Conventional Military Imbalance and Strategic Stability in South Asia

Rodney W. Jones

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Acronyms

AIFV	Armored Infantry Fighting Vehicle
APC	Armored Personnel Carrier
AWACS	Airborne Warning and Control System
AWE&C	Airborne Early Warning and Control System
BVR	Beyond Visual Range
DAE	Department of Atomic Energy
DRDO	Defense Research and Development Organization
GDP	Gross Domestic Product
IRS	Indian Remote Sensing
IISS	International Institute for Strategic Studies
LOC	Line of Control
MBT	Main Battle Tank
MRL	Multiple Rocket Launcher
NFU	No-First Use
NPT	Nuclear Non-Proliferation Treaty
PAES	Paramilitary Force, Atomic Energy, Space and Intelligence
SRBM	Short-Range Ballistic Missile
TES	Technology Experimental Satellite
TNW	Theater Nuclear Weapons
WOT	'War on Terrorism'

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Abstract

India enjoys a large and growing conventional military superiority over Pakistan based on an increase in defense spending over the past three decades from a ratio of under two and a half times Pakistan's defense expenditure to a ratio of six or seven times that of Pakistan. Whilst Pakistan's ground forces have remained formidable against a conventional Indian attack, India's ability to fight offensively with combined arms techniques has significantly outpaced Pakistan's: between 1990 and 2003 India attained and maintained a 3:1 high-performance aircraft numerical advantage over Pakistan; Indian advances in wide-area communications, reconnaissance and battlefield awareness are considerably greater than those of Pakistan; and the naval imbalance rivals or exceeds that between air forces. Overall asymmetry of economic resources and limitations on Pakistan's ability to acquire modern systems has slowed its own conventional modernization by comparison with India so that the capability gap continues to widen.

This conventional military imbalance raises a number of concerns, particularly around whether it will lead to another conventional war, and whether these imbalances would accentuate the risks of the use of nuclear weapons. The possibility of a pre-emptive Indian air campaign against Pakistan's nuclear forces is one of the most plausible scenarios for pushing Pakistan to the point of nuclear retaliation. Regional stability does not therefore rest on nuclear balance per se, but on inequality of strategic depth and the potential for India to employ conventional forces to destroy Pakistan's nuclear forces. The crucial question is therefore whether Pakistan's nuclear capability is sufficient to deter Indian conventional actions. If Pakistan's conventional forces and nuclear forces are not sufficient to deter Indian temptations to use (or threaten to use) its superior conventional military power offensively against Pakistan during times of crisis, the conditions for nuclear stability will be tenuous.

* Rodney W. Jones is President of Policy Architects International, a consulting firm in Reston, Virginia. He is a specialist on nuclear security policy issues, and author of numerous works on nuclear nonproliferation and regional security issues in South Asia. This research paper was written under the terms of the author's appointment as Senior Research Fellow, June-September, 2004, in the South Asian Strategic Stability Unit (SASSU), Department of Peace Studies, at the University of Bradford. It updates and amplifies the author's earlier paper, "Strategic Stability and Conventional Force Imbalance: Case of South Asia," presented at the Workshop on New Challenges to South Asian Strategic Stability, on July 23, 2004, in Bradford (available at: <http://www.bradford.ac.uk/acad/sassu/publications/StrStab&ConvAsymmetry_Bradford_2.pdf>. The views expressed in this research paper are the author's alone and do not necessarily reflect the views of the sponsoring institutions or colleagues. The author is nevertheless indebted to, and wishes to thank several reviewers whose comments or critiques along the way improved the final result, including Gen. (retd.) Jehangir Karamat, Maj-Gen. (retd.) Jamshed Ayaz Khan, Brig. (retd.) Feroz Hassan Khan, Air Commodore (retd.) Tariq Mahmud Ashraf, Rahul Roy-Chaudhury, Professor Zafar Iqbal Cheema, Professor Syed Rifaat Hussain, Dr. Ayesha Siddiqa, and, at the University of Bradford's Peace Studies Department, Professors Shaun Gregory, Malcolm Dando, Malcolm Chalmers, and Paul Rogers. The author also owes special thanks for intellectual and administrative support to SASSU Deputy Director, Maria Sultan, and SASSU Programme Manager, Dr. Simon Whitby, for making this study possible and helping bring it to completion.

Introduction

This study of the conventional force imbalance between India and Pakistan seeks to describe the main features of their respective military forces, the related military imbalances, and the strategic stability implications of those imbalances. The main thesis is that the conventional military balance is more highly unequal in India's favor than commonly understood, this disparity continues to widen to Pakistan's disadvantage, and it has destabilizing effects on their nuclear relationship. Since both states tested nuclear arms in 1998 and have serious unresolved territorial disputes between them, the important underlying issue is whether the conventional military imbalance between them will lead to the outbreak of another conventional war, and whether in such a war those imbalances would also accentuate the risks of nuclear escalation and outbreak of nuclear war.

The analysis shows how the pronounced conventional military imbalance between these two nuclear-armed rivals is politically and militarily destabilizing in their newly nuclearized environment. It raises a number of related questions. Does Pakistan's small nuclear force trump India's conventional military power by enabling Pakistan, as the weaker state, to deter any major and protracted use of conventional force by a militarily superior India? Or does Pakistan's small nuclear force deter only India's first use of its *nuclear* arms – during peacetime, or early in a military conflict – but not India's application of *conventional* military force? What is the scope of nuclear deterrence between India and Pakistan? Is it understood the same way on both sides? What can one expect of nuclear deterrent stability in a relationship in which the stronger side contemplates resorting to limited conventional war to pursue its political and security objectives against the weaker?

Since the fall of 2003 and, more decisively, since January 2004, India and Pakistan have resumed serious negotiations to permit not only a normalization of relations but also a peace-building process that could ultimately dissolve the grounds for their hostility and military rivalry. One fervently hopes this positive process will continue, but it may break down, as many previous efforts to negotiate a more constructive relationship have foundered, usually over the Kashmir issue. In that light, to put this military balance analysis in proper perspective, we should recall that India and Pakistan have been hostile rivals since independence and have fought each other in three major conventional wars between 1947 and 1971, are still engaged in a low-intensity, high-altitude conflict over the undemarcated Siachen Glacier area of Kashmir that began in 1984, and recently clashed in a fourth mini-war over the Line of Control (LOC) at Kargil, in Kashmir, in mid-1999.

Moreover, India and Pakistan came to the brink of war in the major confrontation of 2001-2002, which had been precipitated by a terrorist attack on India's Parliament on December 13, 2001 that India blamed on Pakistan.[1] India rapidly mobilized

[1] India alleged soon after the incident that the five attackers, all of whom died in the attack, were Pakistani nationals, and that the attack was organized by *Jaish-e-Mohammad* and *Lashkar-e-Tayyaba* – two extremist Pakistani organizations that have also been part of the insurgency in Indian-held Kashmir. Indian Home Minister L.K. Advani claimed that the Inter-Services Intelligence (ISI) arm of the Pakistani military supported these organizations. See his "Statement On Tuesday, The 18 December, 2001 in Lok Sabha In Connection With The Terrorist Attack On Parliament House On

virtually all its regular armed forces in what was called Operation *Parakram* (or Valour) and threatened in that confrontation in January 2002 to retaliate against Pakistan with a limited war in Kashmir, and then evidently considered a major conventional war against Pakistan in May-June 2002, but finally decided against it.[2] The ten-month confrontation ebbed after mid-October, 2002 when India began demobilizing its pre-positioned strike forces.[3]

An aggravating factor in the tensions created by this ten-month confrontation was the fact that after the Kargil mini-conflict, Indian officials and senior military officers had begun advancing arguments for the conduct of 'limited war' as a way of responding more effectively to the type of unconventional military intrusion Pakistan had covertly organized at Kargil. They believed that Pakistan would not have dared to launch the Kargil operation had it not been emboldened by possession of demonstrated nuclear weapons and the assumption that India would be deterred from a major conventional military response. The theory underlying these limited war arguments was that India could escape – or fly under the radar – of Pakistan's nuclear deterrence by launching carefully limited punitive military operations. The assumption was that limited Indian war operations that did not threaten vital Pakistani assets and did not seize large tracts of territory would be perceived in Pakistan as 'limited' and therefore would not trigger a Pakistani nuclear response – although leading proponent of these ideas, notably India's former Chief of Army Staff Gen. (retd.) V. P. Malik has recognized that the risks of an escalatory chain of responses cannot be wished away altogether.[4]

In April 2004 – well after the peace process had resumed at the highest levels of both governments, the Indian 'limited war' discourse was revived and expanded in expert and media discussion of so-called *Cold Start* military operations. This Cold Start idea was that well-coordinated Indian conventional military units – air, armored, infantry, and special forces – could mount high speed assaults on predetermined military targets inside Pakistan, going over and around rather than engaging the main, blocking ground forces and defensive fortifications, and then bargain, or retire back to base without triggering a nuclear reprisal.[5]

The 13 December, 2001," available at: <http://www.mea.gov.in/sshome.htm>. President Pervez Musharraf immediately condemned the terrorist attack, expressed his sympathies to India, and after the Indian allegations appeared, denied that the government of Pakistan was in any way responsible for the attack. For additional detail and analysis, see Rodney W. Jones, "America's War on Terrorism: Religious Radicalism and Nuclear Confrontation in South Asia," in Satu P. Limaye, Robert Wirsing, and Mohan Malik, eds. *Religious Radicalism in South Asia* (Honolulu: Asia-Pacific Center for Security Studies, 2004), pp. 295-300; and the account "War rears its head on 13 December," in "India: Another Year of Turmoil," in *Strategic Survey, 2001/2002* (London: International Institute for Strategic Studies, May 2002), pp. 261-262.

[2] Lt. Gen (retd) V. K. Sood and Pravin Sawhney, *Operation Parakram: The War Unfinished* (New Delhi: Sage Publications, 2003), and see in particular the authors' illustrative war maps on pages 74-76.

[3] US diplomatic intervention in January and May, when tensions peaked, encouraged conciliatory response by Pakistan, with specific efforts to arrest militant organizations, and these efforts undoubtedly helped steer India away from launching a war. During the confrontation period and in retrospect, many Western visitors to the subcontinent concluded from the cool demeanor on both sides that *Parakram* was intended from the beginning as a 'political' exercise in coercive diplomacy. It did indeed come out that way. But as Sood and Sawhney indicate in their book, *Ibid*., India's policy makers probably did not know at the outset whether they would actually launch a war or not. All evidence suggests it was a close call. The US 'travel advisory' and precautionary removal of non-essential American official personnel from India at the height of the crisis seemed to be based on an entirely serious apprehension in Washington, D.C., that war might break out.

[4] See Gen. V. P. Malik's "Limited War and Escalation Control, I and II," New Delhi: Institute of Peace and Conflict Studies, Article Nos. 1570 and 1571, November 25, 2004, at: <http://www.ipcs.org/Nuclear.jsp>

[5] Discussion of 'Cold Start' centered on the idea of bringing eight integrated Indian battle groups (armored and mobile infantry strike units) together with elements of the Indian Air Force and Navy as 'thrust formations' for 'hard strikes' against alleged terrorist infrastructure in Pakistan – at levels that

Important in this re-evaluation of offensive conventional military concepts in India is a challenge to the conventional wisdom regarding nuclear-armed adversaries left as an East-West legacy of the Cold War – that nuclear-armed opponents generally seek to avoid even limited conventional warfare against each other, out of prudent concern over the risk of nuclear escalation. Despite serious crises over Berlin, Cuba and the Middle East during the height of the Cold War, American, NATO, and Soviet leaders shied away from authorizing their regular armed forces to open fire, even with conventional weapons, on the forces of their opponent. Nuclear weapons did not end the fear of confrontation, nor did they block the outbreak of the Korean War and other proxy warfare outside the European theater, but they made both sides averse to initiating any hot war against the primary adversary and its close allies. In South Asia, the trend since 1998 seems to have been in the other direction. Thus, the focus in this analysis on conventional military balance and imbalance almost certainly will remain relevant to the most likely security futures in the subcontinent.

One other background point needs mention. The global 'War on Terrorism' has made the conventional and nuclear stability issues in South Asia more acute, partly because U.S. policy precedents of preemption have opened political space for striking back against states that are considered to harbor terrorists. How these issues are resolved will have implications not only for how confidently India and Pakistan can steer away from ordinary war and a local nuclear catastrophe, but should also be instructive for the future in understanding other emerging nuclear state rivalries in the Middle East and Asia. Deciphering the implications will determine how successfully the United States and its partners can help prevent or manage any further nuclear crises that arise in South Asia. Actions to overcome nuclear risk-taking in this region will also set precedents or produce lessons for what can be done about future nuclear crises from proliferation in neighboring regions, e.g., with Iran, and North Korea.

The important underlying issue is whether the conventional military imbalance between them will lead to the outbreak of another conventional war and… accentuate the risks of nuclear escalation.

The paper begins with two brief sections, one on methodological and data issues related to assessing conventional military balances, and the other on Indian and Pakistani nuclear policies and capabilities. Next, the paper surveys and evaluates rising levels of defense expenditures and the changes in the size and conventional combat capabilities of the military services on each side. It uses tables and graphs to show trends in armed force size and major combat systems over time, and calculates ratios that indicate degrees of imbalance. These features help to illuminate components of each side's military threat assessment of the other, as well as the paths by which military imbalances during conventional conflict could increase the probability of nuclear escalation or loss of control. Finally, the paper suggests ways in policy-makers can work on these issues to reduce the chances of conflict and the scale of conflicts that may still occur.

the Indian sponsors believed would give Pakistan no justification, in its response, for crossing the nuclear threshold. See Subhash Kapila, "India's New 'Cold Start' war doctrine strategically reviewed," Delhi: South Asia Analysis Group, Paper No. 99104, May 5, 2004; and for critical Pakistani analysis, Shaukat Qadir, "Cold Start: The Nuclear Side," Lahore: *The Daily Times*, May 17, 2004.

Military Balance Analysis Issues

In assessing measures of conventional military balance, certain methodological issues tend to arouse controversy among analysts and it may therefore be useful to spell out the approach and assumptions adopted here. First, the open source data available for military capability analysis is uneven and what is published may lag, and understate or even exaggerate, actual trends. This analysis relies heavily, but cautiously, on the order of battle data on military systems and related force estimates compiled by the International Institute of Strategic Studies (IISS) in its *Military Balance* series. The author is aware (as are the compilers) that the *Military Balance* is neither infallible nor free of inconsistencies in data on the weapon systems and other defense assets of non-Western countries. Its accuracy and completeness depend partly on the degree to which foreign states provide objective and up to date information about their defenses, acquisitions, and expenditures, and partly on reports by analysts and trade publications that bring additional information to light.[6] This analysis assembles time series information from the *Military Balance* volumes in graphs that make it easier to see trends. The trends are usually more important than the precise details of any given year.

Second, it is not uncommon to hear political scientists and historians disparage so-called 'bean-counting' – that is, enumerating defense expenditures, soldiers and combat units, weapon systems, the order of battle, and other physical features of defense capability. This criticism can be taken too far. Counting military manpower and systems is just a first step in constructing measures of military capability, war-fighting capacity, or military power. If one did not count these physical and observable features of rough military capability at the start, it is not obvious where else one could begin. Counting military observables and calculating their ratios is a legitimate means of getting a first approximation of raw military capability. Observing these ratios over time is indispensable for recognizing trends in growing military power, or in falling behind.[7]

The focus in this analysis on conventional military capabilities is on qualitative as well as quantitative trends in acquisition, fielding and preparation to use modern military systems. Where the trends on both sides diverge increasingly and a military imbalance widens, certain inferences can be drawn about the likely

[6] All countries fence off certain defense matters as secret, and some close off this sector almost entirely. Many countries that appear to be forthcoming still conceal relevant information, or publish information about their defenses in misleading ways. Given these impediments, most would agree that the *Military Balance* is still, overall, the best open source compilation of its kind. It provides continuity in staple coverage, and the compilers expand their coverage when major changes occur in international defense practices.

[7] Where bean-counting can go wrong is when the analyst assumes that static measures of military capability are predictors of combat effectiveness in large battles, campaigns, or wars, and can therefore be used mechanistically to devise strategy or predict the outcome of an armed conflict. That type of oversimplification certainly is untenable. War is a dynamic process in which effective leaders may use strategy, tactics, and surprise to achieve favorable outcomes against an opponent, even if the opponent's assets are measurably superior. In sustained wars – such as that between Iraq and Iran in the 1980s – it is clear that political will, public support, military training and morale, economic mobilization and war production efforts all influence outcomes. Insurgencies, guerrilla warfare, and other asymmetrical warfare also can throw off calculations and expected outcomes of conventional war.

consequences of those disparities in the event of a major armed conflict – such as, hypothetically, when the losing side may begin to contemplate nuclear use. Imbalances that are far-reaching and fundamental are unlikely to be surmounted in modern, fast-paced warfare by the weaker side's superior generalship or tactics, or by nominal differences in cohesion and morale.

A third concern that crops up in focusing on the India-Pakistan military balance is that India's defense establishment has planned since the early 1960s to deal not only with Pakistan but also with potential Chinese aggression, a two-front problem. China invaded eastern India with infantry forces, briefly, in 1962, and then withdrew unilaterally, apparently aiming to convince India that disputed historical claims along their Himalayan boundary should be negotiated pragmatically, not on the basis of earlier British imperial forays into Tibet or China. Ill-prepared to defend the mountain regions in 1962, India methodically built mountain infantry forces, high altitude defense installations, communications links, and hard-surface mountain roads over the next two decades to ensure that the Chinese incursion could not be repeated with impunity. India's decisions to develop a nuclear capability and certain components of its air and naval forces in recent decades also appear to have been justified, at least publically, by concerns over China's nuclear arsenal and long-range military potential, and Chinese activities in Burma.[8]

India's defense establishment has planned since the early 1960s to deal not only with Pakistan but also with potential Chinese aggression, a two-front problem.

