

Strategic Insight

The Risk of Inadvertent Nuclear Use Between India and Pakistan

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Although the Indian and Pakistani governments strongly desire to avoid a fourth war, the coercive diplomacy pursued by each side has brought them to the brink of major conflict on more than one occasion in recent years. Today tensions remain high, and war is a distinct possibility. Should hostilities break out, what are the chances that the fighting could be confined to the use of conventional military force? Although both Indian and Pakistani leaders would do everything in their power to avoid using nuclear weapons, there are three situations in which a large-scale conventional conflict between India and Pakistan could inadvertently escalate to nuclear warfare because of the nations' asymmetries in doctrine and military capabilities.^[1]

Conventional Force Comparison

The conventional military balance is tilted far in India's favor. India has achieved numerical and qualitative superiority in many military categories, particularly in mechanized ground forces and in attack aircraft. It has a two-to-one advantage in tanks and a three-to-one advantage in modern tanks. India also has true infantry fighting vehicles, giving its mechanized infantry much more firepower and mobility than the Pakistani infantry. The two-to-one overall advantage in aircraft grows to almost a six-to-one advantage when one compares just the most modern and capable aircraft - a category in which Pakistan lost its earlier edge after over a decade of U.S.-led international sanctions.^[2] This disadvantage is very significant because Pakistan has little strategic depth; that is, many of its strategic assets are close to its border with India.

Both India and Pakistan have offensively oriented conventional military doctrines. India has developed an offensive-defensive military doctrine that calls for aggressive offensive action to pre-empt or counter-attack the enemy. Currently, India is exploring the concept of limited conventional war based on the notion of strategic space between low-intensity conflicts and full-scale conventional war. This concept is fueled by political and public pressure within India to launch conventional military strikes against Pakistan in retaliation for Pakistan's alleged support of terrorism.^[3] The Pakistani army also relies on an offensive-defensive strategy, which is characterized by retaining adequate reserves at successive force levels, surprise, and aggressive leadership. This strategy calls for the Pakistan army to detect the initial enemy thrust, take effective counter measures to limit penetration, and simultaneously attack the adversary to capture or threaten a strategic objective.^[4]

Strategic Nuclear Balance

Each country possesses a stockpile of nuclear weapons components and could assemble and deploy several nuclear weapons within a few days to a week.^[5] The size, composition, and

operational status of each nuclear arsenal are closely guarded secrets, but sufficient public information exists to make general assumptions about the strategic balance in South Asia.^[6]

Assuming that the Cirus and Dhruva research reactors produce 25-40 kg of bomb-grade plutonium annually, by the end of 2002 India could have stockpiled between 280-600 kg of weapon-grade plutonium.^[7] Although India also has a program to produce highly enriched uranium (HEU), it is not known if the program has managed to produce weapon-grade HEU. Experts assess that India could require as little as 5 kg and as much as 7 kg of plutonium per weapon. Considering the worst- and best-case assumptions about Indian weapon design, it could possess enough fissile material for between 40 and 120 weapons, with 70 as the median estimate.

Unlike India, which relies on plutonium for its weapons, Pakistan's nuclear program is based on HEU. If Pakistan's Kahuta enrichment plant is able to produce 80-140 kg of weapon-grade uranium per year, Pakistan today could have 815-1230 kg available for weapons production. The amount required for a bomb is believed to be 12-25 kg, depending on the weapon design Pakistan employs. In addition, an unsafeguarded heavy-water research reactor recently constructed at Khushab produces plutonium that could be reprocessed to make a few nuclear weapons annually. Adding together its possible plutonium and HEU inventories, Pakistan could have enough fissile material to produce between 35 and 95 weapons, with 60 as the median estimate.

Indian and Pakistani Nuclear Weapon Capabilities

Estimate	Weapon-Grade Plutonium (kg)			Weapon-Grade Uranium (kg)			Weapon Capability		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
India	280	400	600	unknown	unknown	unknown	40	70	120
Pakistan	5	15	45	815	1020	1230	35	60	95

Each state has various aircraft and ballistic missiles that could be used to deliver nuclear weapons. In 2001, DOD assessed that India would most likely employ fighter-bomber aircraft for delivery because its ballistic missiles probably were not yet ready. The air force has several aircraft that could be employed for this mission, but the best suited would be the Jaguar, Mirage-2000, MiG-27, or Su-30. India has deployed short-range Prithvi 1 missiles that are capable of carrying a 1000 kg warhead (the presumed maximum size of a nuclear device), but because of Prithvi's restricted range, India will probably turn to its new solid-propellant Agni 1 missile, which has a 700-900 km range and was rushed into development after the 1999 Kargil conflict. The Agni 1 and the 2000-3000 km-range Agni 2 missile are likely to become India's preferred missile platforms when they become operational.

