, and however bad the situation in the opposite views of each other's position, no situation is completely and forever beyond the redemptive power of the development of reciprocal faith and the creative interchange of views and proposals for a peaceful settlement as alternatives to the deepening differences in an age of unprecedented peril and hope. Better than talking at long distances over the sub-continent is, on occasion, to talk directly to each other in a conference at the highest possible level. The holding of well-prepared direct talks with the desire for a settlement is more than talk: it is itself an act of potentially creative faith which might lead to steps for a fair and peaceful settlement.[63]

Dr. Graham's sagacity is shared by many in the subcontinent at present. A new page in the story of Kashmir awaits inscription by those of goodwill who can look to the future with confidence untinged with bellicosity. This page awaits national leaders whose determination can transcend mundane and meretricious posturing.

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[63] "The Graham Report," (March 1958), *Reports on Kashmir*, 283.

Risk Reduction in South Asia: A Role for Cooperative Aerial Observation?

John H. Hawes and Teresita C. Schaffer

The May 1998 nuclear tests by India and Pakistan transformed the strategic environment in South Asia. They did not, however, change the military potential in the region: India had already proven, twenty-four years earlier, that it was capable of a nuclear test, and Pakistan was confidently believed to have the same capability. By making this capability overt, India and Pakistan increased perceptions of both their own power and vulnerability. The tests thus raised the political stakes in their bilateral confrontation and heightened the risks inherent in what had become a "routine" level of hostility between the two countries.

Now that the initial heady, nationalist reaction has quieted down, consciousness is growing in both countries that their new and extraordinarily destructive capabilities must never be used. In the press and in political and security circles, there is increased discussion of what can be done to provide an added measure of insurance against a catastrophic conflict that no one wants. In general, the menu of possible nuclear risk reduction measures falls into three categories:

- Measures to improve communication and inhibit accidental confrontation between conventional forces;
- Measures, typically adapted from the Cold War era to fit South Asia's particular circumstances, to improve internal control and avoid miscalculation with nuclear and missile forces; and
- Measures to improve Indo–Pakistani relations, including measures related to the divisive issue of Kashmir.

Following the subcontinent's most recent near confrontation, in 1990, India and Pakistan implemented a number of confidence-building measures (CBMs). These included establishment of 'hotlines' at several different levels of command and an agreement whereby the Directors General of Military Operations (DGMOs) for each side would, in turn, initiate a weekly call. Other measures focused on the structure of military exercises, the notification of certain types of military movements, and the banning of military overflights

of each other's territory.[1] These measures were negotiated and implemented bilaterally, an important point for India. Pakistan and India were quietly encouraged by other countries, however, and the experience of Cold War era CBMs between conventional forces in Europe had parallels in some of the ideas which eventually materialized in a form suitable for the subcontinent.

New arrangements could build on the strengths of the 1990 experience: fruitful bilateral negotiations and an attempt to identify and avoid behavior that could be subject to dangerous misinterpretation by the other side.

A general downturn in Indo–Pakistani relations led these measures to atrophy within a few years of their inception. More recent bilateral efforts have focused chiefly on resuming a high-level diplomatic dialogue, as agreed to in June, 1997.[2] The scope for such dialogue, however, has often appeared to be limited by the continuing political confrontation between the two states, as well as by the domestic political ramifications of this confrontation on both sides.

Now that the nuclear tests have brought the two countries' latent nuclear potentials to the surface, the time is ripe for India and Pakistan to establish a more robust risk-reduction regime to take account of the new situation. New arrangements could build on the strengths of the 1990 experience: fruitful bilateral negotiations and an attempt to identify and avoid behavior that could be subject to dangerous misinterpretation by the other side.

At the same time, a new effort at bilateral nuclear risk reduction should also try to remedy some of the weak points of the past. The 1990 arrangements were not very effective in helping India and Pakistan communicate about military capabilities and intentions in such a way as to defuse a budding crisis. The only communication measures included in the 1990 package were the hotlines, and these were the first measures to fall out of regular use. The buildup to the 1990 crisis had been punctuated by recurring alarms, in both India and

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[1] For a discussion of these agreements, see Sumit Ganguly, "Mending Fences," in Michael Krepon and Amit Sevak, eds. *Crisis Prevention, Confidence Building, and Reconciliation Between India and Pakistan* (New York: St. Martin's Press, 1995), 12–13. Copies of these agreements are included in the Appendix.

[2] In June 1997, the Foreign Secretaries of India and Pakistan agreed to resolve outstanding issues in an integrated, bilateral manner. The two governments pledged to commission Working Groups to address peace and security, including CBMs; Jammu and Kashmir; to settle disputes such as Siachen Glacier, Wallar Barrage/Tulbul Navigation Project, and Sir Creek, and to promote economic and commercial cooperation and friendly exchanges in other fields.

Pakistan, about purported preparations for offensive military action. At that time, the only means available to reduce the anxiety these reports generated was reporting by diplomats from third countries, including the United States, who were able to provide Pakistan and India with credible information. While the provision of information by third parties can be useful, it cannot form an enduring basis for crisis stability. Today, the security of both countries would be greatly strengthened if they each had direct access to reliable information, developed and shared on a bilateral basis, without having to depend on third parties.

Today, the security of both countries would be greatly strengthened if they each had direct access to reliable information, developed and shared on a bilateral basis, without having to depend on third parties.