At the same time, but often overlooked, China and India have taken important steps since 1988 to reassure each other in security matters, their relationship has slowly but steadily improved during the post-Cold War period, and now contains substantial areas of trade and technical cooperation. The possibility of a two-front land war, with China fighting India on one side and Pakistan also fighting India on the other, appears far more remote today than it did during the Cold War.[9]

It would be difficult to split out from its military balance with Pakistan those components of Indian defense that would be suitable *only* for use against China, and Indian official publications provide no guidance on this matter. Moreover, there are no significant Indian ground, air, or naval forces – leaving aside certain paramilitary units that have specialized in counterinsurgency in eastern India – that could not be mobilized in the space of two or three months for a war against Pakistan. India's mountain brigades are just as capable of operations across the line of control in the mountains of Kashmir as along the Himalayan watershed – and indeed some were brought into play in exactly that way during the long India-

[8] See Raj Chengappa's *Weapons of Peace: The Secret Story of India's Quest to be a Nuclear Power* (New Delhi: HarperCollins Publishers, 2000), which was based on extended interviews with senior officials. Chengappa focuses on how India's decisions on defense R&D and weapons acquisition were shaped not only by internal politics, bureaucratic rivalries and budget constraints but also by Indian perceptions of major external threats, including those attributed to China.

[9] See Shekhar Gupta, *India Redefines its Role*, (London: IISS, *Adelphi Paper No. 293*), 1995. Gupta went so far as to say nearly 10 years ago that: "As a consequence of a thaw in relations with China, for the first time in four decades Indian strategists can think in terms of no more than a single-front war [i.e., can think in terms of a war solely with Pakistan]" (p. 5). In describing the features of burgeoning China-India detente, trade expansion and cooperation in the mid-1990s (pp. 56-58), Gupta also acknowledged, however, that "most Indian policy-makers continue to assert that China, rather than Pakistan, will be India's long-term security threat." *Ibid*. See also Stephen P. Cohen's historically informed and nuanced analysis of the changing dynamics of India-Pakistan and China-India security relations in *India: Emerging Power* (Washington, D.C.: The Brookings Institution, 2001), chapters 5-8.

Pakistan confrontation of 2001-2002. India's armored and infantry forces, and the air force, are mainly equipped and trained to fight Pakistan's. India's naval forces reflect an ambition to patrol wide swathes of the Indian Ocean, but their capacity for effective combat operations is most easily visualized as a blockade of Karachi, Pakistan's main seaport on the Arabian Sea. Insofar as India's domestic political process is moved by military security matters, is preoccupied almost exclusively with Pakistan.

As a practical matter, therefore, most Indian defense potential weighs directly into the military balance with Pakistan. Some of it may have been acquired with other motivations in mind, and some portion may be tied down by India's precautions against China and counterinsurgencies in eastern India. The lion's share of India's forces that have been tied down, however, are those infantry and paramilitary forces that have been coping with the fifteen-year counterinsurgency problem in Kashmir, and India considers its response to this problem to be part of its defense against Pakistan. Otherwise, most of India's forces, and virtually all of its heavy forces, are available for action directly against Pakistan. That happens to be what Pakistani military planners have prepared for on their eastern front.

Nuclear Deterrence and Military Risk Taking

Having demonstrated their nuclear weapons, Pakistan and India's nuclear attitudes, policies, and capabilities are important components of the overall military balance between them.[10] Nuclear weapons and nuclear deterrence expectations add complexity to how each side evaluates the components of the conventional military balance. This section briefly summarizes what is known about their nuclear postures, capabilities and policies.[11] Their nuclear capabilities vastly increase the stakes of letting conventional hostilities run out of control. The advent of nuclear weapons in the subcontinent has not, so far, deterred either side from risk-taking with sub-conventional war, threats of conventional war, and military brinkmanship.[12] After the nuclear weapons tests in May 1998, India and Pakistan both adopted 'minimum nuclear deterrence' declaratory policies. This was intended to convince a concerned international community that the two governments in South Asia knew the dangers nuclear weapons posed, having lived through the strategic nuclear buildup of the Cold War. Spokesmen on both sides argued that nuclear weapons are good only for deterrence, and not for waging war. In order to wear down Western sanctions triggered by their nuclear testing, New Delhi and Islamabad both claimed they would be responsible stewards of this awesome destructive power, and would avoid strategic mistakes they attributed to the Cold War nuclear rivalry of the superpowers. In South Asia,

[10] When India and Pakistan tested nuclear weapons in May 1998, each claimed to have simultaneously tested several nuclear devices with various yields. Although seismic data were inconclusive in pinpointing yields of simultaneously detonated devices, the tests erased the previous ambiguity about whether each country had militarily usable nuclear weapon capabilities. But most experts believe that the previously secret and inherently ambiguous nuclear weapon programs on both sides had latent nuclear deterrence effects on their neighbors. Their perceived nuclear potentials probably influenced their respective perceptions of the military balance for over a decade before 1998. Pakistan obliquely signaled its latent nuclear weapon capabilities to India as early as the winter of 1985-86, in the course of the Brasstacks crisis prompted by major Indian military exercises in Rajasthan and Punjab. Pakistani officials took it as a given as early as the mid-1960s that India had a nuclear weapons program and assumed that India's so-called 'peaceful nuclear explosion' (PNE) of May 1974 was actually a nuclear weapon test.

[11] For a recent study of India's and Pakistan's nuclear capabilities, postures, and policies, see Rodney W. Jones, *Minimum Nuclear Deterrence Postures in South Asia - An Overview*, Final Report by Policy Architects International, for the U.S. Defense Threat Reduction Agency, Advanced Systems and Concepts Office, October 2001, available at: <http://www.policyarchitects.org>; for a detailed treatment of India's developing nuclear capabilities and posture, see Ashley Tellis, *India's Emerging Nuclear Posture: Between Recessed Deterrent and Ready Arsenal* (Santa Monica, CA: RAND), 2001; and for a capsule view of both countries' nuclear postures and strategic doctrines, see Sir Michael Quinlan, "South Asia Nuclear Briefs," IISS South Asia Program, available at: <http://www.iiss.org/newsite/showpage.php?reason=nologin&returnTo=showpage.php&pageID=78>.

[12] For a recent study that probes the escalatory dangers connected with these issues, see Michael Krepon, Rodney W. Jones, and Ziad Haider, eds. *Escalation Control and the Nuclear Option in South Asia* (Washington, D.C.: The Henry L. Stimson Center), 2004, available at: <http://www.stimson.org/pub.cfm?id=191>. See the thoughtful assessments of nuclear signalling, brinkmanship, and escalation control from Pakistani and Indian perspectives in this volume by Brig-Gen. (retd.) Feroz Hassan Khan, "Nuclear Signalling, Missiles, and Escalation Control in South Asia," and "Rahul Roy-Chaudhry, "Nuclear Doctrine, Declaratory Policy, and Escalation Control," chapters 4 and 5, respectively.

reliance on 'minimum deterrence' was supposed to mean that both sides would suppress the temptation to compete in an ongoing arms race and would avoid worst-case planning and nuclear crises.

A section of India's opinion leaders adopted the view in 1998 that Pakistan's possession of nuclear weapons should put Pakistanis at ease on military security matters with India. Their conjecture was that India would not dare to attack a nuclear-armed Pakistan, and that this should be obvious to Pakistanis. Easing threats to Pakistan's security they thought would dampen Pakistan's antagonism, wind down the long-standing rivalry, and allow tension to subside. In retrospect, this seemed to be wishful thinking. Indeed, it was inaccurate about future behavior on both sides of the relationship.

Their behavior is at odds with the conventional wisdom most drew out of the Cold War that nuclear power adversaries, however firmly prepared for nuclear retaliation, normally look for ways to reduce nuclear risks.

Looking back to another reference point, the Cold War superpowers faced each other across a vast political and cultural divide and initially knew little about the other's thought process, but they nonetheless shied away from acts of hot war against each other, prudently fearful of triggering nuclear confrontation and escalation. In ironic contrast, India and Pakistan, whose leaders know each other's societies and culture exceptionally well, have continued to shoot at each other's forces in Kashmir and came close to major war twice within three years of their nuclear transition in 1998. Their behavior is at odds with the conventional wisdom most drew out of the Cold War that nuclear power adversaries, however firmly prepared for nuclear retaliation, normally look for ways to reduce nuclear risks and to avoid being boxed in, so that the likelihood that either would initiate conventional military strikes directly against the other dropped very low.[13]

It is widely believed that neither India nor Pakistan has yet officially *deployed* nuclear weapons, i.e., has not permanently stationed them in combat-ready status. This implies their nuclear-capable aircraft are not standing by with nuclear weapons on board, or nearby ready to load, and their strategic missiles are not mated with nuclear warheads in firing locations ready for prompt use, at least not in peacetime. Both sides have conveyed the impression that their nuclear weapons are separated from delivery systems, and this suggests that time would be required to transport weapons from storage and load aircraft with nuclear payloads, or mate warheads with mobile missiles. In Pakistan, the nuclear cores and chemical detonators of warheads may be kept separate, in which case the stockpiled nuclear weapons actually would be stored in unassembled form.[14]

In India, the chemical and nuclear components of nuclear weapons are said

[13] This has long been recognized, but for a particularly thoughtful historical treatment, see Michael O. Wheeler, "What was Done to Achieve Strategic Stability During the Cold War," delivered at conference on Strategic Stability in South Asia, Naval Postgraduate School, Monterey, CA, June 30-July 1, 2004. See also Henry A. Kissinger's comments on the Cold War (two-player) calculus of deterrence and his judgment that "... as nuclear weapons spread into more and more hands, the calculus of deterrence grows increasingly ephemeral, and deterrence less and less reliable," in "Iran: A Nuclear Test Case," *The Washington Post*, March 8, 2005, p. A-15.

[14] Air Commodore Khalid Banuri, "An Outline on Pakistan's Command and Control," delivered at conference on Strategic Stability in South Asia, Naval Postgraduate School, Monterey, CA, June 30-July 1, 2004.

to be stored separately in different locations and under different agencies. The nuclear cores reportedly are segregated in storage facilities under the custody of civilian scientists of the Department of Atomic Energy (DAE), while the chemical explosive triggers are thought to be in the hands of civilian technicians in the Defense Research and Development Organization (DRDO), under the Ministry of Defense. The delivery systems are yet further removed – under the central authority of a new Strategic Command, and physically controlled by one or another military service organization.[15]

Compartmentalization of this kind arguably does have certain safety advantages, such as reducing the accident exposure of assembled nuclear weapons in peacetime. Time required for assembly and mating to delivery systems may provide some buffer against knee jerk reactions in the political process and hasty military use under crisis. Stored weapons if adequately concealed and protected in reinforced vaults may also be nearly invulnerable to preemptive attack, at least from conventional air strikes. But this recessed nuclear weapon posture, if it is the actual status, can be undone rather quickly – probably within two or three days at most – once tensions begin to rise and either side observing the other's preparatory moves believes a crisis is about to unfold.

India and Pakistan's nuclear declaratory postures are not symmetrical. India claims to have a nuclear deterrent posture of 'no first use' (NFU), similar to China's long-advertised posture. If adhered to, this would imply that India would not fire a nuclear weapon unless an adversary first attacked India with nuclear weapons. In January 2003, India narrowed this NFU pledge, announcing that a nuclear response could be undertaken in the event of a chemical or biological attack on India, or on Indian military forces – even if they are outside Indian territory. Pakistan's nuclear use posture has not been declared in so many words, other than to make clear that the sole purpose of its deterrent is to prevent aggression from India. Pakistan skirts NFU discussion, leaving open the option of first use, presumably in order to maximize the deterrent effect of its strategic nuclear capability not only against India's use of *nuclear* forces but also against any major Indian *conventional* attack on Pakistan.[16]

At this stage, the nuclear forces of both India and Pakistan probably are numerically modest. The cautious IISS estimate in print is that each side has something upwards of 40 nuclear weapons.[17] Our estimate here for 2004 would be possession of at least 40 to 60 nuclear weapons in Pakistan, and at least 90 to 100 in India.[18] India claims to have been constrained in the past by relatively small spent fuel stocks from plutonium production reactors and by capacity constraints in its plutonium separation facilities. But if India employs its gaseous centrifuges to obtain weapons-grade uranium (as well as fuel for nuclear-powered submarine reactors), and utilizes the maximum capacity of its chemical separation facilities for the extraction of weapons-grade plutonium from various reactor sources of spent fuel, India's nuclear stockpile could climb

[15] Gurmeet Kanwal, "Command and Control of India's Nuclear Forces," delivered at conference on Strategic Stability in South Asia, Naval Postgraduate School, Monterey, CA, June 30-July 1, 2004, slide 26.

[16] Rodney W. Jones, "Pakistan's Nuclear Posture: Quest for Assured Nuclear Deterrence – A Conjecture," *Spotlight on Regional Affairs*, Islamabad: Institute of Regional Studies, Vol. XIX, No. 1, January 2000, 40 pages; reprinted in *Regional Studies* (Islamabad), Vol. XVIII, Spring 2000, pp. 3-39; revised version published in Charles H. Kennedy, Carl Ernst, Kathleen McNeil and David Gilmartin, eds. *Pakistan at the Millennium* (Karachi: Oxford University Press) 2003, pp. 302-350.

[17] IISS, The Military Balance, 2004-2005, Table 7, p. 251.

[18] Sir Michael Quinlan uses similar estimates; see "South Asia Nuclear Briefs," op. cit. For the technical plausibility of even higher estimates, see the nuclear weapon equivalent (NWE) production charts in Rodney W. Jones, "Minimum Nuclear Deterrence Postures in South Asia," op. cit.

dramatically. At the same time, if Pakistan's stockpile is already at least 40 to 60 nuclear weapons, and growing, it has already achieved a strategic threshold most observers would consider entirely sufficient for a minimum nuclear deterrent against its opponent. With this still relatively small arsenal, however, Pakistan probably would be disinclined to subdivide the scarce weapons to allocate a portion for use as tactical nuclear weapons (TNW). To date, India is reticent on TNW – no direct evidence has surfaced so far to indicate that Indian planners advocate a TNW requirement, but Indian retired military experts and the media have intermittently discussed TNW utilization scenarios since the mid-1960s.[19]

Both India and Pakistan are believed to have developed simple airborne nuclear weapons, or gravity bombs, before they developed missile warheads. By the 1990s, it was clear that both were also developing and acquiring *mobile* ballistic missiles for nuclear delivery. In Pakistan's case, the longer-range missile types are intended to provide target coverage deep inside India's large territory, over distances that its fighter aircraft could not reach. In India's case, its fighter aircraft can reach almost all urban targets in Pakistan with ease. India is also concerned about deterring nuclear threats from China, however, and India's air force acquisitions and missile development programs aim to give India nuclear-capable delivery systems that can travel 3,000 to 4,000 kilometers, to bring China's bigger cities within reach as potential targets. India is also on the verge of co-producing a Russian-origin, nuclear-capable cruise missile called *BrahMos*, which could be carried by aircraft as a standoff weapon.

Tables 1 and 2, below, show the types and estimated ranges of aircraft and missiles that India and Pakistan are believed to have available as nuclear-capable strategic delivery systems.[20] While Table 1 depicts Nuclear-Capable Strike and Reconnaissance Aircraft, it should be noted that to date neither country has issued official information identifying aircraft types or squadrons earmarked for *nuclear* missions (underscoring the veiled nuclear posture of 'non-deployment'). But reporting suggests that the Mirage-2000 type probably was India's earlier choice for nuclear missions against Pakistan.[21]

[19] For a recent analysis of how TNW could complicate nuclear stability in South Asia, see Michael Krepon, Ziad Haider and Charles Thornton, "Are Tactical Nuclear Weapons Needed in South Asia?" in Krepon, Jones and Haider, eds. *Escalation Control and the Nuclear Option in South Asia*, op. cit., pp. 119-147. For past references to TNW discussion in military circles in Pakistan and India, see Stephen P. Cohen, *India: Emerging Power*, op. cit., pp. 185-187.

[20] Aircraft ranges, expressed in Table 1 as a 'radius of action' (outbound leg of a round trip), assume a ground attack flight profile and armament, and no air-to-air refueling. Combat aircraft ranges can vary significantly according to the weight and types of armament carried, their flight altitude profile, whether the aircraft fly direct or indirect routes to target and back, and whether they carry extra fuel tanks, or are refueled in the air during an operation. The Indian Air Force presently is integrating tanker aircraft and air-to-air refueling capabilities; Pakistan's does not have air-to-air refueling capabilities at this time. To illustrate how widely the published figures for combat aircraft swing, the radius of action often given for the Su-30 MKI is 3,000 km, more than twice the 1,450 km figure given here in Table 1. The 3,000 km range number probably is correct for a Su-30 MKI operated in an interceptor flight profile carrying extra fuel tanks. For sources on the 3,000 km figure, see: Tariq Mahmud Ashraf, "Sukhoi Su-30MKI: What can it do? Why did the Indians opt for it? How could they employ it?" in *Defence Journal*, Issue 82, June 2004, pp. 88-94; and Manoj Raj's contributor article on the Su-30 MKI, on the Air Combat Information Group web site, which states that the range of the aircraft on internal fuel only is 3,000 km, but with air-to-air refueling rises to 5,200 km, available at: <http://www.acig.org/artman/publish/article_407.shtml>

[21] The IISS *Military Balance 2004-2005*, Table 6, "Operational Offensive Nuclear Delivery Systems," p. 250, lists, for India, the Jaguar (S)I, the MiG-27M, and the Mirage 2000H. Raj Chengappa in his *Weapons for Peace: The Secret Story of India's Quest to be a Nuclear Power* (New Delhi: Harper Collins Publishers India, 2000), p. 382-84, reports that India first tried, unsuccessfully, to mate an externally carried nuclear bomb prototype to the Jaguar and later switched the project to the Mirage-2000.