Developing a new nuclear risk-reduction package is fundamentally a job for the two countries at primary risk. This process will be most beneficial if it is supplemented by a serious, ongoing, Indo–Pakistani political dialogue. In the belief that the effort will be most successful if India and Pakistan have a broad array of measures to choose from, this essay analyzes one potentially useful ingredient in the mix: a program of cooperative aerial observation.

There is no tradition of cooperative aerial observation in South Asia. The one Indo–Pakistani agreement concerning aerial activities, alluded to above, banned overflights of one another's territory by Indian and Pakistani military aircraft. Indeed, the practice in India and Pakistan had been to avoid direct interaction between the two military establishments. This is understandable in political terms. And yet in some other regional tensions, notably the Middle East, military officers have actually found it easier than their civilian counterparts to communicate, once the ground rules are set. Military officers have a vocabulary, a rank structure, and a tradition in common, and their training includes concepts of how to deal with adversaries. More importantly, military officers understand better than anyone the risks of misunderstanding.

At least two techniques have been used or attempted internationally to give potential adversaries agreed access to aerial observation. The Open Skies Treaty, negotiated between NATO and Warsaw Pact states at the end of the Cold War, involved direct observation by the participants. This Treaty still awaits formal entry into force. The security arrangements accompanying the Egyptian–Israeli peace agreement included provision for third-party flights generating identical data. This data was provided to both sides, and coupled with a

network of observer stations in Sinai whose primary purpose was to give Israel some of the warning time it had relinquished. The proposal presented here is a variant on the Open Skies model, adapted for the different political and security circumstances in South Asia. Direct observation has the advantage of being more meaningful to the country doing the observing. Moreover, it fits better into the history of direct bilateral dealings between India and Pakistan.

PRINCIPLES FOR INDO–PAKISTANI AERIAL OBSERVATION MEASURES

The basic concept is a simple one: India and Pakistan would each agree to carry out an equal number of flights over their own respective national territories, using identical surveillance cameras. An identical set of the film produced by each country's flights would be provided to both sides. In addition to its own aircrew, each country would also host representatives from the other country on board its aircraft during the observation flights. The flights would give both sides common baseline information and a tool for assessing threat information they might receive from other sources.

While the concept is simple, aerial verification can be implemented in more or less ambitious ways, depending on how the governments involved calibrate the tradeoffs between gaining, and relinquishing, information. The parties would need to agree on the number of flights, their duration, and the capabilities of the cameras used. They would need to weigh these and other factors against the security objectives they set for the program and the political constraints on bilateral agreements. One could begin modestly, for example, providing for very few flights over a limited number of pre-designated sites. Such a small program would demonstrate an ability to work together to share information. It could help to defuse potential crisis situations even though the information it yielded would necessarily be of limited scope. To the degree, however, that both parties were interested in sharing information more extensively, they could design a program either with a greater number of flights or expanded territorial coverage, or they could work up to a more extensive program gradually. Some of the options are considered below.

While the concept is simple, aerial verification can be implemented in more or less ambitious ways, depending on how the governments involved calibrate the tradeoffs between gaining, and relinquishing, information.

In our judgment, four key principles would have to guide an Indo–Pakistani aerial observation program. These are:

- no overflight by foreign aircraft;
- a strict focus on gathering information;
- at least as much concern for conventional forces as for nuclear capabilities; and
- continuing dependence on mutual cooperation.
- A brief discussion of each of these points follows.

No Foreign Overflight

For both political and military reasons, we believe that neither India nor Pakistan would accept the use of foreign observation aircraft within its national airspace. Therefore, all observations under the proposed measure would have to be accomplished using Indian aircraft in Indian airspace, and Pakistani aircraft in Pakistani airspace. In each case the aircraft would carry dual sets of cameras, to provide both parties equal records of the imagery. Similarly, in each case the host country would carry an observation delegation from the other country on its aircraft for the duration of the observation flight, so that both parties could be satisfied that the observation plane followed an agreed route and that the photographs that were taken corresponded to the sites and times that had been agreed upon.

It is worth recalling that the issue of host country vs. visiting country aircraft was a major point of contention between the former Soviet Union and other participants in the Open Skies Treaty negotiations. At that time, the former Soviet Union took the position that the host country had to provide the aircraft to guarantee that the observation aircraft did not contain weapons or hidden sensors not permitted under the agreement. Conversely, the other participants in those negotiations were concerned that a host country aircraft might be too easily subject to diversion away from important sites or that the aircraft or its on-board sensors might suffer unexplained technical malfunctions which would interfere with or force the cancellation of an observation flight. They therefore attempted—unsuccessfully in the event—to alleviate Soviet concerns by providing for rigorous pre-inspection of the aircraft.

In our judgment the position taken by the former Soviet Union probably best reflects the current military and political realities between India and Pakistan. By using only host country aircraft for observation missions, both countries could avoid arousing unnecessary suspicions and security concerns. Moreover, this is the only formula that would make it possible for the parties to develop the positive security benefits of an observation program from the start. Conducting observations in this manner, of course, would place the burden on the host country to ensure that its observation aircraft were operationally ready when needed, that its crews and flight controllers were thoroughly trained for cooperative observation missions, and that there were no untoward incidents. We recognize that there is a potential for misunderstandings and disputes in the event that one or the other party were to believe that the other side was improperly using its control of the observation aircraft to impede access to important information. Even inadvertent errors or malfunctions could be mistaken for deliberate interference. We believe, however, that this possibility could be minimized after both parties gain operational experience in carrying out missions. We are also convinced that it is a much smaller risk than the danger of misunderstanding and miscalculation that would exist in the context of an observation program conducted by foreign aircraft, or in the absence of an observation program altogether.

By using only host country aircraft for observation missions, both countries could avoid arousing unnecessary suspicions and security concerns.

Informational Focus

Second, because an observation measure could potentially "see" anything on the ground it covers, it would have to be clearly understood by the parties that the mere gathering of information did not itself imply any limitation or constraint on the equipment or forces that might be observed. This is an important distinction to make. Many people tend to confuse observation with limitations, and any such confusion could lead to misunderstandings between the parties, or even prevent the successful conclusion of an observation agreement. This confusion may come from the fact that several observation programs elsewhere in the world were instituted for purposes of monitoring specific territorial constraints or arms control agreements, including, for example, the Egyptian–Israeli disengagement in the Sinai or the US–Soviet reduction of missiles under the Strategic Arms Reduction treaties (START). In the case of India and Pakistan, however,

there are currently no agreed geographical, quantitative, or qualitative limitations on military capabilities.

Thus a cooperative aerial observation program would simply make factual observations rather than monitoring an agreement. The parties might note, for example, that a certain number of weapons of "x" type were or were not deployed in "y"region, or that several units of "z"size had or had not moved from region "a" to region "b." Such factual observations could deal with both nuclear-capable and conventional forces, and would be valuable to the parties in assessing their security situation, particularly in a crisis. This risk-reduction function could be performed independently of the existence or non-existence of any constraints on force deployments. At the same time, should the parties at some point decide to institute either formal or informal limitations on deployments—say in a particular geographic area—then the existence of the aerial observation risk-reduction program would provide a ready-made means of also providing both countries with reliable information on such limitations.

A cooperative aerial observation program would simply make factual observations rather than monitoring an agreement.

Broad Scope

Third, any observation program that is designed to make a serious contribution to risk reduction must give at least as much attention to the conventional forces of India and Pakistan as to their nuclear programs. Notwithstanding the role that the two countries' nuclear programs have played in stimulating renewed interest in mitigating the risk of conflict, conventional forces remain the most important indicators of the likelihood—or unlikelihood—of major conflict. Because conventional forces would almost certainly be the first to be committed in any major conflict, observation of their movements would be especially valuable in determining whether a conflict is imminent. Also, the size of conventional force units and the range of major equipment they contain make the task of observation relatively straightforward. Rather than looking for the proverbial "needle in a haystack," observers can follow the activities of a series of specific "haystacks" in specific areas. Finally, in terms of the possible risk of escalation to the use of nuclear weapons, most scenarios suggest that such use is most likely to be considered by the parties in the context of a conflict that had already developed at the conventional level. While there has been much concern about the possibility of a preemptive strike—a fear perhaps heightened by the relatively small size of the nuclear-capable forces involved— no sane planner on either

side could be completely confident of wiping out the other side's nuclear forces. This makes preemption an unacceptably risky strategy. A "bolt from the blue"—an unexpected nuclear attack without a previously existing crisis or conflict involving conventional forces—is the least plausible scenario.

None of this means that an observation program should avoid looking at nuclear programs. As the May 1998 nuclear testing by both countries has re-emphasized, nuclear weapons and their delivery systems possess enormous political as well as military importance. Consequently both parties have powerful incentives to acquire the most complete and timely information possible on the nuclear capabilities of the other side. A cooperative observation program could facilitate that objective. For example, India and Pakistan have exchanged lists of certain nuclear-related facilities throughout their respective countries which they have agreed not to attack. Periodic aerial observation of some or all of these facilities would not provide internal details of their programs, but it could be useful in assessing developments in the scope or direction of activity. In addition, aerial observation of garrisons and air bases—either nationally or in specifically designated regions which the parties believed were most significant for bilateral assessment purposes—would indicate whether or not certain nuclear capable missile or aircraft delivery systems were deployed at those locations. This information on nuclear-capable deployments—or non-deployments—would itself be of significant importance in assessing a security situation.

Any observation program that is designed to make a serious contribution to risk reduction must give at least as much attention to the conventional forces of India and Pakistan as to their nuclear programs.

Going beyond actual deployment information, however, to make judgments about the likelihood of actual deployment of nuclear capable systems in a crisis, is probably beyond the capacity of a cooperative aerial observation arrangement. Allowing flights during periods of heightened tensions might provide some reassurance. Agreed limits on the number of flights, the time delays between observation flights, and the tight security which necessarily surrounds all nuclear activities, would reduce the ability of either party to gain hard information on the possible nuclear employment intentions of the other party.

This reinforces our view, noted above, that a meaningful risk-reduction program must also focus heavily on giving national military and political leaders sufficient

information about the conventional force deployments of the other side to enable them to make informed choices in a crisis. To the degree this can be achieved, the observation program could dampen the possibility of escalation at the conventional level, before the use of nuclear weapons might be considered.