Table 1. Nuclear-Capable Strike and Reconnaissance Aircraft India and Pakistan - 2004*

	Aircraft Type	Radius of Action (Ground attack: km, unrefueled)	Inventory	Supplier
India				
	Modern			
	Su-30 K and MKI	600 - 1450	28	Russia
	Mirage 2000H/TH	600 - 1185	40	France/UK
	Jaguar S(I)	500-700	64	France/UK
	Vintage			
	MiG-27M (Bahadur)	540	70	Russia
	Strategic (Long-Range)			
	Tu-142 (Bear F) MR/ASW	6,200	8	Russia
	Ilyushin-38 MR/ASW	3,600	6	Russia
	Tu-22M (Backfire) - *under negotiation*	2,400	4	Russia
	Total		***220***	
Pakistan				
	Modern			
	F-16 A/B	550 - 1250	32	US
	Vintage - Upgraded			
	Mirage 5	600	54	France
	Total		***86***	

Note*: In fighter aircraft types, ground-attack (FGA) types are counted as "nuclear-capable," and interceptor types are omitted - even though many interceptors (e.g., Indian MiG-29s and Pakistani Mirage-IIIs) could be used as nuclear delivery vehicles. ***Sources*: IISS, Military Balance 2004-2005; Federation of American Scientists, GlobalSecurity.org, and Air Combat Information Group (ACIG) websites.

India may also consider the Su-30 MKI type and possibly the Tu-22M Backfire medium-range bomber type (if and when Russia leases or transfers this system to India) as delivery systems that could be used (or converted) for nuclear deterrence of China. Both would lend themselves to being equipped with standoff missiles, such as the BrahMos. As Table 1 indicates, India could also (or alternatively) use MiG-27M Bahadur and/or Jaguar S(I) ground attack aircraft for nuclear missions against Pakistan.[22]

For its part, Pakistan almost certainly would rely on a squadron of F-16s for nuclear missions, but could also employ a number of its Mirage V ground attack aircraft as nuclear bombers.[23] With respect to the missile types listed in Table 2 (on 'Nuclear-Capable Ballistic and Cruise Missiles'), below, India and Pakistan usually have announced to the press the fact of a missile flight test at the time it was conducted, and have gradually increased the information they release about the range and performance of flight-tested missiles.[24] Neither gives out official information about the size of its missile inventories, however. Both possess dual-capable missiles, but no official information is released on which missiles are (or are planned to be) nuclear-armed. Hence, the open source figures used here on inventories (sifted primarily from IISS data) should be treated with caution, and the information on range and capability assembled from IISS data as well as several other sources noted in the table itself should be considered as approximations.[25]

More important for purposes of stable nuclear deterrence is the information indicated on the ranges of these missiles, especially in Pakistan's case, where long range missiles capable of reaching most of India compensate somewhat for Pakistan's narrow geography and India's relative ease in covering Pakistan's urban centers with supersonic aircraft. Both India and Pakistan have concentrated on developing *mobile* missiles. In Pakistan's case, mobile missiles arguably are vital – for missile force survivability – and are therefore important for nuclear crisis stability.

Nuclear targeting philosophy is not discussed openly by either side – at least not officially, but evidently supports strategic deterrence objectives and presumably emphasizes high value economic targets in urban areas

[22] India and Pakistan, it would be reasonable to suppose, each would have chosen a small number, probably between 10 and 20 supersonic, ground-attack aircraft on each side, for modification for nuclear missions against the other, rather than retrofitting all the available nuclear-capable aircraft of a given type. Even the designated aircraft would still be expected to train for and perform non-nuclear missions, due to the likely shortage of combat aircraft for multiple missions and sorties in the event of a real war. One may also surmise that India has designated (or will designate) a small number of the longest-range combat aircraft to be ready under certain contingencies for nuclear missions against China. The Su-30 MKI, which is equipped for air-to-air refueling, could be used against China. Air-to-air refueling could extend the Su-30 MKI operational radius to between 3,000 and 5,200 km, well beyond the unrefueled ground-attack profile indicated in the table here. India has plans to acquire or co-produce a fleet of 140 of these high-performance combat aircraft, although its reported current inventory of 28 is much smaller than had originally been expected by 2004, apparently due to delays in delivery and difficulties in finalising arrangements with Russia for co-production. See note 9, above.

[23] On the likelihood that Pakistan's choice would be its nuclear-capable F-16, see Tariq Mahmud Ashraf, "Air Power imbalance and Strategic Instability in South Asia," prepared for conference on Strategic Stability in South Asia, Naval Postgraduate School, Monterey, CA, June 30-July 1, 2004.

[24] The IISS has begun to compile reports on missile flight tests in South Asia. See *The Military Balance 2004-2005,* Table 4, Selected Missile Flight Tests, South Asia, 2003-04, p. 145, including reported flight test ranges.

[25] Ballistic missile ranges, expressed in Table 2, have upper limits, for a given missile type and variant, based on the total propulsion capacity of the fuel package and the payload. But the actual ranges of any type can also vary considerably depending on variations in the payload (or warhead) mass and on whether the missile is flown in an optimal ballistic trajectory or instead in a depressed trajectory. Some liquid-fueled missiles can vary their range by shutting down propulsion before they reach their maximum range. Missile launch with, or against, the earth's rotation also affects the distance a ballistic missile can travel over ground.

Table 2. Nuclear-Capable Ballistic and Cruise Missiles - India and Pakistan, 2004

India						
Missile Type	**Range (km)**	**Inventory**	**Status**	**Configuration**	**Payload (kg)**	**Supplier/Tech Source**
Prithvi-1 SSM (Army)	150	100	operational 1997	1-stg, liquid, mob	800 - 1,000	Russia/SA-2
Prithvi-2 SSM (Air Force)	250	50	on order	1-stg, liquid, mob	500	Russia/SA-2
Prithvi-3 SSM (Navy)	250-350		test failure	1-stg, liquid, mob	500	Russia/SA-2
Agni-1 SSM	1,200-1,500		tested	2-stg, solid/liquid	1,000	US/Fr/Ger/Russia
Agni-1b SSM (Army)	700	some	operational by 2005	1-stg, solid, mob	1,000	US/Fr/Ger/Russia
Agni-2 SSM	1,800-2,000	6	prototypes	2-stg, solid, rail-mob	1,000	US/Fr/Ger/Russia
Agni-3 SSM	3,000		R&D	3-stg, 2 solid	N/A	US/Fr/Ger/Russia
BrahMos PJ-10 CM (anti-ship, land-attack, and air-launched versions)	290 (in SSM mode)	some	in production, surface naval deployment by 2005	ramjet cruise + solid kick stage	200-300	Russia/Yakhont/India
Sagarika (Dhanush?)	300-350		R&D/purchase?	sub-launched ballistic	200-400	Russia/SS-X-27/Klub
Lakshya RPV	up to 600		in service 2002	cruise	450	Russia?
Surya	5,000+		R&D	multistage, cryogenic SLV conversion	500-750	Russia
Pakistan						
Missile Type	**Range (km)**	**Inventory**	**Status**	**Configuration**	**Payload (kg)**	**Supplier/Tech Source**
Hatf-2/Abdali SSM	100-180	95	operational	2-stg, solid, mob	100 - 500	France/Eridan
Hatf-3/Ghaznavi SSM	280	50	operational	1-stg, solid, mob	500	PRC/M-11
Hatf-4/Shaheen-1 SSM	750	6	operational 2003	1-stg, solid, mob	500	PRC/M-9
Hatf-6/Shaheen-2 SSM	2,000-2,500		testing	2-stg, solid, mob	1,000	PRC/M-18/DF-11?
Hatf-5/Ghauri-1 SSM	1,350-1,500	15-20	operational	1-stg, liquid, mob	500-700	DPRK/No-dong-1
Hatf-5B/Ghauri-2 SSM	2,000-2,300		R&D testing	2-stg, liquid	700-1,000	DPRK/Taepo-dong-1
Ghauri-3 SSM	3,000		R&D	2-stg, liquid	1,000	DPRK/Taepo-dong-2

Key: SSM = surface to surface missile; CM = Cruise Missile; RPV/UAV = remotely piloted (unmanned) air vehicle
Sources: IISS, Military Balance 2004-2005 (and earlier editions); Federation of American Scientists, GlobalSecurity.org, and Claremont Missile.Com websites.

(countervalue targeting). If either side also considers targeting the opposing side's nuclear military forces with nuclear weapons (counterforce targeting), it has not been made public. India has some inherent capacity, however, to target Pakistan's nuclear delivery systems with air-delivered *conventional* weapons. Despite India's currently relaxed nuclear force posture – and the low probability today of either side launching, or fearing, an 'out of the blue' nuclear attack – structural issues of nuclear crisis stability are nevertheless important, particularly in the near absence of tactical early warning and utterly short aircraft and missile flight times.[26]

Indo-Pakistani nuclear stability [is] inordinately sensitive to the *conventional military balance* – or, as it actually pertains here, the conventional military *imbalance*.

But perhaps the most fundamental structural sources of nuclear crisis instability between India and Pakistan are not nuclear per se. They lie rather in the great inequality of strategic depth, even for conventional war, and the potential capacity for India to employ *conventional* air strike assets to pin down and possibly even preempt Pakistan's strategic deterrent assets. These factors make Indo-Pakistani nuclear stability inordinately sensitive to the *conventional military balance* – or, as it actually pertains here, the conventional military *imbalance*.

[26] For an assessment of structural factors in nuclear crisis stability, see Rodney W. Jones, "Nuclear Stability and Escalation Control in South Asia: Structural Factors," in Krepon, Jones and Haider, eds. *Escalation Control and the Nuclear Option in South Asia*, op. cit., pp. 25-55.

Conventional Military Imbalance

In overall national resources and military power, India and Pakistan are far from evenly matched. India, with well over a billion population and 1.27 million square miles of territory, is a large power by world standards and a giant compared to Pakistan. For the last decade, India's economy has been growing more rapidly than Pakistan's. For conventional defense, India enjoys a naturally extended strategic depth, covering most of the subcontinent. Pakistan is much smaller, relative to India, albeit not a small power in comparison with many other countries. Pakistan's population now over 150 million, is roughly the size of Russia's, and its territory of over 310,000 square miles, nearly twice the size of California.

For territorial defense purposes, the land border between India and Pakistan extends some 1,800 kilometers. Together with each country's long coastlines, these distances stretch both sides' conventional air, ground, and naval forces. Except for the Kashmir region, the terrain along the India-Pakistan border is flat. Armored attack through the Punjab faces natural as well as fortified obstacles because the terrain is crisscrossed by rivers and irrigation canals, and heavy battle tanks carelessly used can bog down in irrigated soil. The vast desert borderlands south of Punjab – in India's Rajasthan and Gujarat states situated opposite Pakistan's Sindh province – are, however, open to rapid armored force movement and the distances from the closest points of the Indian border to Pakistan's narrow, internal lines of communication are short.
In the late 1950s and 1960s, Pakistan was powerful enough militarily to believe it had a chance of shaking India's hold over Kashmir in a localized conflict, although this was disproved in the stalemated 1965 war. But Pakistan never enjoyed a military capacity to invade India deeply, or to press for anything like a strategic advantage. Even after the 1971 war (in which Pakistan lost its former Bengali-speaking province of East Pakistan), Pakistan's conventional military capacity to block an air and armored assault by India was substantial. But India's capacity to cut through this blocking capability has been increasing as a consequence of India's ambitious military modernization of the 1980s and 1990s – some of which will be illustrated in the graphs on major weapons systems in this study.[27] Constraints on Pakistan's ability to acquire modern systems have slowed its own conventional modernization by comparison with India's, so that the capability gap continues to widen.

[27] For assessments of the scope and impact of the Indian conventional military buildup on the balance with Pakistan in the 1980s and 1990s, see my series of earlier works on the subject: "Old Quarrels and New Realities: Security in Southern Asia During the Cold War," in Brad Roberts, ed., *U.S. Foreign Policy After the Cold War* (Cambridge, MA: MIT Press, 1992), pp. 109-132; "South Asia," in Andrew J. Pierre, ed. *Cascade of Arms: Managing Conventional Weapons Proliferation* (Washington, D.C.: Brookings Institution Press, 1997), pp. 305-339; and "Conventional Military Asymmetry and Regional Stability Among Emerging Nuclear States: India and Pakistan," *Fourth Nuclear Stability Roundtable: Conference on Strategic Stability and Global Change*, March 12-13, 2002, available at: <http://www.policyarchitects.org/pdf/NucStability_IndiaPakistan1.pdf>.

Even today, Pakistan still has sufficient conventional military power on the ground to block a standard Indian ground force assault through Punjab, at least in the initial stages. India would find it difficult for economic and logistical reasons to pursue an all out conventional war against Pakistan. It would not be a cakewalk. The economic costs to India of an all out war against Pakistan would be severe. India's post-Kargil temptation to project the impression that it could sustain a decisive war against Pakistan, however, is a key concern in Islamabad, especially after India's 2001-2002 mobilization and the ensuing two-way confrontation. Moreover, the trends of military modernization and faster economic growth in India, and India's growing economic capacity to sustain a long war, are now understandably unsettling to Islamabad.

Constraints on Pakistan's ability to acquire modern systems have slowed its own conventional modernization

India's growing military power has, nevertheless, accentuated Pakistan's strategic vulnerability to an all-out Indian invasion of its territory. Pakistan's key vulnerabilities at the conventional level are twofold. From a defense standpoint, the growing air imbalance is the most important, technically. Used aggressively in a sustained manner, India's growing air combat and ground strike capacity could deprive Pakistan of control over its own airspace, exposing its ground forces to systematic air attack. The other vulnerability is how the conventional imbalance works geographically. If India were to attack Pakistan strategically, Pakistan could be cut in two on its longitudinal axis, south of its own Punjab province. Even with shorter lines of internal communication, Pakistan's ground forces could be stretched and outgunned by Indian armored assault in the desert plains opposite Pakistan's narrow waist near Rahim Yar Khan. The north-south trunk lines of communication in Pakistan are very narrow at that point and hardly 70 kilometers from the Indian border.

This essay examines several features of the increasing conventional military imbalance between India and Pakistan, to illustrate its extent and to draw attention to how this factor itself can be conducive to military instability, particularly in crises. The analysis here is centered on the growing India-Pakistan disparities over time in defense expenditures and acquisition of major conventional military weapons systems. The graphs illustrate each side's efforts to modernize its major weapons systems and platforms, improving their combat capabilities qualitatively, as well as growing their force structures quantitatively.

Although it will be apparent from the quantitative force ratio figures presented later that numerical disparities have grown incrementally in India's favor, the most important disparities that have resulted from Pakistan's and India's respective military modernization programs are qualitative, and these have favored India cumulatively over time – in certain areas, impressively so. The growing qualitative disparities relate not only to deeper reach of strike and firepower and the mobility of armored forces, but also to improved abilities to acquire targets and coordinate firepower, through surveillance, maneuver, coordination of large armored and infantry units, and the use of force multipliers intrinsic to combined arms operations. This becomes most evident in the analysis of the air balance. India's modernization has also greatly reduced the burden of logistics and shortened the time frames for ground force mobilization. The one conventional Pakistani defense advantage that remains – the flip side of its narrow strategic depth – is its comparatively short internal lines of

communication and logistics. These give Pakistan's ground forces a shorter mobilization schedule and compactness that would stand up well against any limited ground attack from the east, and probably would exact a high price, initially, even against an all-out Indian invasion.

The disparities in modern conventional capability nevertheless suggest that India's capabilities to fight offensively with combined arms techniques have significantly outpaced Pakistan's, particularly over the last two decades. This implies that India could pursue military goals of conventional warfare against Pakistan more rapidly today, shortening the duration of a conflict, and achieving decisive results before the international community could get deeply involved. The same factors tend to abbreviate the time available for deliberation and increase the chances of escalation to the nuclear level.