Voluntary Cooperation

Fourth, the strength and the weakness of a cooperative observation program is its dependence on active cooperation between the parties. Aerial observation could only take place as long as India and Pakistan remained committed to the program, and willing to fly observation missions over their own territory. Neither party could gain any information under the program without the participation of the other. Neither one could continue the program alone if the other backed out. In one sense, this is a guarantee for both parties. Either party could shut the program down immediately if it believed this were necessary. At the same time it is a risk, since the potential for either party to terminate the program means that the flow of information could be interrupted at any moment. Were one party to terminate the observation flights during a period of crisis, for example, the other party might interpret this action as an effort to hide aggressive preparations. It might, therefore, feel compelled to take offsetting actions, despite—or because of—the absence of hard information on what the other side was doing.

Going beyond actual deployment information, however, to make judgments about the likelihood of actual deployment of nuclear capable systems in a crisis, is probably beyond the capacity of a cooperative aerial observation arrangement.

In one sense, an interruption of the observation program would only return both parties to the present situation, with its lack of information and attendant uncertainties. In another sense, however, a deliberate interruption of a successful observation program could be read as potentially more dangerous than the present situation, in that any closing down of information in a crisis—for whatever reason—could serve to magnify existing tensions. Because the observation program would depend on an agreement between sovereign states, its continuation would have to remain voluntary. At the same time, the parties would have to be conscious of the potential signals that they might send if they were to terminate the program.

GETTING DOWN TO CASES: HOW WOULD AN OBSERVATION PROGRAM WORK?

Within the framework of the four broad points discussed above, a great deal of latitude for shaping the actual structure and operation of a cooperative observation program remains. The two parties would need to decide such questions as: the number and length of flights to be undertaken; the amount of national territory that is subject to observation; whether there should be any excluded areas; what quality of imagery should be produced; and, how cooperation between the host country and the visiting country would work in practice. In combination, the answers to these questions would constitute the detailed operational structure of an observation program. By definition, these are subjects for careful analysis and discussion between the parties. Here we can only begin to outline some of the possible factors which the parties might wish to consider in deciding these issues.

Aerial observation could only take place as long as India and Pakistan remained committed to the program, and willing to fly observation missions over their own territory.

Area

India and Pakistan might decide to include several areas in an observation program. Options range from a relatively narrow strip along their common border, to a selection of militarily-relevant sites throughout each nation, to unrestricted coverage of most or all of the national territory of each party. Each of these options could be relevant to the basic objective of risk reduction. Each, however, presents complications.

Coverage of the region immediately adjacent to the border could give information on the strength and movement of forces closest to a potential conflict. Because of this, both parties already exert considerable effort to acquire such information unilaterally, including using aerial photography aimed across the border into the territory of the other party. Indeed, this can lead to aerial incursions, with all the risks that these entail. Providing cooperative aerial coverage of the regions alongside the international border, as well as of the Line of Control (LoC) dividing Kashmir, could significantly improve the quality and quantity of information available regarding the forces in closest proximity. Defining the depth of a region subject to co-operative observation would be tricky. Is it to be defined, for example, as the strip fifty kilometers deep on each side of the border, running parallel

to the border northward from the Arabian Sea all the way to the Himalayas? Or should it be a strip of some lesser or greater constant depth? Or should the depth vary with location, based on geographic features, known force deployments, transportation routes, or other special factors? Would a strip of the same depth be appropriate for the international border as well as for the LoC, or would military or political considerations argue for different depths in each case?

Providing cooperative aerial coverage of the regions alongside the international border, as well as of the Line of Control dividing Kashmir, could significantly improve the quality and quantity of information available regarding the forces in closest proximity.

While the concept of a border strip is probably the easiest way to define the area of aerial observation, and might therefore represent a logical first step in any observation program, there are both political and military reasons why the parties might also want to consider observation of other regions as well. In the first place, the force dispositions of the parties are such that, depending on the definition used, one or the other side could feel that it was giving more information than it was receiving if observation were limited to a zone close to a border. Or there might be concern that the establishment of a fixed zone of observation along a border would lead one or both parties to station forces just outside that zone, thereby defeating the purposes of the observation measure.

Secondly, however the depth of a border region is determined, both India and Pakistan will always have important forces stationed outside that area that could play a significant part in any conflict. Indeed, the movement or non-movement of conventional and/or nuclear-capable forces stationed at some distance from a border could be a more important indicator of future military developments than activity in the immediate border area itself. Third, because of the difference in overall size of India and Pakistan, it is apparent that a much greater percentage of Pakistan would be covered by an observation measure applied to border regions than the same measure would cover in India, and that, conversely, a higher percentage of Indian territory would be unobserved under such a measure.

For all these reasons, the parties might wish to consider including other areas. They might, for example, include all airfields within operational range of the border, and then add other designated military facilities which also fell within that range. This would cover most

forces and equipment that could be immediately brought to bear on a potential conflict, and as such would provide essential information for risk reduction. Depending on the frequency of observations, such an approach would, in particular, be able to detect the introduction to known sites in the area of additional equipment or units, including, for example, nuclear-capable delivery systems. It would not, however, cover longer-range missiles which might be deployed outside the region, nor would it be able to pick up the redeployment of forces or equipment from outside the region to previously unknown sites within the region. Coverage of such forces or equipment would require either blanket coverage in the region, or coverage of designated military facilities outside the region where equipment of potential concern were deployed, coupled with coverage of road and rail lines of communication into the region.

The most extensive approach would be to include the entire territory of both parties, excluding certain distant regions too remote to be relevant to the balance between India and Pakistan. India, for example, might argue that Assam and the other territories in the northeast should be excluded from cooperative observation on such grounds. Pakistan might advance a similar argument with regard to its territory bordering Afghanistan. Similarly, both parties might wish to make exceptions on political grounds for their national capital areas. In order to be mutually acceptable to both parties, such potential exclusions would depend on whether they agreed that knowledge of the forces and activities in those areas was or was not material to the assessment of the military situation in a potential crisis.

Distance

Two elements are needed to determine the appropriate extent of a cooperative observation flight: First, the decisions which the parties make regarding the area to be covered, as discussed above. And second, the number and location of airfields from which observation flights could operate. Solely for purposes of this illustration, let us assume that each party would designate two airfields as observation bases. In each country, one of these airfields would be adjacent to the international boundary or LoC to facilitate coverage of this area. If the parties had agreed on coverage extending beyond a border strip, then a second airfield might be needed at a convenient point deeper inside the two countries. Hypothetically, the designated airfields might be Amritsar and Lahore in the area of the international boundary. The location of the other airfield would depend on the scope of the additional coverage.

With these hypothetical starting points, flights in the border and LoC regions would have to be long enough to make the round trip from Amritsar or Lahore to the Arabian Sea

in the south or the Himalayas in the north. In addition to calculating the straight-line distances, however, the flights would also have to be granted an additional allowance, perhaps ten per cent. This allowance would provide the flexibility necessary to maneuver laterally over the depth of the border and LoC areas and would ensure that the return flight track to the starting airfield did not have to simply duplicate the outbound track. Since the total length of the international border or the LoC is equal for both parties, it would be straightforward and equitable to define equal flight distances for both parties for any observation flight by either party in the border region.

For coverage of the rest of the two countries, flight distances would need to take account of the difference in geographic size between India and Pakistan. They might, for example, be calculated by drawing arcs based on the two designated airfields in each country, with the radius of the arcs reaching to the furthermost points in those countries which the parties had agreed to include in the cooperative observation program. As in the case of border area flights, the requisite flight distance would be sufficient to make a return trip along the radius of the arc, plus a ten per cent allowance for lateral maneuvering. With two airfields designated as starting points in each country, as in this hypothetical example, all points to be observed would have to fall within the arcs from one or the other airfield.

Since the total length of the international border or the LoC is equal for both parties, it would be straightforward and equitable to define equal flight distances for both parties for any observation flight by either party in the border region.

If a greater number of airfields were designated, the size of the respective arcs and the lengths of flight needed to reach all relevant sites in each country would be correspondingly less. Also, the question of the possible inclusion or exclusion of certain territories on the far borders of India and Pakistan, as discussed above, could be a significant factor in setting requirements for the length of flights. Finally, as a matter of practical logistics it might be necessary in some cases to identify refueling points for particularly long flights, depending on the type of aircraft chosen for the observation flights in each country.

Number

How many flights are enough? The question can only be answered by weighing the purposes of the observation program. If, for example, the objective were primarily symbolic confidence building, then a handful of flights per year in each country might suffice. In a positive sense, even a small number of missions would establish the principle of cooperative observation, demonstrate the feasibility of working together on a security issue, and provide some limited additional information. These are not trivial benefits, particularly in the present atmosphere. No one would argue, however, that such a limited program would provide the steady flow of information necessary to strengthen each country's understanding of the military situation and reduce the risk of escalation through miscalculation.

In a positive sense, even a small number of missions would establish the principle of cooperative observation, demonstrate the feasibility of working together on a security issue, and provide some limited additional information.

If the objective of the program were to provide each party with an annual survey of major elements of the other party's military order of battle, then a dozen flights might be required on each side. This, too, would be an important advance. The operation of the program would itself represent a significant effort at cooperation and the information produced would refine understanding of the long-term situation. It would also have a certain utility as a risk-reduction measure, although the limited number of flights might not leave the parties with enough flexibility to conduct observations in a timely manner in a period of crisis. The parties could attempt to deal with this problem by utilizing some of the flights for routine information collection, while "saving" some for a potential crisis situation.

Finally, if the objective were to provide up-to-date information over an extended crisis period on the movement—or non-movement—of forces and equipment, the potential requirement for flights could become very large. Particularly in times of tension, both parties could perceive a need for almost daily observation flights over an open-ended period of time. Moreover, were there to be an actual crisis, neither party would want to be placed in a situation where it could not obtain reliable information about important sites or activities because it had to worry about the rate that it was consuming a limited quota of observation flights. Such large numbers of flights, however, would be certain to encounter

resistance on both logistical and political grounds. Host country observation planes and crews could only sustain high rates of operation for a finite period. Moreover, the political climate in both countries is such that any observation agreement would have to be subject to relatively tight numerical limits.

A related issue is the periodicity of flights. If scheduling is simply on an "as needed" basis, each country might feel that some political stigma is attached to making the initial request, as was the case with unscheduled hotline calls. One way around this situation, which also offers a means of addressing some of the issues raised above, would be to set up a certain number of regularly scheduled flights—say, one every two months—which would be flown automatically, without request. The countries could then agree on a number of flights outside this quota, which could be used on a reciprocal basis in times of increased tension if either country felt the need to reassure itself with more intense observation. They might, for example, agree on twelve such unscheduled flights each, to be used as needed—although for logistical reasons there would need to be a limit on how many could take place in any given month. This arrangement could provide "surge capacity" for periods of tension, with a limitation to avoid straining the resources of both sides.