Defense Expenditures

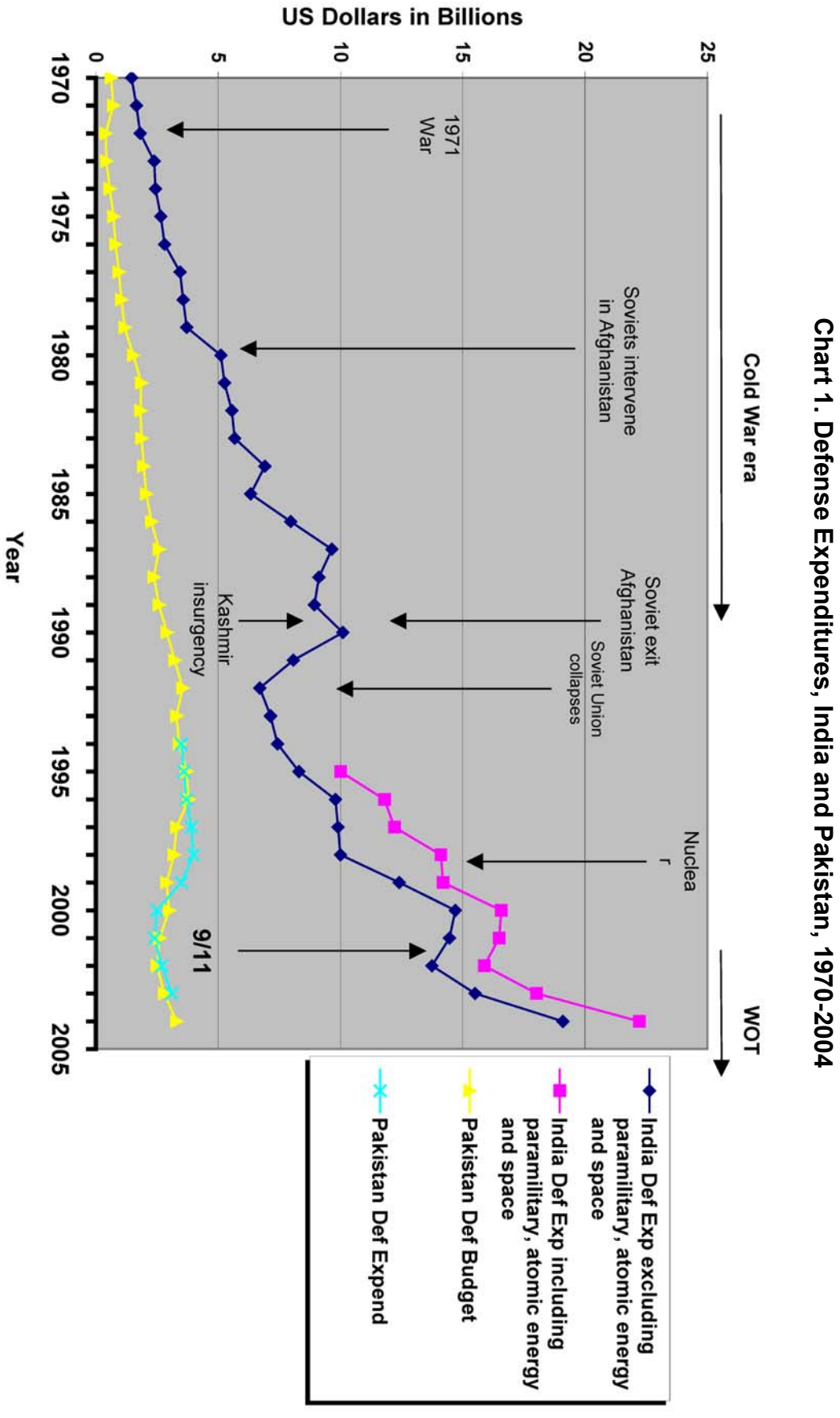
Chart 1 below on "Defense Expenditures – India and Pakistan, 1970-2000," shows how the disparity in each side's defense expenditures has evolved, with a widening divergence since the 1971 war.[28] Historical reference points were inserted in this Chart for contextual understanding. For instance, labels near the top show horizontally the remainder of the Cold War period and when the 'War on Terrorism' began. The arrow-delineated markers refer to the 1971 war, the Soviet intervention in Afghanistan, the Soviet exit, the rise of armed insurgency in Kashmir, the Soviet Union's collapse, the 1998 nuclear tests in South Asia, and 9/11.

The dark blue and yellow plotted lines show that while both countries' defense expenditures have risen substantially over most of that period, India's in absolute terms have climbed more steeply. In 1970, when Pakistan's defense budget was still based in part on the economy of East Pakistan, the ratio of Indian to Pakistani defense expenditure was approximately 2.35:1, Indian defense expenditure then being less than two and a half times Pakistan's. By 1980, the first full year of Soviet intervention in Afghanistan, India's defense expenditure ratio to Pakistan's had widened to 3.38:1, nearly three and a half times Pakistan's. From 1985 to 1987, India's then burgeoning arms acquisition drove its defense expenditures up sharply, to over $9.65 billion in 1987, versus Pakistan's $2.58 billion, widening the India-Pakistan ratio further in 1987 to 3.74:1. That gap remained approximately the same through 1989 and 1990, covering the period when the Soviet Union finally withdrew from Afghanistan and the Kashmir insurgency began.

The dark blue line in Chart 1 shows that Indian defense expenditures plummeted between 1990 and 1996 from a high of $10.10 billion in 1990, to a low of $6.70 billion in 1992, before resuming a steep upward trend, reaching the ten billion dollar level again in 1996. The intervening trough in Indian defense expenditure is attributable primarily to the 1991-92 collapse of the Soviet Union, which had been India's biggest arms supplier, nearly shutting down India's related procurement costs for several years.

[28] The defense expenditure data is drawn from the IISS series, *The Military Balance*, from 1969-1970 to 2004-2005. Both sets of national defense figures in Chart 1 are standardized in billions of US dollars. A US dollar standard removes the currency inflation of Indian and Pakistani rupees that amounted to about 1000 per cent over the depicted 34-year period. Insofar as *The Military Balance* corrects defense figures from earlier volumes in subsequent volumes, the data here are based on the corrected figures. The Indian figures represented by the dark blue line are *actual* defense expenditures, which often differ from the budgeted figure – except that the figure for 2004 is the budget figure, since actual expenditure information for 2004 was not yet available. The pink line shows higher defense expenditure figures for India because it represents, in addition to regular defense expenditures, a category of "Other military-related funding" that the IISS treated separately but provided figures for between 1995 and 2003. This "Other" category includes Indian spending on Paramilitary Forces, the Departments of Atomic Energy and Space, and the Intelligence Bureau (designated in the legend for Chart 1 as PAES). This PAES-added trend line appears to be a better approximation of India's overall defense expenditures. A comparable IISS figure on "Other military-related funding" for Pakistan is not available. Pakistan publishes far less defense budget and expenditure information than India. The yellow line represents the IISS data on Pakistan's defense *budget* figures in years that figures for Pakistan's *actual* defense expenditures were not given. The turquoise colored line tracks the IISS figures on *actual* Pakistani defense expenditure beginning in 1994, and as available through 2003.

Chart 1. Defense Expenditures, India and Pakistan, 1970-2004



The end of the Cold War apparently did not represent a 'peace dividend' for India but rather a continued build-up, slowed temporarily, however, by problems of procurement and delayed delivery from Moscow.

By about 1995-96, Russia had resumed the former Soviet role of primary military supplier to India, but Russia was more insistent on receiving hard currency than had been the case during the Cold War. India's low point of $6.7 billion defense expenditure in 1992 coincided with a near peak in Pakistan's defense budget of $3.55 billion, temporarily resulting in an atypically narrowed India-Pakistan ratio that year of 1.89:1. But thereafter, Pakistan's expenditure flattened out and actually dropped toward the end of the decade. India's expenditure resumed its climb – quite sharply for two years after the nuclear tests in 1998, with a shallow drop just after the turn of the century, and an upward climb again in 2002, the first full year of the 'War on Terrorism' (WOT). As of 2004, regular Indian defense expenditure plotted in the blue line was budgeted to reach $19.1 billion, while Pakistan's budgeted amount in the yellow line reached $3.3 billion. The Indian-Pakistan ratio based on these figures for 2004 is 5.78:1, India's projected regular defense budget allocation being nearly six times Pakistan's – the widest divergence in the depicted period. Certainly the trend in the ratios of these figures indicates a sharpening imbalance between Pakistan and India, from an India-Pakistan low of about 2.35:1 in 1970, to nearly 6:1 in 2004.

We have so far discussed only the dark blue line as the plot of India's *regular* defense expenditures. There are other items not reflected in that line that are also in large part defense expenditures. Beginning in 1995, the IISS began breaking out, for India, "Other military-related funding" categories including expenditures on Paramilitary Forces, the Departments of Atomic Energy and Space, and the Intelligence Bureau (designated here in brief as PAES). The pink line on Chart 1 represents the figures that result from adding to regular Indian Ministry of Defense expenditures the PAES expenditure categories.[29] The pink line indicates that India's overall defense expenditures rose steeply through the year 2000, before dropping somewhat in 2001-2002, due to the fact that unspent Indian defense allocations for part of that period reportedly were actually returned to the Treasury at the end of 2003.[30] Based on the figures available for 2003-04 (2004 being a budget projection), the increase resumed, topping out at $22.22 billion in 2004.

After 1996, Pakistan's official defense budget totals reflected in the yellow line actually decreased, and after a brief lag, the apparent actual defense expenditures reflected in the turquoise line also dropped.[31] Not counting India's PAES, the

[29] India's regular defense budget funds the Ministry of Defense's direct responsibilities, including the military services. The big items are, broadly speaking, the capital costs of equipment procurement, the salaries and upkeep of uniformed personnel in the army, navy, and air force, the operating costs of current equipment and ordnance replenishment, and the pensions of retired service personnel. Paramilitary forces are supported by other departmental budgets, as are nuclear weapons and missile development and space surveillance R&D and procurement expenses.

[30] In 2003, the Indian Ministry of Defense, at the request of the government, actually gave back several hundred million dollars of unspent funds to the Indian Treasury. Apparently, the MOD was unable to spend all the money it had allocated in 2002 and 2003 because of delivery delays and other bottlenecks in the acquisition process for major equipment in the pipeline, primarily from Russia. I'm indebted to Rahul Roy Chaudhry, Fellow at IISS, for bringing this to my attention.

[31] The drop may be explained in part by Pakistan's poor economic performance in the 1990s and loss of U.S. security-related assistance (due to the triggering of the Pressler Amendment), two factors that almost certainly constrained Pakistan's defense expenditures. Since Pakistan does not publish defense budget details, comparisons must be treated with caution. Pakistan almost certainly has off-line defense revenues as well as expenditures that cannot be pinpointed or estimated on the basis of available information. The continued recent decline in Pakistan's announced defense budget figure may also be due in part to moving military pensions into other federal accounts, although this has yet to be confirmed. Pakistan may have had defense-related

India-Pakistan ratio widened in India's favor from 3.12:1 in 1998, to 4.8:1 in 2000, and then to 5.78:1 (as already mentioned) in 2004. Adding in India's PAES and also adding the brief plot of Pakistani actual expenditures, the India-Pakistan divergence was even greater, from 3.5:1 in 1998 (when India's overall defense expenditures rose to $14.10 billion), to just over 5:1 in India's favor in 2000 (India's overall defense expenditure then reaching $17.84 billion), and finally in 2004 the India-Pakistan defense budget ratio rose to approximately 6.73:1. *Over a three decade period, therefore, India increased its defense expenditure lead over Pakistan, in US dollar denominated terms, from a defense spending ratio of under two and a half times Pakistan's to a ratio of six or seven times that of Pakistan.*

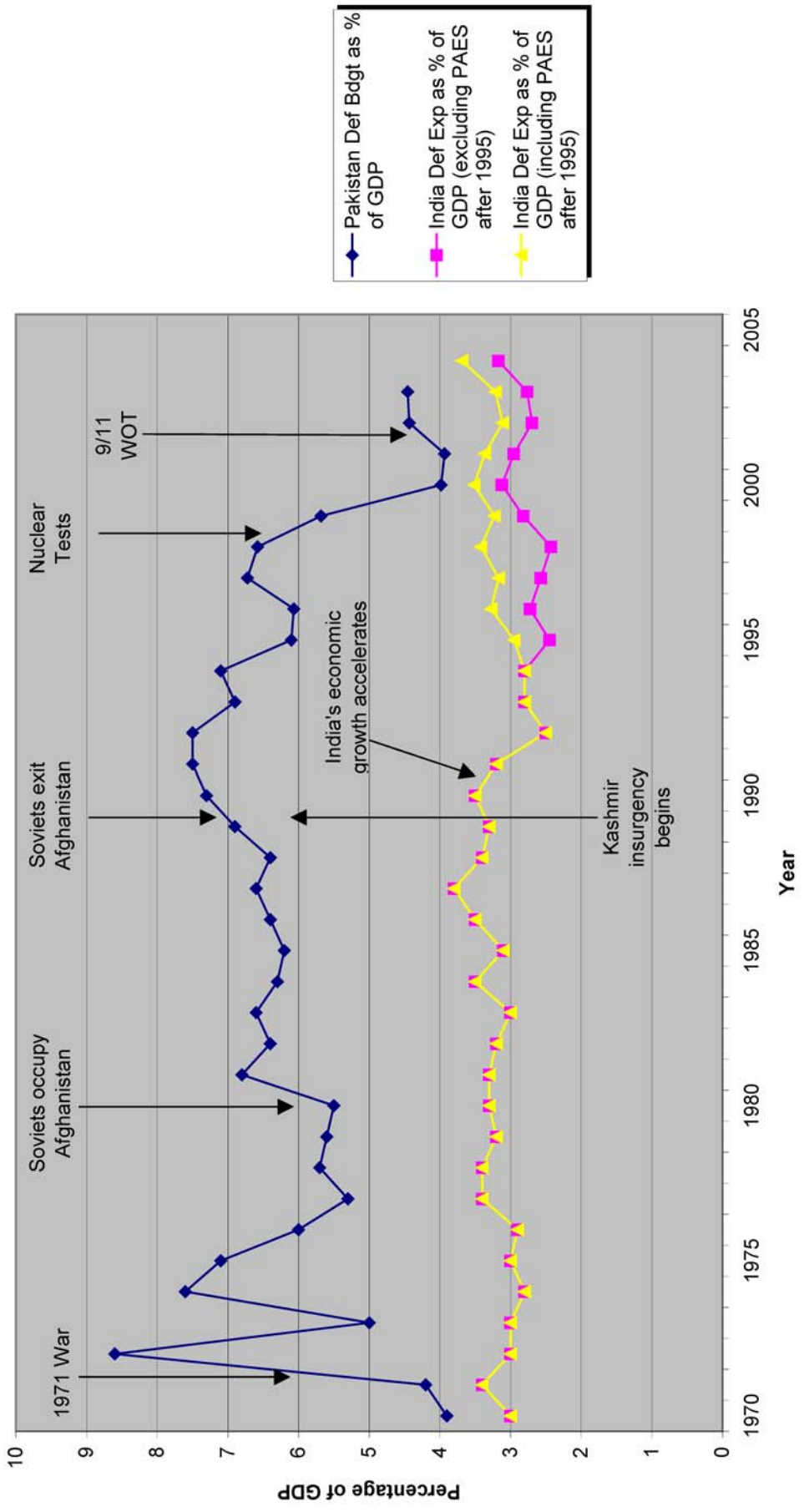
Moreover, India accomplished this while keeping the proportion of defense expenditure to its GDP within roughly the same limits, varying between 2.5 and 4 per cent, with an average of a little over 3 per cent annually, not counting PAES. India's achievement was aided by acceleration of its economic growth after 1991. (See Chart 2 below, "Defense Expenditure as Per Cent of GDP - India and Pakistan, 1970-2000." Note that the dark blue line in Chart 2 is the plot of Pakistani figures, and the yellow line represents India's, with the pink line after 1995 denoting the plot of India's regular defense expenditures, excluding PAES.) India has thus been able to keep its 'defense burden' relatively modest, by comparison with Pakistan, whose peak levels of defense expenditure reached 7.6 per cent of GDP and whose average has been about 6.5 per cent. In recent years, at least according to official figures, Pakistan has also been able to reduce its defense burden to about 5.7 per cent of GDP. Adding the PAES figures for India shows India's defense effort increased in the 1990s, and by 2004 had climbed to about 3.7 per cent of GDP.

It is true, as Indian analysts are quick to point out, that a significant part of India's defense expenditure has been oriented since 1962 to improving India's defense position against China. But no official Indian measure of its China-related defense expenditure has ever been issued for public information, and it would be difficult to separate out defense equipment and infrastructure costs (e.g., for a small number of long-range aircraft, a part of the production capacity of the nuclear program, some naval 'blue water' capacity, and road-building in the Himalayas) that may be geared specifically to defense against China. The Himalayan heights and the vast interior of the sparsely populated Tibetan plateau remain India's chief defensive barrier against China expanding as a land power, and China's naval power projection is still limited essentially to Korea, the Sea of Japan and the South China Sea, all east of the Southeast Asian archipelagos of Indonesia and Malaysia.

The bulk of India's military manpower and heavy military equipment is still configured for the subcontinent, and plays directly into the balance with Pakistan. China's officially announced military expenditures have remained at least twice India's, and if they could be counted by any meaningful standard of comparability, quite probably would come out as at least four times India's – with a lopsided ratio between China and India not unlike that between India and Pakistan. There is no official evidence that India has ever seriously attempted to reduce this disparity. China measures its own defenses primarily against those of the Pacific basin powers, the United States, Russia, and Japan. Within the subcontinent, it is the disparity between India and Pakistan that counts most in terms of foreseeable conflicts.

financial assistance from other countries that is not recorded in the budget. Pakistan has also economized in its defense procurement expenditures, in part by acquiring new equipment from less expensive suppliers such as China and Ukraine, and in part by refurbishing rather than replacing older equipment, as it has done with the avionic and armament upgrading of Mirage aircraft. It has also purchased second-hand Mirage III and V aircraft from Australia and Libya.