If the objective were to provide up-to-date information over an extended crisis period on the movement—or non-movement—of forces and equipment, the potential requirement for flights could become very large.

Aircraft

We have already explained our view that only aircraft operated by the host nation would be authorized to conduct observation missions under a cooperative program. India and Pakistan would therefore each be able to choose the particular aircraft which they would use for the observation flights over their own territory. An observation aircraft of this type must be large enough to carry not only the cameras and related equipment, but also the host country crew and the representatives of the other party who would be carried on board as guests. To insure that an aircraft were ready for operations at all times, each country would probably have to designate and equip both a primary and a back-up aircraft. The internal configuration of the aircraft might, at a minimum, provide work space for both host country and observer teams of approximately four people each, in addition to the host country's aircrew; dual sets of computer screens to automatically track the route of flight and the areas to be photographed; and links to the global navigation system. As discussed

in the notes on sensors and processing below, the planes would require a dual set of cameras (and other instruments if included) so that each party could receive a negative of the same pictures.

Flight Planning

Although all observation flights would be conducted by host country aircraft flown by host country crews, the flight route would be planned in advance by the party requesting the flight. As discussed above, the maximum length of an observation flight and the area subject to coverage would be fixed by mutual agreement of the parties. Within those parameters, the party requesting a flight would draw up a detailed flight plan, starting from a designated airfield in the host country and setting forth the headings and turning points of the route that it wished the host country aircraft to fly. The flight plan would also indicate the points at which photography is requested. The country requesting the flight would present this plan to the host country in advance of the flight, giving the host country time to prepare the crew and to notify air traffic control authorities along the flight route.

If the flight plan were consistent with the agreed length and area of coverage criteria, the host country would implement it as written. The parties could, however, provide for amendments to the flight plan to deal with unforeseen circumstances. One such possibility, for example, would involve a host country military training exercise involving live firing of missiles or maneuvering of combat aircraft which could pose a danger to the observation aircraft. In this event, the host country might propose an amendment to the proposed flight plan to route the observation aircraft around the affected area, or to change the time of its arrival over the affected area to avoid danger from the exercise activity.

Sensors

The most important sensor to employ for a cooperative aerial observation program would be a high-quality optical camera. This camera would provide the broadest range of general purpose information. It is the simplest and least expensive system meeting the requirements of a cooperative effort, and the interpretation of its output is relatively straightforward. A case might be made for the inclusion of other sensors in addition to cameras. For example, a synthetic aperture radar would give the observation missions an all-weather, day and night capability which optical cameras lack. The parties might decide that such additional capabilities were important to have. We believe, however, that a successful observation program devoted to risk reduction could be operated with optical cameras alone. Moreover, we note that the technical aspects of establishing a cooperative

observation program involving radars or other sensors could be significantly more complex. In any event, a program based on optical cameras would be a logical initial step, and radars or other sensors could be considered for eventual subsequent introduction if the parties so desired. Each party would be responsible for outfitting its own observation aircraft with the agreed equipment. Third parties might wish to offer relevant equipment or technical advice on its installation as a means of facilitating the implementation of the agreement.

To ensure equality of observational output, India and Pakistan would need to agree on the specifications of the camera systems to be installed on their aircraft. Apart from the overall optical and mechanical quality of the system, which we take as given, the primary factor to be considered is the resolution which the camera is capable of achieving. Both parties would want to ensure that the cameras installed on the other party's aircraft were capable of producing imagery with a certain minimum degree of resolution. Moreover, both parties would want to ensure that the required degree of resolution could be produced from a specified altitude above ground. The higher the altitude above ground from which the camera system can produce the desired resolution, the larger the area which can be effectively photographed from the aircraft on a given track. At lower altitudes, more flights would be required to cover the same areas on the ground, which would not be efficient from the point of view of either the host country flying the missions, or the visiting country, designing the flight plans. For calibration purposes, the parties might set a nominal standard operating altitude—say for illustration, 20,000 or 30,000 feet. This would not limit the activity of observation aircraft during actual missions. It would, however, provide a yardstick for assessing whether or not the optical cameras met the required resolution standards.

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In practice, modern aerial cameras can produce almost any desired degree of resolution from such altitudes. The parties would have to determine what minimum level of resolution was required to provide the information needed for risk reduction. They would also have to determine whether this minimum level should also be considered a maximum, or whether higher quality photography would be acceptable or desirable. The answers to these questions depend on the parties' assessment of the indicators they would need to identify to provide valid assessments of what is taking place on the ground. At one end of the range, for example, the parties might decide that they needed an ability to recognize that

an object on the ground was a tank. In this view, being able to identify the presence of tanks in a given area, or their movement from one area to another, could be an important indicator of military developments.

The ability to spot a tank was the minimum level of resolution specified in the European Open Skies Treaty. In optical terms, this capability was set at one-meter resolution. The reason for the choice, however, was not that the parties felt that it would provide an adequate level of information. Rather, this was the finest level of resolution that the former Soviet Union was then prepared to accept. The other parties decided to compromise on this limited capability as better than nothing. They believed at the time, however, that much finer degrees of resolution could provide important security information. In our view, a greater degree of resolution would also be beneficial to India and Pakistan.

Since risk reduction depends on the quality of shared information, both parties would benefit from significantly better standards of resolution as a general proposition, perhaps to a level of a half or a few tenths of a meter.