Chart 2. Defense Expenditure as % of GDP, India and Pakistan - 1970 - 2004



Armed Forces Manpower

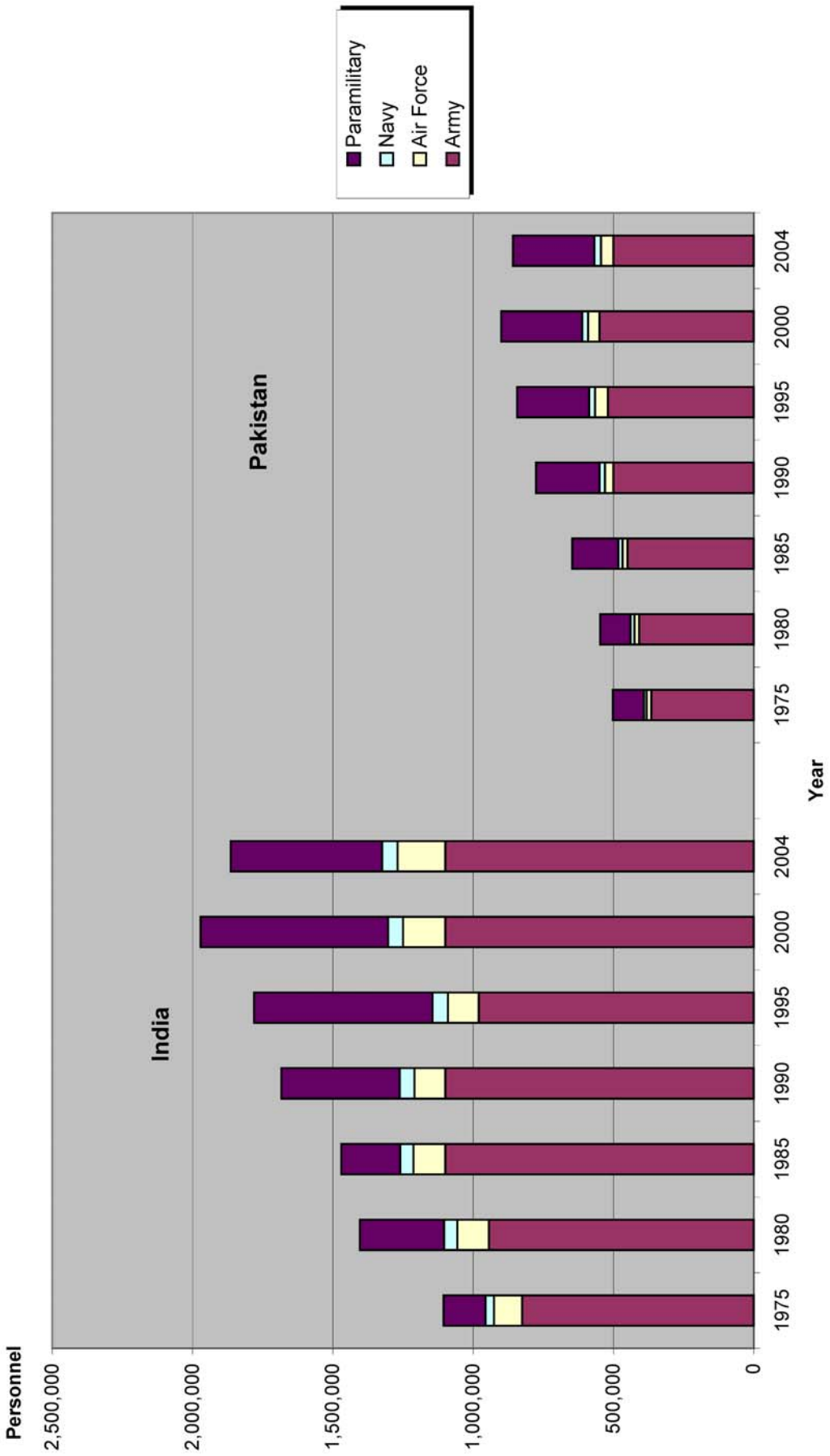
Comparing India and Pakistan's armed forces in terms of total numbers of uniformed personnel by service type shows a more stable pattern. See Chart 3, below, on "Indian and Pakistani Military Service Personnel, 1975 to 2004." The stacked bar graph in Chart 3 shows the numerical sizes of the Army, Air Force and Navy on each side, by selected years. While the armed forces have grown significantly on both sides over time, in this metric Pakistan's ground forces have kept pace with India's, overall. One can see almost at a glance that the India-Pakistan Army ratio remains nearly constant at about 2:1 in India's favor. Chart 3 also depicts the personnel of the aggregated paramilitary forces on each side. Interestingly, each side's paramilitary forces have grown much more rapidly than its regular army – from about one-fifth to slightly over one-half of the size of the army on each side. Chart 3 also shows that the Army is by far the dominant military service on each side, in manpower terms, with the Air Force next in size, and each Navy the smallest service on each side.

From 1975 to 2004, Pakistan's Army remained roughly half the size of India's, while Pakistan's paramilitary forces also increased in roughly the same proportion to the Army as India's – so that Pakistan's paramilitary remained about half the size of India's. In the other military services, the ratios have changed more significantly during that period.

India's Air Force personnel numbered about 100,000 in 1975, and rose to 170,000 in 2004, and Pakistan's rose from 17,000 to 45,000 in the same period of time. This brought the India-Pakistan air force personnel ratio down from 5.9:1 in 1975 to 3.8:1 in 2004, a significant adjustment in Pakistan's favor. This personnel ratio is less relevant to force balances, however, than how the air forces are equipped and trained. Even so, a 3.8:1 air force personnel ratio in India's favor is a sizeable advantage.

India's Navy grew from 30,000 to 55,000 personnel between 1975 and 2004, and Pakistan's grew somewhat more, proportionately, from 10,000 in 1975 to 24,000 in 2004. In this case, the India-Pakistan naval personnel ratio dropped from 3:1 in 1975 to 2.3:1 in 2004, again a significant change in Pakistan's favor. As noted in connection with the air force balance, the personnel ratio is less important to force balances than how the naval forces are equipped and trained. We will return to each of the military services in the context of major equipment modernization trends, which are more illustrative of the growing conventional force imbalances.

Chart 3. Indian and Pakistani Military Service Personnel, 1975 - 2004



Air Force Capabilities

Should India and Pakistan come to blows again in a major conventional conflict, the air force imbalance is the most serious for conventional military and nuclear instability. Trends in air force modernization have increased the capability of aircraft to conduct precision strikes against airfields, military bases, and key infrastructural facilities, including power plants and communications nodes. The same trends increase the command abilities of a well-prepared armed force to coordinate air and ground operations in an attack across border defenses. Although the precision strike, air-to-ground support, surveillance, and data-relay capabilities of the Indian Air Force would not be comparable to those of the Western powers, as demonstrated in operations against Afghanistan in 2001 or Iraq in 1991 and 2003, they have improved incrementally since the 1980s, with significant cumulative results. Future acquisitions seem destined to strengthen them impressively.

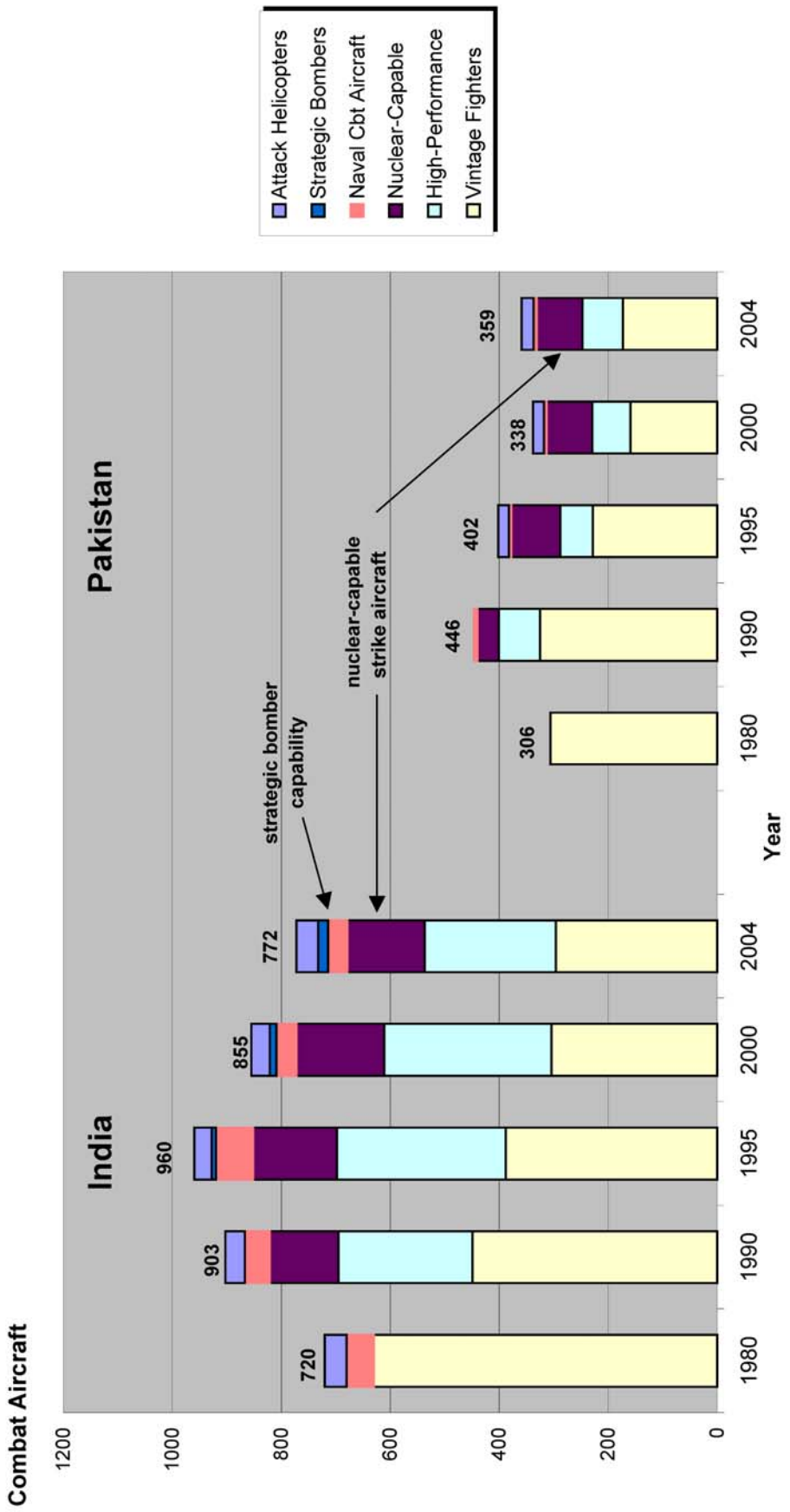
India's air force acquisitions continue to move toward the fulfillment of planning objectives for high-impact, combined arms operations against Pakistan. India's conventional precision strike capabilities with laser-guided bombs supported by the surveillance and target-acquisition functions of its existing high-altitude MiG-25 reconnaissance aircraft and initial satellite imaging capability gives it a theoretical potential, assuming the advantage of surprise, to assert control over Pakistan's airspace and attempt conventional disarming strikes on Pakistan's nuclear assets (such as aircraft at airfields, and missiles in their ground based shelters). India's acquisition by 2007 of the three Phalcon airborne warning and control system (AWACs) aircraft now on order from Israel will boost this emerging capability a quantum step higher.[32]

India has continued to acquire state of the art, supersonic fighter and ground attack aircraft (Mirage-2000H, Jaguar S(I), MiG-29, and Su-30K MKI) and has refurbished or upgraded older aircraft (MiG-21 and MiG-23 types) to enhance their sensors, air-to-air armaments, and interceptor capabilities. India has acquired beyond-visual-range (BVR), or 'fire and forget', air-to-air missiles for its more advanced fighter aircraft, a quantum leap over the capability of the missiles on Pakistani interceptors. India has had Western-origin, laser-guided bombing technology for over a decade, a capability still missing on Pakistan's side. Furthermore, India expects within a few years to be able to equip its more powerful combat aircraft with the Russian-originated, 290 km range, dual-capable BrahMos cruise missile (see Table 2, above) that not only offers a standoff capability but is designed to reach supersonic speed (and thus to bypass surface-to-air missile defense systems) as it homes in on its target.

The Pakistan Air Force has been denied state of the art aircraft acquisitions for two decades, and has been limited to refurbishing older high-performance aircraft (such as its Mirage III and V fighters), scrounging for spare parts for its limited F-16 inventory (still a first rate airplane, but 1970s technology) and

[32] See Tariq Mahmud Ashraf, "IAF's Acquisition of Phalcon AEW: A Paradigm Shift in South Asian Air Power Scenario," *Defence Journal* (Karachi), Issue 76, December 2003, pp. 31-37.

Chart 4. Composition of India's and Pakistan's Air Forces 1980-2004



purchasing new Chinese fighter and ground attack aircraft that are, however, based on old MiG-19 and MiG-21 airframe designs (1950s and 1960s generation aircraft). Although the newly produced Chinese aircraft (e.g., the Q-5 Fantan, and F-7PG) are more capable in avionics, armament, engine performance and range than their MiG-19/21 predecessors, the Chinese aircraft nevertheless require more frequent maintenance than Western alternatives and also suffer from relatively short range and brief loiter capability. As a result, while India has been able to replace a large proportion of its 'vintage' aircraft with modern, high-performance types, Pakistan has been forced to accept cheaper but much less satisfactory upgrades.[33] This raises serious doubts about Pakistan's ability to maintain control over its own air space, in the event of a major Indian conventional campaign against Pakistan, in which India's air force doctrine calls for suppression of Pakistani air defenses and airfields.

Capability features resulting from the Indian and Pakistani aircraft acquisition and modernization policies over the last quarter century are depicted visually in Chart 4, below, on the "Composition of India's and Pakistan's Air Forces - 1980-2004." The total numbers and ratios between India and Pakistan's fixed-wing combat aircraft (leaving helicopters aside for the moment) changed only marginally over this period of time – shifting slightly to India's advantage. The India-Pakistan fixed-wing combat aircraft ratio rose from about 2.2:1 in 1970, when both sides had only 'vintage' aircraft, to 2.43:1 in 1995, and further up to 2.58:1 in 2000, before dropping back, apparently, to about 2.2:1 in 2004.[34]

More important than the total numbers and ratio of fixed-wing combat aircraft in each air force, however, are the qualitative factors in the combat fleets. Both air forces were able to carry out modernization in the decade of the 1980s. Both displaced some vintage aircraft by more modern, high-performance aircraft, including nuclear-capable types. But as Chart 4 indicates, India has achieved a qualitative air power advantage over Pakistan, marked by the shrinking proportion of vintage aircraft in its total inventory, and an increasing proportion of modern, high-performance aircraft. The ratio between India's and Pakistan's inventories of modern, high-performance combat aircraft [35] – which is a more telling indicator of the air imbalance than overall numbers – rose as high as 3.33:1.00 in India's favor in 1990, following India's sizeable buildup in the 1980s. After dropping somewhat in 1995, this ratio has stayed at a level of approximately 3:1 in India's favor from 1995 to 2003.[36] Based

[33] After invoking the Pressler Amendment in 1990, the US blocked the sale of 70 F-16s that Pakistan had ordered and paid for. Some compensation was later made to Pakistan in other forms. Recent reports indicate that the US has offered, pending Congressional assent, to sell 18 F-16 fighter aircraft to Pakistan. See Joshua Kucera, "US Offers to Sell F-16s to Pakistan," *Jane's Defence Weekly*, September 20, 2004. Even this small a number of this capable interceptor would improve Pakistan's air defense, but not decisively.

[34] India's fixed-wing combat aircraft total peaked in 1995 at 928. According to the latest IISS figures we have used here, there is a surprising and not easily explained decline in India's fixed-wing combat aircraft inventory, dropping to 821 in 2000, and dropping yet further to 732 in 2004 – a total decline from the 1995 peak of over 20 per cent, which seems implausible. India has had a high rate of crashes of its older MiG aircraft, and some aircraft could have been retired, e.g., 65 Mig-27Ms appear to have been dropped from India's combat aircraft inventory within just the last year. Some of India's acquisitions, e.g., deliveries of the Su-30 MKI, have also suffered serious delays. But it is also possible, knowing that refurbishment programs are underway, that the IISS did not count some of India's combat aircraft inventory that have simply been taken out of service temporarily and will reappear after they have been reequipped.

[35] While Chart 4 breaks out "high-performance aircraft" and nominally "nuclear-capable aircraft" as distinct sets in the bar graphs, to derive the ratio between India and Pakistan's high-performance aircraft we add the aircraft in these two categories together. The aircraft in the nuclear-capable category depicted here would be regarded as high-performance types in both countries.

[36] Calculations of the India-Pakistan high-performance aircraft ratio for intervening years show 2.95:1 in 1995, 3.03:1 in 2000, and 2.84:1 in 2003, before dropping sharply to 2.42:1 in 2004.

on IISS data, the high-performance aircraft ratio apparently dropped to about 2.4:1 in 2004; it is unclear whether this is an anomaly in the data or an indication of a real narrowing of the disparity. Nonetheless, these ratios show that India had attained and essentially maintained a 3:1 high-performance aircraft numerical advantage over Pakistan between 1990 and 2003.

The order of battle numbers in Chart 4 and the calculated air balance ratios just discussed tell only part of the story of the impact of air modernization on the conventional balance. Given Pakistan's narrow geography, India's increasing overhead surveillance capability and the superior range, sensors and armaments in the leading edge of India's air forces, India's potential air combat capability advantage over Pakistan today probably should be translated, at least from a technical point of view, as somewhere between 4:1 and 6:1. India is acquiring, relative to Pakistan, a virtual strategic bombing capability in its fleet of Su-30 MKI, Mirage-2000H, and Jaguar S(I) strike aircraft. The Tu-22M Backfire bombers India has been negotiating to lease (or purchase) from Russia can each carry a payload of about 25 tons – the equivalent of two dozen 2,000 pound bombs, or a large number of standoff air-to-ground ballistic and cruise missiles.[37]

The most serious danger in the air power imbalance is the potential for Indian surprise conventional air attacks… against Pakistan's nuclear storage facilities.