For example, if it were possible for both parties not simply to recognize a tank as such, but to differentiate between different models of tanks, armored personnel carriers (APCs), and artillery pieces, they would be in a much better position to ascertain the kinds of military units that were moving or deployed. Or, for example, if it were possible for both parties not simply to recognize an aircraft or a missile launcher as such, but to identify the type of aircraft or missile launcher, they would have a much more accurate understanding of the implications of the movement of aircraft or missiles, including both conventional and nuclear-capable systems. Since risk reduction depends on the quality of shared information, both parties would benefit from significantly better standards of resolution as a general proposition, perhaps to a level of a half or a few tenths of a meter.

At the same time, however, both parties might be concerned that beyond a certain point, high resolution photography could reveal important technological secrets. In addition, the parties might believe that such high levels of resolution would not be required to achieve generally agreed risk reduction objectives. In this event, the parties might want to set a threshold level for highest degree of resolution permissible under the cooperative observation program. Where this point lies would be a matter for discussion between the parties. There is occasionally a fine line between the ability to distinguish between one

piece of equipment and another—which is clearly important to risk reduction—and the ability to observe important technological innovations on those systems, which the parties might not want to expose to analysis. Some models of systems are very close to other models of the same system, and their distinguishing characteristics are only visible at very high degrees of resolution. These cases obviously would present difficult issues for decision by the parties. From a risk reduction point of view, the safest approach would be to start with the requirements for identifying types of tanks, aircraft, artillery, missile launchers, and APCs, and then work backwards where and as necessary to protect sensitive technologies. The objective of such a process should be to ensure that both parties have the maximum possible ability to identify particular pieces and models of military equipment, and that this ability is not infringed except for genuinely overriding reasons of national or technological security.

Processing

As noted above, host country observation planes would have to be outfitted with dual cameras, so that each party could receive a set of the film negatives immediately at the conclusion of the flight. If other sensors in addition to optical cameras were employed, these would also require dual recording systems. No information would be transmitted from the observation plane in real time during the flight. After the observation flight, the host country and the visiting country would each be separately responsible for developing and analyzing the set of negatives or other data which they had received from the flight. In the case of the visiting country, this would mean that processing would not begin until the visiting country observer team that had participated in the flight on the host country aircraft had returned home. Each party would be able to draw on preexisting photo-interpretation capabilities.

The provision for dual sets of negatives or other data ensures that both parties would have the identical raw material regarding the area under observation. On the one hand, this could provide an essential basis for discussion should the visiting party wish to pose questions to the host party regarding something that was seen on the flight. On the other hand, it would serve as a protection for the host party against potential claims that something had been seen on a flight which was not, in fact, there. As such, the existence of dual sets of material could work as an incentive for careful evaluation of the situation. As with the photographic equipment, third parties might wish to offer relevant processing equipment and training to both sides. It would even be possible to seek third party expertise in analyzing photographs. One way of doing this would be to have a single outside party—perhaps an agreed neutral international body—examine the photographs and provide

identical reports to both sides. At present, this would appear to be out of step with the bilateral character of most successful Indo–Pakistani agreements, but it is one further option the countries could consider.

Dispute Resolution

No observation program anywhere in the world has ever functioned perfectly. It must be expected that there will be disputes and possible misunderstandings over the operation of even the best designed program. If a camera malfunctions, for example, parties could disagree as to whether sabotage were involved. If a flight is diverted because of weather, for example, parties could disagree as to whether this was a necessary decision or an opportunistic means of avoiding observation. In looking at the pictures from a flight, one party might conclude that the other party had resorted to excessive camouflage in an effort to create a misleading impression of force deployments.

One way to facilitate consultations regarding the implementation of an agreement would be to establish a bilateral mechanism, where the parties could raise and discuss questions as they occurred.

These and other potential misunderstandings could well arise during the operation of an agreement. However, because each occurrence would reflect unique circumstances, and because each party would necessarily have its own views of the situation, there can be no guaranteed formula for resolving disputes. Rather, the parties would have to agree that, in the event of disputes, they would devote their best efforts to remedying the particular problem and to ensuring that it does not happen again. The incentive to succeed in such efforts would be the mutual interest in preserving the overall observation program. One way to facilitate consultations regarding the implementation of an agreement would be to establish a bilateral mechanism, where the parties could raise and discuss questions as they occurred. Such a mechanism could defuse some potential problems at the technical level. At the same time, it would not infringe on the ability of the parties to draw their own independent conclusions from the operation of the cooperative observation program including, most importantly, their own conclusions regarding the security-related information provided by the program.

Misuse of Information

Some observers might fear that information gathered through cooperative aerial observation might be used to plan a disabling first strike. In such a scenario, observation flights would be used to pinpoint the location of certain high-value targets. Such targets would include, in particular, all elements of the respective national nuclear programs, nuclear-capable missile and aircraft delivery vehicles, and major ground force units. Both countries are likely to be very sensitive to this type of risk. However, they overcame very similar security concerns when they signed the agreement not to attack each other's nuclear installations and exchanged lists of the covered installations. In any event, the notion that it would be possible to pinpoint the location of any particular category of military equipment, even nuclear-capable delivery systems, greatly underestimates the complexities involved in the task. Since covering all potential sites within the national territory of the two parties would require separate observation flights over a period of weeks and months, neither country would be able to compile a truly comprehensive, up-to-date target set. This would be the case even if the parties were to agree to cooperative observation of their entire national territories. If, as discussed above, the parties decided to provide for observation of relatively narrow border areas or some other limited area or list of sites, then the possibility of comprehensive coverage becomes even smaller. Secondly, as noted previously, no country is going to undertake the risk of attempting a preemptive strike without far more certain knowledge than cooperative observation—or any other observation system—could provide. Even if an attack could be executed perfectly on all identified targets—which is improbable in the extreme as an operational matter—the costs of missing a single delivery vehicle because of an incomplete or out-of-date list would be catastrophic.

Since covering all potential sites within the national territory of the two parties would require separate observation flights over a period of weeks and months, neither country would be able to compile a truly comprehensive, up-to-date target set.

Similar considerations would apply to fears that information from cooperative observation might be used to orchestrate an attack on the conventional forces of the other party. In this case, while the consequences of missing an individual aircraft or ground force target would not be as severe, the sheer number of potential targets, and their ability to move before, during, and after any period of observation, means that the likelihood of successfully

targeting of any significant percentage of them using information derived from periodic cooperative observation is very small.

AN OBSERVATION TIMELINE

Preparation for an observation mission could begin with one of the parties, which we will call the "visitor," preparing a flight plan covering sites in the territory of the other party, which we will call the "host." Once that plan was complete, the visitor would notify the host that it wished to have an observation flight conducted. In this initial notification, the visitor would identify the airfield in the host country from which the flight would depart. After a fixed interval following the notification, at most perhaps twenty-four hours, a group of four or five visiting observers would arrive at the host country's airfield from which the flight was to take place. This visiting party might arrive by land, if the airfield were close to the international border between India and Pakistan, or by air. In either case, the time and method of arrival would be agreed upon in advance between the parties.

Immediately upon arrival, the visiting party would present a copy of the flight plan to the host country's representatives. There would then be an agreed interval of a few hours, to give the host country time to notify its air traffic control system of the route of the flight and to prepare the observation aircraft and crew. In practice, this interval would also give the host country an opportunity to notify military installations and other sensitive facilities along the route of flight. Such advance notification could result in some sensitive equipment being moved under cover or some observable activities being postponed. It is unlikely, however, that either party would be able to use this short interval to hide major force movements. At the end of the interval, the observation flight would depart.

On board the host country aircraft would be the host country flight crew, a host country observation team, and the visiting country observation team. Both observation teams could consist of four or five persons. During the course of the flight, the two observation teams would keep track of the route of the flight, checking it against the flight plan. The observation teams would also be responsible for ensuring that the photographic equipment was operating correctly and that pictures were being taken at the desired locations. Actual operation of the cameras would be automatic, in accordance with pre-programmed instructions provided by the visiting party.

Assuming there were no mechanical or other difficulties during the flight, the observation plane would return to its original base on conclusion of the flight. The total flying time could be several hours, depending on the distance covered and the speed of the

aircraft. If necessary in cases where a particularly long mission might encounter darkness before the observation flight was completed, the parties could arrange to schedule an interim overnight landing. Upon return to the original airfield, both the visiting and host parties would receive a set of negatives from the dual cameras on the plane. The visiting party would take its set of negatives and return directly to its country the same way it arrived, either by land or by air. Both parties would then proceed to process the film in their own facilities. There would, however, be no agreed timeline for the processing operation. Nor would there need to be any agreed timeline for the subsequent interpretation of the resulting photography. Each party could decide its own priorities for processing and interpretation, depending on its perception of the situation.

Once the photography had been analyzed, the visiting party would draw on that information to build its understanding of the current military situation.

Once the photography had been analyzed, the visiting party would draw on that information to build its understanding of the current military situation. Again, there would be no prescribed or agreed timeline for the assessment process. If, for example, the photography indicated significant changes in the deployments of host country military forces, the visiting country might decide to move rapidly to seek further clarification or to take offsetting steps of its own. Conversely, if the photography indicated no significant change in host country positions from what had been observed on earlier occasions, the visiting country might conclude that there was no near-term need to alter its own dispositions or take other urgent action. In either case, the results of the photography would only be one input into the decision-making process of the visiting country. The timeliness and objectivity of that input, however, could be of great importance for the security of both parties.

CONCLUSION

Any program of cooperative aerial observation would require India and Pakistan to overcome major political challenges. The military establishments in both countries are accustomed to guarding information, not sharing it, and popular opinion has not been prepared for the change in philosophy inherent in a program of this sort. Putting a program in place would involve difficult negotiations. We believe, however, that there is sufficient flexibility inherent in the nature of such a program—including the prohibition of overflight

of either party's territory by foreign aircraft, choices of areas of coverage, varying numbers of flights, and other factors—to meet the political and military needs of both sides.

There is sufficient flexibility inherent in the nature of such a program—including the prohibition of overflight of either party's territory by foreign aircraft, choices of areas of coverage, varying numbers of flights, and other factors—to meet the political and military needs of both sides.

Most importantly, we believe that a program of cooperative aerial observation would offer immediate, tangible security advantages for both sides. Some of these advantages are direct, *e.g.*, each country would acquire information for itself, thereby refining its own assessment of the situation. Other advantages are indirect, including the development of working relationships with counterparts, and the chance to correct potentially dangerous misperceptions held by the other side. In combination, these advantages would provide the leaders of both countries a flexible tool to reduce the most serious threat to their national security, while strengthening their respective national capabilities to assess and control potentially dangerous developments.

Contributor's Notes

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