India's co-development with Russia of the BrahMos missile for India's air (and naval) forces introduces to the South Asia military balance a highly lethal, hybrid (cruise plus ballistic) missile that is likely to be considered for conventional counterforce missions against naval ships, ordnance storage facilities, sensitive military production facilities, aircraft hangars, military communications nodes, and command and control centers. India is now integrating air-to-air refueling capabilities for its leading edge air forces, which will give them a higher sortie rate and ability to operate from the natural protection of airfields deep in India's interior. India's most up to date aircraft have long-range air superiority combat capabilities, with multiple target acquisition radars and beyond visual range (BVR) air-to-air missiles and fire-control systems that could, in a conflict, put virtually all of Pakistan's airborne assets at risk. When delivered in 2007, India's three Israeli-equipped Phalcon AWACS platforms will greatly increase India's combat capability to sweep Pakistan's airspace during any future conflict. Pakistan may have found a relatively economical counterpart to the Phalcon, however, in the Swedish turboprop Erieye AWE&C platform.[38]

[37] A Russia-India lease or purchase deal for 4 Tu-22M Backfire bombers has been in the news since at least December 1999, but as of November 2004 no reports confirmed a deal had been consummated. Russian nuclear-capable standoff missiles that could be supplied with this platform include the KH-22 (AS-4 Kitchen) or the KH-15 (AS-16 Kickback), with 450-500 and 300 km ranges, respectively. See webpage: <http://www.vectorsite.net/twcruz6.html>. Russia considered but finally declined to sell this highly capable bomber to China in the mid-1990s. In India's case, Russia may have linked the Backfire deal to its getting satisfactory terms in other arms and technology supply negotiations with India, which have included co-production arrangements for India with the Su-30 MKI, Indian purchase of Russian refitting services and MiG-29 aircraft to equip the Russian-built Admiral Gorshkov aircraft carrier before it is transferred to India in about 2008-09 (the cost and schedule of this deal was finally agreed in February 2004), prospective Indian leasing of Russian Akula-class nuclear-powered submarines and Russian assistance in India's development of its own nuclear-powered submarine – the so-called Advanced Technology Vessel (ATV).

[38] Pakistan has long canvassed for an airborne warning and control system aircraft that would at least improve its own tactical early warning and air defense battle management capabilities, and pressed its search hard after announcement of Indian

Pakistan's ground attack aircraft retain a strategic nuclear penetration capability for deterrence, but Pakistan's interceptors are likely to be heavily outmatched in any sustained conflict in maintaining air defense missions and in providing protective cover, let alone direct battlefield support, for ground forces.

The most serious danger in the air power imbalance is the potential for Indian surprise conventional air attacks that could serve a preemptive objective against Pakistan's nuclear storage facilities, the mobile missile systems prior to their dispersal, and aircraft at air bases. India's ability to organize and execute surprise attacks and sustained bombardment of sensitive Pakistani facilities probably has not yet been fully realized, technically, due to the procurement and production delays in India's assembling state of the art ground attack capabilities, but the trends in Indian air force modernization are in that direction.

A preemptive Indian air campaign against Pakistan is one of the most plausible scenarios for actually pushing Pakistan to the point of considering strategic nuclear retaliation. The overall asymmetry of economic resources between India and Pakistan and the limitations on Pakistan's ability to obtain advanced military technologies from most Western sources is likely to accentuate the adverse air balance trends illustrated here.

acquisition of the *Phalcon*. In mid-2004, Sweden reportedly agreed to sell Pakistan seven mid-sized, SAAB-2000 turboprop Erieye airborne early warning and control system (AWE&C) aircraft. With their phased array scanning radar in modules in the fuselage, rather than in the rotodome configuration that looks like a mushroom above the fuselage, the Erieye is just a bit slower in speed but a smaller target, quite agile, and far more economical to acquire and operate than the jet-powered American E-3 AWACS or the Israeli-Russian *Phalcon*. See S.M. Hali, "SAAB 2000 and ERIEYE AWE&C," *Pakistan Observer*, July 18, 2004, available at: <http://www.infopak.gov.pk/writeups/SAAB_2000_&_ERIEYE_AWE&C_system.htm>

Ground Force Capabilities

Pakistan's ground defenses have remained formidable against a conventional Indian attack, particularly where they are configured defensively to hold lines in the irrigated Punjab agricultural areas. Fortified embankments and gun emplacements have been built along the Punjab borders on both sides.[39] Pakistan also has the inherent advantage of operating on shorter lines of communication and logistics. But Pakistan's ground forces could be exposed to relentless Indian air force attrition if Pakistan lost control over its own air space. In addition, Pakistan is vulnerable to rapid Indian armored assault from Rajasthan across the flat desert terrain opposite the junction of Punjab and Sind provinces, where Pakistan's north-south lines of communication are narrow. Both sides have made advances in fielding capabilities for mechanized and maneuver warfare on the ground, both have increased their artillery firepower and range, and both have gained in means of coordination of their major armored strike formations[40] and supporting infantry units, but India's advances in wide-area communications and battlefield surveillance (for situational awareness) appear to be considerably greater than those attainable by Pakistan.

Chart 5, below, on the "Composition of India's and Pakistan's Ground Forces - Armor and Artillery, 1979-2004," compares certain features of Indian and Pakistani ground force combat equipment modernization and numerical balance shifts over time – emphasizing the feature of mobility, particularly in armored vehicles and self-propelled artillery, but also multiple rocket launchers (MRLs) and short-range mobile ballistic missiles (SRBMs). Again, the category 'vintage' is used here in the analysis of main battle tanks (MBTs) to distinguish them from their modern, higher performance counterparts.[41]

[39] Pakistan's attention to a robust ground force defensive balance should be no surprise, since it is the raison d'être of the Pakistan Army, which not only is the dominant military service but is also dominant politically behind the scenes, even during periods of elected government.

[40] India has formed, for its Western front with Pakistan, three Army "strike corps" formations, each with about 50,000-60,000 troops, an armored division and an independent armored brigade, several infantry divisions, paratroop and commando components, attack helicopters, self-propelled artillery, multiple rocket launchers, air defense units and engineer units. Each corps counts on sizeable contingents of Air Force fighter support and transport aircraft. Pakistan has the equivalent of two "strike corps" formations of its own, one based in the upper Punjab, and the other at Multan, in the southern Punjab, able to move either towards the northern Punjab, or against an invasion from Rajasthan in the south – but not both at the same time.

[41] Vintage tanks as classified here typically were brought into service in the 1950s and 1960s, usually in the 40-50 ton weight range with 90-105 mm guns, and light armor. Tank upgrade programs have improved the endurance and fire control systems of such tanks. Modern, high-performance tanks are classified as entering service typically in the 1970s or later, typically are equipped with 120-125 mm main guns, generally have more powerful engines and are capable of higher speeds, have heavier and layered-composite or reactive armor, and usually have sophisticated range-finding, night vision, and fire-control systems.
Examples of Vintage tanks still fielded by India are: the British Vickers Mk1designated Vijayanta, the Soviet-origin T-55, and the Soviet PT-76, an amphibious, light tank. Vintage tanks still fielded by Pakistan are: the US-origin M-48A5, the Soviet designed T-54/55, and the Chinese Types-59/69 (upgraded tanks derived from the T-54 design). The modern tanks fielded by India are the Russian-designed T-72M1 and T-90S, which are also co-produced in India, and India's indigenous Arjun main battle tank, which, however, has not proved satisfactory. Pakistan's modern tanks are the

India moved a large number of older tanks into storage in the 1990s, and since these would be relevant to combat capability weighting only in a long conflict, they are omitted from the comments and ratio analysis that follows.[42]

The main trends that are evident in this graph are the overall augmentation of armored warfighting capability on both sides, including the integration over time of modern MBTs and other mechanized combat vehicles, armored personnel carriers (APCs) or armored infantry fighting vehicles (AIFVs), and self-propelled artillery (SPs). Both sides underwent an armored buildup in the 1980s and 1990s, although this was generally more formidable on India's side, especially in its acquisition of modern Soviet/Russian-origin MBTs and in AIFVs. India's modern MBTs in the depicted timeframe consist primarily of T-72s imported from the Soviet Union/Russia, or co-produced in India from kits.

Pakistan was less able, earlier, to acquire modern MBTs (although its US-supplied earlier generation M-48A5s – a much more capable descendant of the famous M-47 'Patton tank', and Chinese T-59/69s remained serviceable), and Pakistan had acquired APCs (including the US M-113) rather than AIFVs. In the late 1990s, Pakistan began acquiring modern T-80UD MBTs from Ukraine, and more recently has begun to produce its own indigenous MBT, which is similar to a Chinese Type-98, with a 125 mm gun, and uses high-heat tolerant Ukrainian diesel engines. These show in the graph as Pakistan's 'modern' MBTs.[43]

Between 1979 and 2004, and counting all vintage and modern MBTs (except those in storage) and both APCs and AIFVs, India's numerical advantage over Pakistan in heavy armor and armored combat vehicles remained more or less constant at between 1.65:1 (1979) and 1.73:1 (1996), dropping slightly to 1.45:1 in 2000, and then rising again in 2004 to 1.8:1. India's biggest armored offensive force advantage was in opening up leads over Pakistan in *modern* MBTs, which Pakistan finally narrowed toward the end of the 1990s. The modern MBT ratios between India and Pakistan were as follows: 300:0 in 1985, 700:0 in 1990, 1300:0 in 1992, 1100:200 (or 5.5:1) in 1996, 1500:520 (or 2.9:1) in 2000, and 2038:640 (or 3.2:1) in 2004. If India's plans for the indigenously produced Arjun tank had succeeded ten years ago, as hoped, the gap by 2004 might have been even wider.

Adding weight to India's side of the ground force balance are the AIFVs, which increased from zero to 1600 in our period of review. Pakistan has no AIFVs. While AIFVs do not have anything like the firepower of a tank, they have considerably more firepower (e.g., a Russian BMP-1 AIFV has a 73 mm gun with an 800 meter range), typically, than Armored Personnel Carriers (APCs).[44] However, the principal function of both classes of vehicles is not to engage other

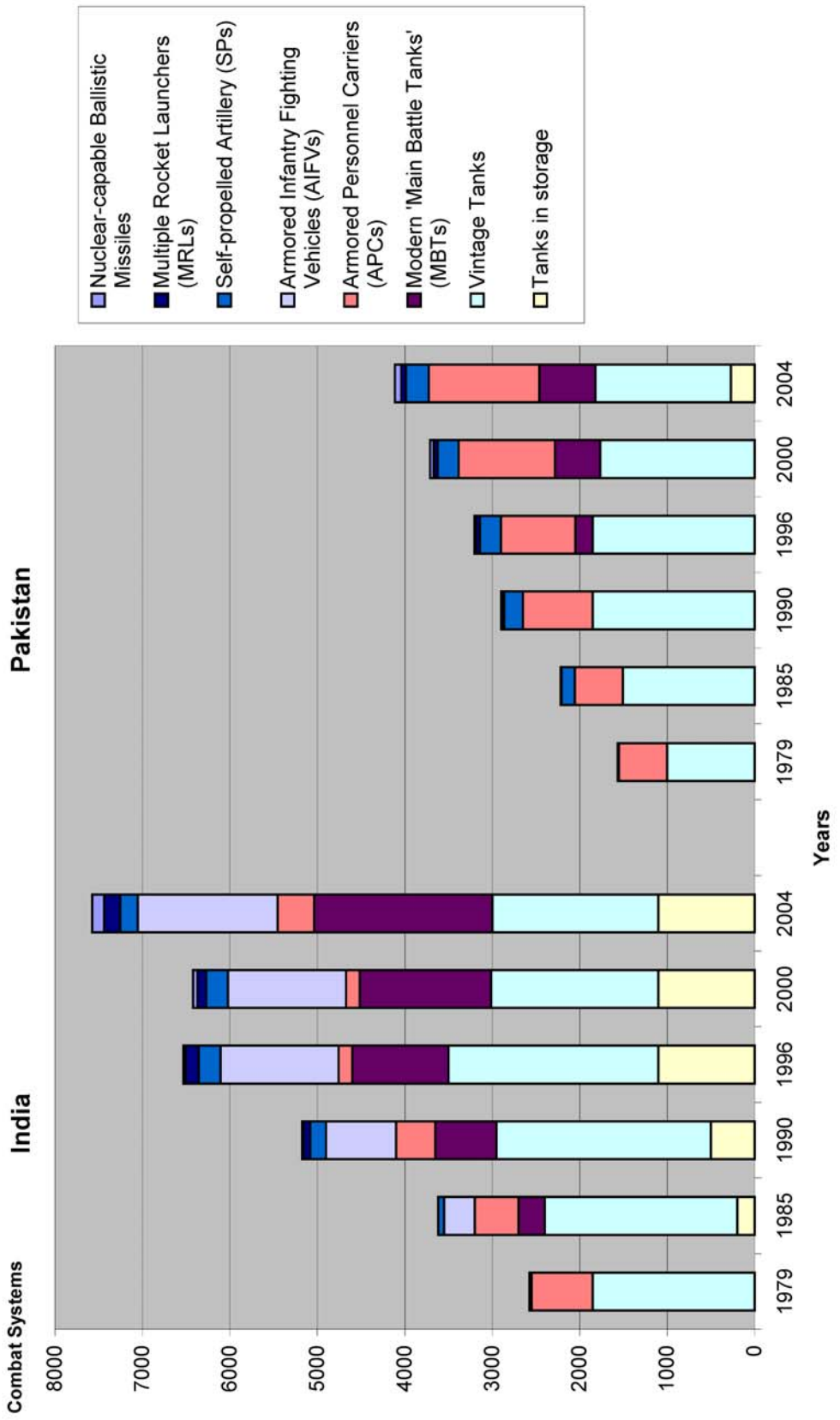
Ukrainian T-80UD (an upgraded Russian T-72) and the indigenous Al-Khalid, which is based on cooperation with China and Ukrainian engines, and similar to China's T-98.

[42] A finer grained analysis of each side's ground force combat equipment would compare towed artillery and mortars, anti-tank guided missiles, air defense guns, and surface to air missile systems (SAMs), as well as transport and support vehicles, but all of these types of equipment are omitted here, partly because of their variety and the complexity of analysis their inclusion would entail, and partly because the numbers India and Pakistan have of many of these systems are not reported.

[43] Both India and Pakistan have developed MBT production and assembly programs of their own, although it is not yet clear to what extent either will rely heavily on fielding its own models. India's Arjun program which relied on imported engines and other components has been plagued with difficulties, and recent reports suggest that India has decided to acquire and co-produce Russian T-90Ss instead of buying its own Arjun in large numbers. Pakistan's Al-Khalid program is actually based on a partnership with China for co-production of a version of China's T-98 (a tank which China meant to be an answer to the Soviet T-72), and with Ukraine for supply of heat-tolerant, 1200 horsepower diesel engines.

[44] Pakistan's Russian-origin BTR-70/80 APCs have a 14.5 mm gun, and the German UR-416 has a 7.62 mm gun.

Chart 5. Composition of India's and Pakistan's Ground Forces - Armor, Artillery and Ballistic Missiles, 1979 - 2004



armored vehicles but rather to support rapid ground movement of infantry units for maneuver warfare, and in this feature both armies have made considerable headway in the last few years.

Chart 5 shows that India and Pakistan began acquiring self-propelled artillery at about the same time (the early 1980s), and have stayed roughly on a par in that category, another component of maneuver warfare. Their towed artillery, howitzers, and mortars dwarf both sides' self-propelled artillery numbers and firepower, however.[45] India has achieved and maintained a significant edge of about 3:1, however, in multiple rocket launchers.

Surface to surface ballistic missiles have been added to this chart because in their conventional role they are usually thought of as a means of long-distance artillery bombardment. But India and Pakistan have left ambiguity about whether their shortest-range ballistic missiles will exclusively use conventional warheads or may also be nuclear-tipped (see Table 2, above). The numerical inventory figures for such missiles are based on extremely fragmentary unofficial information, and are not necessarily reliable, but the suggestion here is that India's inventory for ballistic missiles that exceed 100 kilometers in range-capability may be about three times Pakistan's.

Pakistan may have an inventory edge over India at present in the longer-range ballistic missile category, since India appears only to be beginning production of longer-range and presumably nuclear ballistic missiles, such as the Agni 2 and 3. India may open up a wide lead in missiles, however, as it ramps up its production of the hybrid cruise/ballistic BrahMos missile – whose range is said to be 290 kilometers (this could be extended considerably in an air-delivered version). The BrahMos may be built in several versions, one being a mobile, ground-based (land-attack) cruise missile. If conventionally equipped, the BrahMos would weigh more significantly in the conventional balance than the ground-launched ballistic missiles – because of its versatility and presumed accuracy. If India has mastered nuclear warhead designs in the 200-300 kilogram weight class – which is not yet self-evident – BrahMos could be equipped with nuclear warheads as a nuclear strike vehicle.

[45] Modern long-range field artillery is capable of traveling well over 30 kilometers, the distance of Lahore from the Indian border.

Naval Capabilities

While Pakistan's ground forces still maintain a degree of balance for defensive purposes in the Punjab theater, the stark naval imbalance rivals or exceeds that between air forces. (See Chart 6 below.) Pakistan's twin vulnerability to India's much larger naval forces is their ability to bottle up Pakistan's naval ships at Qasim Naval Base adjacent to Karachi – until recently Pakistan's sole naval base – and to blockade commerce and refined oil supply through Pakistan's only international class shipping port at Karachi on the Arabian Sea coast. India in fact did blockade Karachi in the 1971 Indo-Pakistan War, and recently threatened to twice, in the Kargil conflict of 1999, and during the 2001-2002 confrontation. Pakistan's small navy could not mount a significant counter-threat to India's principal ports, such as Mumbai (Bombay), far to the south on India's western coast.

Pakistan has had plans for decades to reduce this vulnerability, but the staggering costs have prevented rapid progress. In 2000, however, Pakistan completed construction of the first phase of an alternate naval base (Jinnah Naval Base) at Ormara, 240 kilometers northwest of Karachi.[46] In 2001, Pakistan also won a Chinese commitment to assist in the construction of a new deep-water port at Gwadar – further along the same Makran coast and close to the border with Iran – to be capable of handling cargo ships up to 100,000 tonnage and oil tankers up to 200,000 tonnage capacity from the nearby Persian Gulf.[47] A port at Gwadar would modestly relieve the threat that Indian naval blockade of Karachi could be decisive in an armed conflict, but completion of the Gwadar facility is still several years off.[48]

While these port developments do not appear, officially, to have Chinese *military* involvement, future Chinese stakes in the flow of energy from the Gulf when tied to sensitive Pakistani coastal facilities could add a new dimension to the balance in the subcontinent, complicating the once-simple Indian offensive military planning against Pakistan's coastal infrastructure. At the conventional and possibly nuclear level, however, Pakistan probably will face new standoff threats to this southern

[46] The first phase construction of the new base is reported to be capable of berthing 8 ships and 4 submarines. See "Jinnah Naval Base at Ormara," *National News Bureau*, June 22, 2000, available at: <http://www.fas.org/news/pakistan/2000/000622-pak-ptv1.htm>.

[47] Visiting Pakistan in May 2001, China's prime minister pledged $240 million to assist in the development of a deep-water port at Gwadar and $200 million more to build a 650 kilometer coastal highway linking Karachi and Gwadar, possibly in return for certain Pakistani concessions on Chinese mineral extraction in Baluchistan. See Commander Vijay Sakhuja, "Sino-Pakistan Maritime Initiatives," Article No. 730, April 10, 2002, on the Institute of Peace and Conflict website: <http://www.ipcs.org/Pak_articles2.jsp?action=showView&kValue=301&country=1016&status=article&mod=a>. A senior former Indian intelligence official has written that China was lured to make these pledges by Pakistani promises to grant China concessions to build a naval signals monitoring facility on the Mekran coast (opposite the Strait of Hormuz chokepoint on the Arabian Sea), and to count on berthing facilities for its naval vessels, at Ormara as well as Gwadar. See B. Raman, "Chinese Activities in Balochistan," South Asia Analysis Group, paper no. 259, June 18, 2001, available at: <http://www.saag.org/papers3/paper259.html>.

[48] For an up to date assessment of the strategic significance of Chinese assistance in constructing a deep water port in Pakistan at Gwadar, see Ziad Haider, "Baluchis, Beijing, and Pakistan's Gwadar Port," *Georgetown Journal of International Affairs*, Winter/Spring, 2005, pp. 95-103.

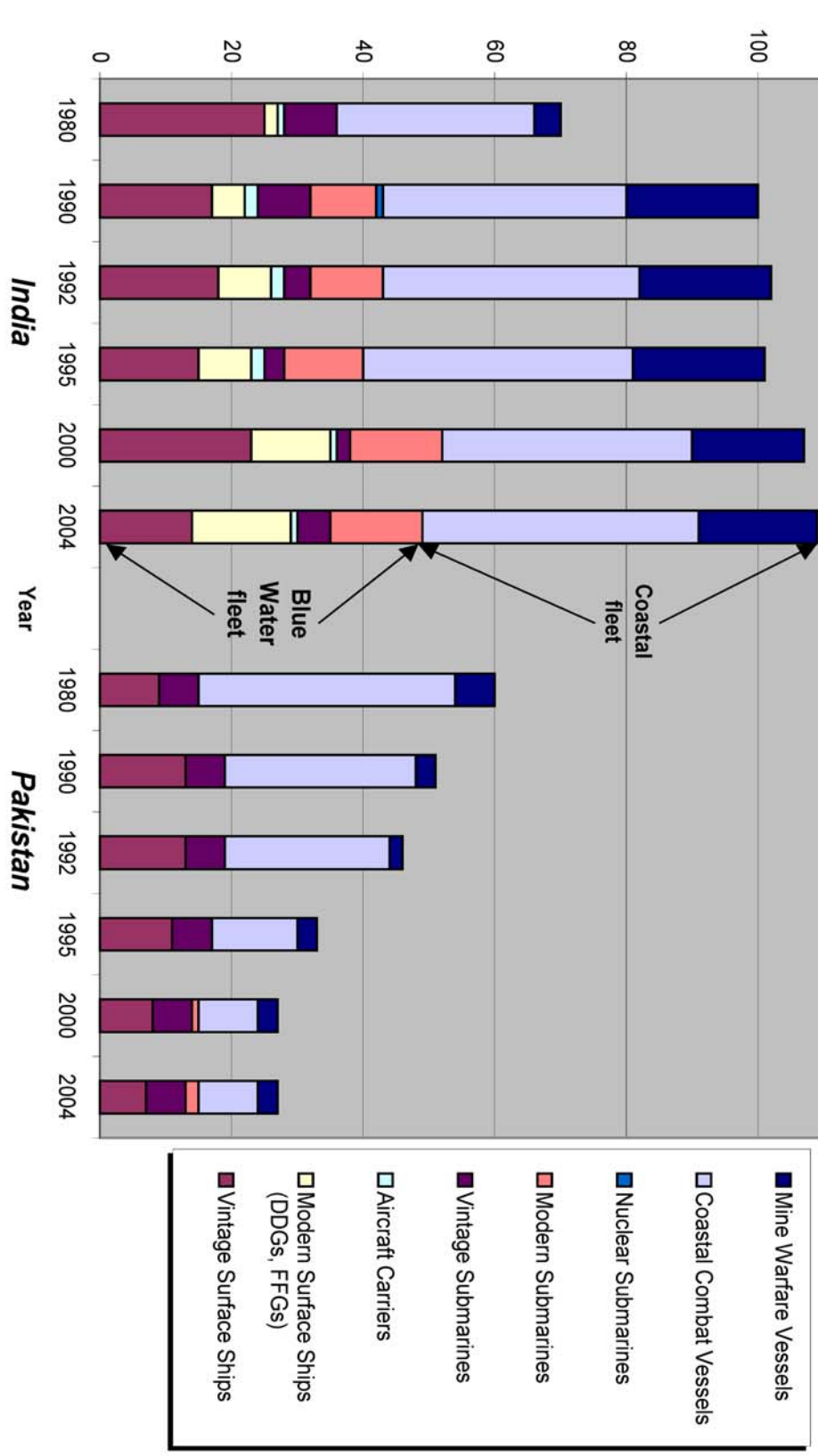


Chart 6. India's and Pakistan's Naval Fleets, 1980-2004

infrastructure from India's future acquisition of nuclear-capable ship-launched (and possibly submarine-launched) cruise missiles.

Chart 6 on "India's and Pakistan's Naval Vessels, 1980-2004" distinguishes 'blue water' and 'coastal' fleets as well as 'vintage' and 'modern' vessels for both countries. Both of India's fleets have grown, though on a surprisingly gradual trajectory, given the Defense Ministry's more ambitious plans – probably restrained, however, by the huge costs of naval modernization. India's blue water fleet, for instance, expanded from 36 vessels in 1980 to 52 in 2000, a 45% increase, before dropping marginally to 49 vessels in 2004, after phasing out several vintage vessels. India's coastal fleet grew from 34 vessels in 1980 to 55 in 2000, a 62% increase, and increased somewhat further to 60 vessels in 2004.

Pakistan's entire naval fleet actually shrank during that period from 60 vessels in 1980 to 27 in 2004, by 55% overall, although Pakistan's blue water portion began and ended with 15 vessels, after a small blip in the early 1990s. The ratio of Indian to Pakistani blue water vessels went from 2.4:1 in 1980 up to 3.47:1 in 2000, and down slightly to 3.27:1 in 2004. More important, India's blue water fleet integrated 29 'modern' vessels during that period (including 15 modern destroyers and frigates, and 14 modern diesel submarines), while Pakistan had added only two 'modern' vessels by 2004, both being French-designed diesel submarines. India's Navy, with its more modern surface and submarine fleets and the one operational aircraft carrier it currently deploys – if concentrated opposite Karachi and elsewhere along Pakistan's coast – probably could either bottle up or overwhelm Pakistan's naval forces. [49] In assessing the naval imbalance, it is important to be aware of the increasing offensive potential of the new equipment – particularly ship-to-ship and land-attack missiles, but also anti-submarine warfare aircraft – that is being integrated on naval platforms, and that soaks up a significant part of India's naval capital investment. Pakistan also seeks to increase the offensive potency of its naval assets, but falls far short of India's naval combat and expansive surveillance equipment (see, also, next section, on Reconnaissance and Surveillance Capabilities). Furthermore, India has acquisition plans underway that could boost the lethality of its navy in quantum leaps, at least against Pakistan.

In early 2004, India apparently finalized an agreement with Russia (first announced in 2000) that would transfer to India the 40,000 ton Kiev-class Russian aircraft carrier, *Admiral Gorshkov*, after refitting it in Russia, while providing a fleet of MiG-29 fighter aircraft for the deck – all of which will take at least until 2008-09.[50] Long secret, it is now known that India also has had an indigenous nuclear-powered submarine (called the Advanced Technology Vehicle, or ATA) development project underway for at least two decades, and is seeking Russian assistance for the nuclear power plant. In preparation for the production and launch of a prototype, India may also lease from Russia two Akula-class nuclear-powered cruise missile submarines (as India once leased a Soviet nuclear-powered Charlie-class cruise missile submarine in the 1980s). Once the full import of these plans, and India's slow but steady progress in domestic construction of frigate, destroyer, and diesel-powered submarine class ships is taken into consideration, the net trend in the Indian naval superiority over Pakistan can be expected to widen the currently great disparity even more substantially over time.

[49] The current Indian aircraft carrier, the *Viraat*, formerly was the 28,500 ton *HMS Hermes* which the UK supplied to India in 1986, was recently refitted, and is equipped with 15-20 Harrier vertical take-off and landing (VTOL) fighters and 15 Sea Eagle helicopters.

[50] India once had plans to have at least one aircraft carrier each for the eastern and western maritime areas off its coasts. It has retired one older aircraft carrier. By the time the *Gorshkov* is in service with India, the *Viraat* will be at the end of its currently projected service life.

Reconnaissance and Surveillance Capabilities

An important further element of asymmetry in the India-Pakistan conventional military balance is in the fields of airborne and space-based military reconnaissance and surveillance. A large share of Indian airborne capability happens to be attached to the Navy (ostensibly for wide-area, maritime reconnaissance) rather than to the Air Force, but its surveillance functions vis-à-vis Pakistan can be regarded as multi-purpose in nature. Chart 7 on "India's and Pakistan's Naval Air and Airborne Warning, 1980-2004" provides just a glimpse into this field from the naval angle, along with numbers of the two countries' naval combat aircraft.[51] India's combat air and maritime surveillance capabilities are fairly impressive by local standards and numerically outweigh Pakistan's roughly 6:1. If qualitative factors are taken into consideration, the imbalance is considerably greater.

While India has recently ordered three sophisticated Israeli Phalcon AWACs aircraft (to be delivered in 2007), the chart reflects the fact that India had acquired airborne surveillance in the 1990s, albeit with less sophisticated capabilities than Phalcon will provide. India has long used its Air Force MiG-25R aircraft, which are capable of flying above the maximum altitude of most interceptor aircraft as well as most surface-to-air missiles, for photographic flights over Pakistan. As mentioned earlier, in July 2004 Pakistan struck a deal with Sweden to acquire seven Erieye turboprop AWE&C aircraft, which will give Pakistan a partial answer to India's cross-border surveillance capabilities with the Phalcon.

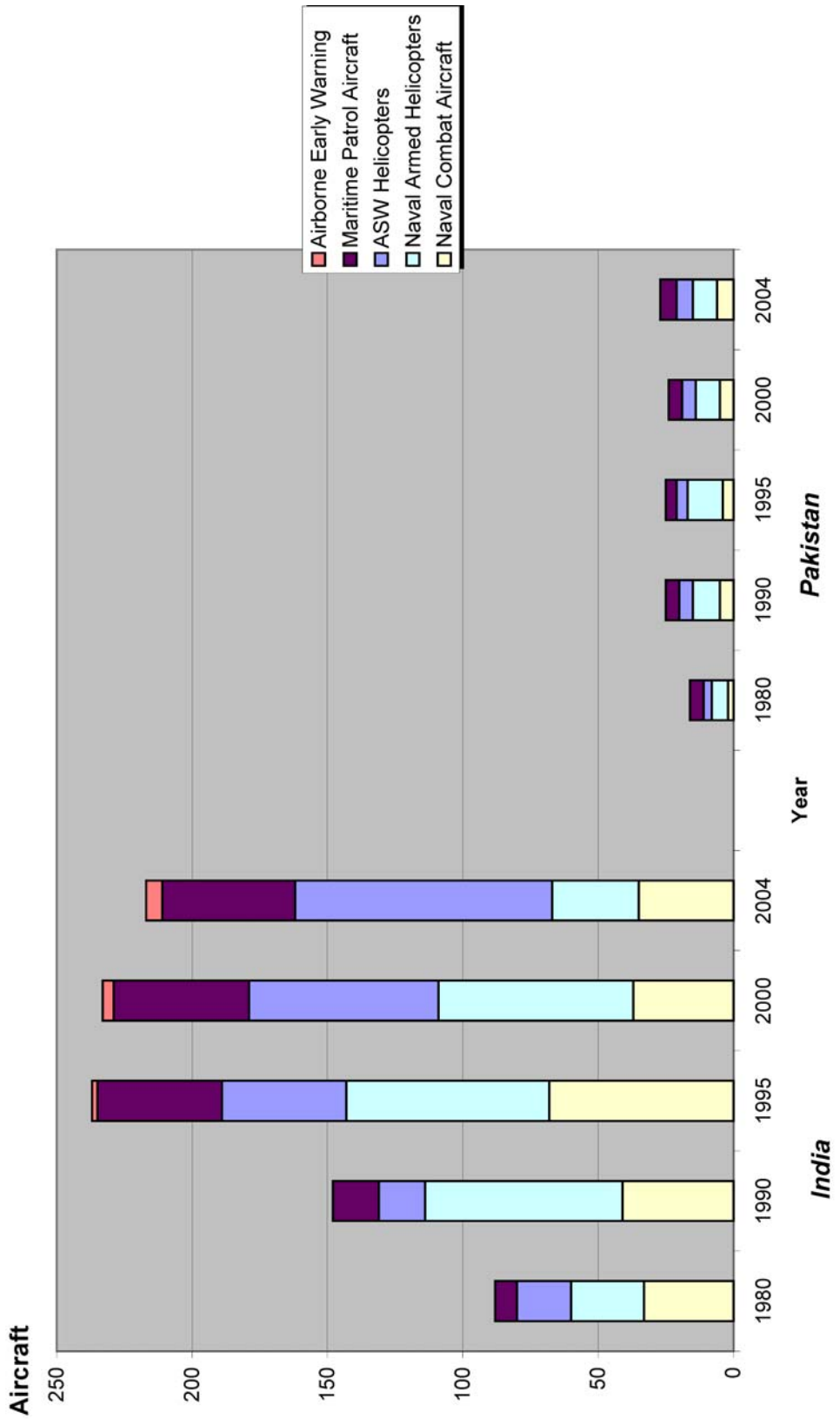
India has also had the first of its own high-resolution imaging satellites (the IRS, or Indian Remote Sensing, series) aloft since the late 1990s, with the IRS-C1/1D pair's output producing a respectable 5.8 to 6 meter resolution by 1998, sufficient to pinpoint tanks and other major military vehicles, and aircraft, on the ground.[52] In 2001, India launched a Technology Experimental Satellite (TES) that is claimed to have an image resolution of about 1 meter, with speculation that it has spying applications.[53] Pakistan seeks equivalent surveillance capabilities but

[51] Naval combat aircraft are also included in Chart 4 reflecting the overall balance in air forces. Their depiction in Chart 7 is illustrative, in this context, of the naval portion of the air balance, and is not to suggest that this segment of each side's air combat capability should be counted twice. Note, however, that in 2004 India's Ilyushin-38 (*May*) "maritime reconnaissance" aircraft were approved for the use of Sea Eagle anti-ship missiles and thus are now "combat aircraft" as well as reconnaissance and surveillance platforms.

[52] See Chidanand Rajghatta, "Eye in the Sky – Indian Satellites Reach 'Peek' Form," *Indian Express*, March 2, 1999; and Chapter 18 in *Air University Space Primer*, Rest of World (ROW) Satellite Systems," pp. 14-15 on India, may be found at: <http://www.globalsecurity.org/space/library/report/2003/primer.htm>.

[53] See R.K. Radhakrishnan, "Three Satellites Placed in Orbit," *The Hindu*, on-line edition, October 23, 2001.

Chart 7. India's and Pakistan's Naval Air Combat and Airborne Warning Aircraft - 1980-2004



probably will need several years to acquire or develop them.[54]

High-quality space images of many parts of the world became available commercially, from various international sources, in the 1990s.[55] India and Pakistan both are assumed to be utilizing these services for detailed military surveys of their opponent's defense infrastructure and force dispositions.[56] But since defense establishments are unlikely to view commercial imagery as substitutes for real-time or near real-time surveillance and early warning, competition to deploy systems that close those gaps is bound to continue. India already has a large advantage over Pakistan in this field.

Nuclear deterrent stability is exceptionally sensitive to real-time asymmetries in surveillance capability. Between two countries that rely for part of their nuclear deterrence on short- and medium-range ballistic missiles, nuclear stability could also be put out of reach by asymmetries in anti-ballistic missile defense capabilities.

This is yet another area in which India is endeavoring to open up a gap that Pakistan probably cannot fill, at least not satisfactorily or at affordable cost. India sought the Arrow missile defense system from Israel, but Washington apparently denied approval of Israeli transfer of Arrow interceptor systems. Israel has, however, been free to sell India the Green Pine phased array radars that are designed for the Arrow's detection and tracking of incoming ballistic missiles. These radars are also useful for other Indian air defense applications. The US itself has been willing to discuss missile defense issues with India in the context of the U.S. Army's Patriot missile defense system, but has not yet showed its hand on whether it would seriously consider making either version of this interceptor system available to India.[57]

[54] According to GlobalSecurity.org, Pakistan is cooperating with a number of other countries to put an observation satellite into space: "In January 2000 the official Iranian news agency IRNA reported that the Asian Research Satellite would be launched by mid-2000 by China. The Asian Research Satellite is [the] first multilateral research satellite built by Iran in collaboration with Pakistan and four other Asian countries (China, Korea, Indonesia and Mongolia). The manufacturing and launching of the satellite is estimated to cost around $40 million. The satellite will be launched from China and will be set in orbit at 800 km from the earth. In fact, by late 2004 there had been no further reports of this satellite." Available at: <http://www.globalsecurity.org/space/world/iran/earth.htm>. Separately, on "Small Multimission Spacecraft (SMMS)," Global Security.org reports: "China, Thailand and Iran are working on a joint Small Multimission Spacecraft (SMMS) devoted to civilian remote-sensing and communications experiments. The SMMS satellite will carry a low-resolution charge-coupled device (CCD) camera and an experimental telecommunications system. The SMMS will give Iran and Pakistan a semi-autonomous space-imaging capability. The 470-kg. (1,034-lb.) spacecraft is set for launch on a Chinese booster, by 2004-05, into a 650-km. (400-mi.) Sun-synchronous polar orbit." <http://www.globalsecurity.org/space/world/china/smms.htm>.

[55] William J. Broad, "Commercial Use of Spy Satellites to Begin; Private Ventures Hope for Profits," *New York Times*, February 10, 1997, read on-line at: <http://www.fas.org/irp/news/1997/civvy-spysats.html>; and Vernon Loeb, "Candid Cameras Cover the Bases," *Washington Post*, December 15, 2002, read on-line at: <http://www.globalsecurity.org/org/news/2002/021215-eye01.htm>.

[56] See "Govt Nod Mandatory [in India] for Buying Satellite Images," *The Statesman* (India), August 9, 2001, available at: <http://www.globalsecurity.org/org/news/2001/010809-image.htm>.

[57] Patriot anti-ballistic missile systems currently exist in second and third generations, with either point-defense or limited area defense capabilities against short- and medium-range offensive missiles. The intercept range and kill technologies for Patriot-II and Patriot-III interceptors are distinct, the former relying on proximity explosive warheads operating up to high, endo-atmospheric altitudes, and the latter employing more sophisticated kinetic (hit-to-kill) warheads whose homing sensors operate efficiently only above the atmosphere.

Conclusions and Implications

As the charted data and trends analyzed in this study indicate, the conventional military imbalance between India and Pakistan has increased steadily in India's favor over the last two to three decades. Pakistan has experienced some areas of military modernization, but the worsening in Pakistan's military situation, relatively speaking, is unmistakable. This relative decline has continued despite Pakistan's comparatively high defense expenditure burden and access to relatively inexpensive arms from China, its most reliable supplier. Capability gaps that favor Indian conventional military superiority over Pakistan probably will widen further over the coming years, due to India's size, larger resource base, greater capacity for advanced military technology absorption, and wider access to arms suppliers.

Tested nuclear weapons on both sides in 1998 added a potent deterrent factor on Pakistan's side that could have been expected to compensate to a large degree for the decline of its relative weight in the conventional military balance. Pakistan's nuclear capability could have been expected to narrow India's freedom to use force to exploit its growing conventional superiority. But the political and military stability many initially expected of nuclearization in the subcontinent did not automatically materialize. Instead, both sides have used military force or threatened its use below the nuclear threshold.

In Pakistan's case, its use of force was over Kashmir, at the subconventional level against India forces near the northern LOC at Kargil and Dras. In India's case, it has used conventional force to repel Pakistan's intrusion at Kargil, but also threatened to expand the Kargil conflict before it was defused with American help, and then, following the attack on Parliament in December 2001, threatened both limited and major conventional warfare against Pakistan with a prolonged full mobilization over ten months. In this context, one could hardly help but be concerned that the outbreak of a conventional war in which India seriously exploits its upper hand in the conventional imbalance, or that is further inflamed by cross currents of terrorist attack, would be a recipe for escalation that could spiral into nuclear war.

Questions were raised at the outset regarding the scope of nuclear deterrence in South Asia today in light of the conventional military imbalance. With conventional military superiority, India has no need to exercise its nuclear deterrent to dissuade Pakistan from deliberately launching an offensive conventional war across the border from its side. India can be self-assured that any Pakistani military adventure across the international border in the Punjab or Rajasthan sectors would be stopped by methodical counterattacks, or isolated by end runs, before it has penetrated any distance. No one would doubt that India's nuclear deterrence assures India in peacetime that no mainstream Pakistani regime would contemplate or threaten a surprise nuclear attack against India – nullifying any scenario of an 'attack out of the blue.' Given the conventional military imbalance, the question then is: Does Pakistan's *nuclear* capability exert deterrence against India's actions at the *conventional* level? Is Pakistani nuclear deterrence sufficient to curb India's potential use of force in one or more discrete conventional, offensive actions

against Pakistan? If Pakistan's nuclear capacity does have deterrent effects against India' use of conventional force, how extensive and reliable are those effects?

The short answer based on recent events, at least in the absence of hard facts about what was on the minds of policy-makers on both sides, could be read either way. Pakistan's nuclear deterrent may have had some deterrent effect against India's conventional action, but this judgment is highly uncertain, with worrisome implications for bilateral nuclear stability. India's full-scale mobilization in 2001-2002 suggests that Pakistan could not count on the simple fact of its strategic nuclear retaliatory capacity to deter Indian preparation to go to full-scale conventional war against Pakistan. At least Pakistan could not rely on that assumption at that time, given the severity of India's reaction to the provocation of the terrorist attack on Parliament and India's perceived new opportunities from the precedents set by the initial U.S. 'War on Terrorism' campaign against the Taliban in Afghanistan. More generally, Pakistan's nuclear deterrent has not driven the Indian military establishment to plan only for a traditional defensive posture or to give high priority to analysis of how nuclear war can be avoided.

Instead, the Indian establishment has embarked on a systematic analysis of how limited conventional military operations could be pursued against Pakistan, calibrated to bypass Pakistani compulsions to escalate and thus to keep the level of conflict well below the nuclear threshold. Calculations of this kind by Indian analysts are by definition hypothetical, of course, and have no way of ensuring that Pakistani reactions will fit their preconceptions, comply with their limited intentions, or leave it to India to manage nuclear risks unilaterally on the comfortable assumption that it possesses escalation dominance. Pursuing these offensive operational ideas leads, logically, to high-risk courses of action and scenarios that could unfold in unpredictable (or predictably uncontrollable) ways. But the fact that they are even contemplated highlights the uncertain deterrent scope of Pakistan's nuclear retaliatory capacity. This in turn leads back to what should be of deep concern about an increasingly lopsided conventional military imbalance between two nuclear adversaries.

The conventional military imbalances and the trends analyzed here constitute structural military instabilities that are bound in the course of sustained conflict to generate escalatory pressures on both sides that can be expected to drive the nuclear threshold down, to lower levels. If Pakistan's *conventional* military deterrence against India were by itself sufficient to make Indian attack implausible save under the most severe circumstances, one would posit that the nuclear threshold is relatively high and that there are significant grounds for a fairly high level of nuclear stability. If Pakistan has insufficient conventional deterrence and if its nuclear deterrent does not fill the conventional gap enough to negate Indian temptations to use (or threaten to use) its superior conventional military power offensively against Pakistan, one would expect nuclear stability conditions to be tenuous. That is, it would be reasonable to suppose once a conventional conflict has actually gotten underway, as losses are suffered and escalation of conventional options ensues, that the nuclear threshold would drop to a much lower level, and the level of nuclear instability would be correspondingly high. These concerns would be amplified by the nature of the major weapons systems and trends in enhanced combat capability now embedded in the conventional imbalance, based on the last two or three decades of military modernization. Perhaps the most important enhanced conventional combat capabilities are accelerated rates of mobilization, heavier firepower, greater precision in targeting, increased mobility of ground forces, greater payloads and operating range of strike aircraft, enhanced communication and battlefield surveillance, real-time coordination of

corps-sized armored and special forces, and a practiced understanding of the use of combined arms. The major India-Pakistan wars between 1947 and 1971 were relatively limited in duration, attrition, and collateral effects, and hard to sustain because of logistical and fuel supply bottlenecks. But the modernization of forces and logistics since 1971 have greatly increased the likely lethality, pace and sustainability of full-scale conventional warfare between India and Pakistan.

In this context, although Pakistan's ground forces are quite robust in their own right and could make Indian ground offensives very costly to India, the air force asymmetries illustrated earlier and Pakistan's lack of strategic depth suggest that if it is faced with a determined Indian air war of attrition, Pakistan could lose control of its air space in a matter of weeks if not days, and its then exposed ground forces could suffer major setbacks from Indian air attack. Such setbacks by themselves could amount to India crossing Pakistan's red lines, thus pushing its decision-makers up to the nuclear threshold.[58]

Equally if not more important, given the character of Indian air force doctrine, growing freedom of action in Pakistan's air space, and a well-designed plan for a sustained bombing campaign with its most potent ground attack aircraft, Indian could attempt a methodical but relentless preemption of Pakistan's strategic nuclear retaliatory capacity – by *conventional* means alone. An Indian air campaign would attempt to suppress Pakistan's air force and this would have the effect of targeting Pakistan's nuclear delivery aircraft and their support infrastructure. An Indian air campaign might, if Indian intelligence has detected and pinpointed the basing facilities and infrastructure, attempt to interdict Pakistan's mobile missile nuclear delivery systems and nuclear weapons production plants using conventional precision bombing alone. Successfully executing such a campaign and carrying it to a logical conclusion would be no easy task. But if such efforts were even incrementally successful, they would be bound at some point to cross Pakistani red lines and conceivably push Pakistani decision-makers past the nuclear threshold. Knowing that this could happen, Indian decision-makers necessarily would have begun their own preparations for the use of nuclear force, as a fallback should it become necessary. The conditions for nuclear escalation, by either side, would then be in place, and a variety of paths to such escalation can easily be imagined.

Offense-defense competition could introduce hair trigger forms of instability, a loss of control cannot be ruled out in future nuclear or military crises.

Acquisition trends could make these structural nuclear instabilities even more severe in due course. While the Indian acquisition of the Phalcon AWACS system will not be complete until 2007 and the day-to-day surveillance coverage provided by this system across the border may still have gaps, one effect of its deployment will be to make it more difficult for Pakistan to conceal any movement of its air delivered or mobile missile strategic assets. India's tactical warning time may become slightly longer and more precise, but the certitude for Pakistan of the penetrability of its strategic delivery systems may be brought into

[58] Former and serving Pakistani officials have posited certain benchmarks that point to the possible nature of Pakistani nuclear red lines. See Agha Shahi, Zulfiqar Ali Khan, and Abdul Sattar, "Securing Nuclear Peace," *The News*, October 5, 1999; and Gen. Khalid Kidwai's reported remarks to Italian visitors in "Nuclear safety, nuclear stability, and nuclear strategy in Pakistan," A concise report of a visit by Landau Network - Centra Volta, January 2002, further analyzed in Rodney W. Jones, "South Asia under the Nuclear Shadow: Is Stable Nuclear Deterrence Feasible?" in *The Friday Times* (Lahore), February 22-28, 2002.

question, at least by those who are professionally trained to assess worst case scenarios. To offset destabilizing pressures, Pakistan will be inclined to invest in compensating measures, such as the diversification of its delivery systems and adoption of methods to improve the concealability, survivability and penetrability of strategic assets.

To add to this trend of competitive technology acquisitions – elsewhere commonly known as 'arms racing', India may succeed eventually in acquiring and deploying anti-ballistic missile interceptor systems of some kind. While even an early generation missile defense system probably would not be in place for at least another decade, and may not be highly efficient, the obvious purpose and anticipated deployment will stimulate Pakistani efforts to devise counter-measures. These could involve acquisition of additional types of strategic delivery systems and development of aircraft and missile penetration measures. Since developing these measures would take time to execute, many uncertainties may be attributed to the effectiveness of the systems involved at any given point in time, and offense-defense competition could introduce hair trigger forms of instability, a loss of control cannot be ruled out in future nuclear or military crises.

Policy courses of action for the United States, the United Kingdom and other external powers are inevitably more complex to postulate and implement after two major regional countries have gone nuclear than they were earlier. The passing of the Cold War, the spread of other weapons of mass destruction, and the advent of new Western strategies responding to global terrorism add to this complexity. Thoughts are offered here in three areas, as points of departure. These pertain to political measures to reduce the main sources of conflict between India and Pakistan, factors for arms supplier states to weigh when they are in a position to influence the evolution of the military balance in South Asia and connected regions, and approaches to foster greater stability in India-Pakistan nuclear relations per se.

The structural factors that give rise to nuclear instability and higher likelihood of loss of control in crises clearly are less pressing on a day to day basis when political relations between adversaries are improving and temptations on both sides to experiment with the use of force are restrained by broader, positive objectives. The diplomatic thawing of the recent confrontations between India and Pakistan and the positive steps in negotiations that have gathered momentum since April 2003 are highly beneficial in shifting both countries away from warlike expectations, but need to be sustained. They are sensitive to international concerns but are particularly encouraging because the specific diplomatic initiatives and much of their content is self-generated by Pakistan and India.

How far the process that has been set in motion will dissolve the underlying conflict over (and within) Kashmir and lay a foundation for the resolution of that problem remains to be seen, but one can see evidence of new flexibility and subtle departures from long-frozen traditional positions are perceptible now for the first time. Talks over a wide range of national security-related subjects, including terrorism, as well as economic, trade, communications and humanitarian topics are proceeding with incremental but perceivably concrete results. Outside powers should encourage the leaders of both countries to strengthen their commitments to ensure that these developments stay on course and have a chance to solidify and mature. Those who have elevated either the flowering of democracy or counterterrorism to the forefront of their strategic policy concerns would do well to understand that in this region the coupled reduction of military tension and an honorable resolution of the dispute over Kashmir may yield bigger dividends than any other conceivable development.

Exercising sensible policy influence from outside over the evolution of the military balance in South Asia – where the conventional imbalance is likely to persist if not widen – should begin with a more sophisticated appreciation than has been evident lately of how the national security and strategic concerns of both Pakistan and India can be improved by positive means. Genuine respect for any country's national security concerns is easily recognized, particularly when cumulative actions are consistent with that understanding over time. To some extent, this requires Western leaders to resist entrapment in zero-sum rationales, whether these are inspired by shortsighted adversarialism or grandstanding to galleries within the region, or are concocted by expatriate lobbies at home. There are many avenues to work on constructive projects that reinforce security and popular recognition of outside support, including collaborative investment in energy security and pipeline projects. These should now catch up with the highly worthwhile military-to-military cooperation initiatives that have burgeoned within the region, although those of the future should continue to be scrubbed to reinforce their constructive purposes rather than the competitive agendas that some participants may strive to bend them to.

In thinking through principles of security provision in this new order, there can be no escape from the old verities that feeding military power with ill-considered arms supply or carefree transfer of sensitive technology cooperation is fraught with pitfalls. These areas of policy were applied in a particular fashion during the Cold War, but they have lost none of their general relevance in the post-Cold War era. Redressing gross conventional military imbalance in South Asia cannot be a general prescription for the future, but sensitivity to and restraint in worsening gaps by over attention to the desires of only one side, and attention to compensating for serious shortcomings that affect nuclear stability would be worthy of systematic attention from the advanced industrial countries as a whole. Foreseeably, the military technology areas of greatest concern with regard to military and nuclear stability in South Asia, besides the nuclear and delivery system domains themselves are space, surveillance, submarine, and missile defense technologies. It could well be prudent for the U.S. to develop its technology transfer plans in these areas in close consultation with major allies, as well as with Russia and China, although it may not be feasible or even wise to bring all of these channels together directly in every case.

Finally, working out intelligent measures to contribute directly to nuclear stability cries for additional attention. Most of the pathways to nuclear stability are available to India and Pakistan themselves, through dialogue, mutual adjustment, and special areas of cooperation – including, cooperative threat reduction. However, there may be ways in which the lessons learned and experience with best practices of the nuclear weapons states recognized by the Treaty on Nonproliferation of Nuclear Weapons (NPT) can be adopted as subjects of nuclear safety, security and stability discussion with Pakistan and India. This is a legally complicated area due to NPT restrictions that have the force

of international law, as well as other technology transfer restrictions that should not be transgressed, but dialogue and shared experience of certain kinds would be permissible. The recent International Institute of Strategic Studies paper on this subject[59] offers well crafted principles for nuclear security and stability dialogue, with examples and applications to South Asia. Thes principles could be a good point of departure for the development of new nuclear stability initiatives for South Asia, although they do not mention the most obvious nuclear stability principle of standing down threats of launching conventional war.

[59] See "Towards Nuclear Stability in South Asia: A Prospectus for Progress," *IISS Strategic Comments*, Vol. 11, Issue 1, February 2005, currently available on-line at: < http://www.iiss.org/>.