Pakistan has placed a high priority on acquiring ballistic missiles to offset India's conventional military advantages and to ensure reliable delivery of nuclear weapons. Although the Pakistan Air Force F-16 and Mirage 5 aircraft probably are capable of nuclear delivery, the liquid-fuel Ghauri 1 and 2 missiles developed with North Korean assistance, and the solid-fuel Shaheen 1 and 2 missiles developed with Chinese help, are more likely choices.^[8]

Potential Indian and Pakistani Nuclear Delivery Systems

	Aircraft	Range	Source	Status	
	(hi-lo-hi)				
India	Mirage-2000H	1205 km	France	2 squadrons, 35 planes in inventory	
	Su-30 MKI	3000 km	Russia	50 planes purchased, 18 in inventory	
	Jaguar S(I)	850 km	UK/France	4 squadrons, 88 planes in inventory	
	MiG-27 ML	500 km	Russia	214 planes in inventory	
	Missiles		Range	Source	Status and most recent test
	Prithvi 1 (SS-150)	150 km	indigenous		Army version, in service
	Prithvi 2 (SS-250)	250 km	indigenous		Air Force version, tested, in development
	Prithvi 3 (Danush)	350 km	indigenous		Navy version, failed test in 2000, in development
	Agni 1	700 - 900 km	indigenous		tested in January 2003, in development
	Agni 2	2000 - 3000 km	indigenous		tested in 1999 and 2001, in development
Agni 3	3500 - 4000 km	indigenous		in early development	
Pakistan	Aircraft	Range	Source	Status	
	(hi-lo-hi)				
	F-16 A/B	925 km	United States	32 planes in inventory	
	Mirage 5 PA	1300 km	France	50 planes in inventory	
	Missiles		Range	Source	Status and most recent test
	Hatf 1	80 - 100 km	indigenous		in service since mid-1990s
	Hatf 2 (Abdali)	180 km	indigenous/China		tested May 2002, in production
	Hatf 3 (Ghaznavi)	290km	Indigenous/China		M-11, tested May 2002, in service
	Hatf 4 (Shaheen 1)	600-700 km	indigenous/China		tested October 2002, in service
	Hatf 5 (Ghauri 1)	1300-1500 km	indigenous/DPRK		No Dong, tested in May 2002, in service
Hatf 5 (Ghauri 2)	2000 km	indigenous/DPRK		No Dong, tested in April 2002, in development	
Hatf 6 (Shaheen 2)	2000 - 2500 km	indigenous/China		not yet tested, in development	

India's draft nuclear doctrine, published in August 1999, is based on a retaliatory, no-first-use policy.^[9] The doctrine casts Indian nuclear forces principally as a deterrent against a nuclear attack on India. Pakistan has not publicly announced an official nuclear doctrine, but it is concerned with deterring India from taking advantage of its conventional superiority. Pakistan

appears to have adopted a nuclear first-use policy to deter India from using its conventional military superiority.^[10]

Survivability at Risk

Large-scale conventional warfare between India and Pakistan has the potential to threaten the survival of Pakistan's strategic nuclear forces. However, limited Indian attacks, such as a retaliatory strike on the ground or through the air, would not serve as a real threat to Pakistan's strategic weapon systems.

The asymmetries of strategic depth and offensive military capability give India an operational advantage, and may create a situation in which India's conventional ground or air forces come into contact with Pakistan's strategic nuclear forces. Pakistan's shorter-range Hatf 3/M-11 ballistic missiles must be stationed fairly far forward to reach strategic targets in India, perhaps leaving them vulnerable to both air and ground attack. The same is true of Pakistan's forward airbases, which are within easy striking distance of the border. This is a very troubling scenario because Pakistan places great emphasis on its strategic nuclear forces to deter a large-scale conventional attack by India. The survival of Pakistan's strategic forces is critical to Pakistan, and a threat to them could place pressure on Pakistan to launch a nuclear attack while the strategic forces are still intact and capable of making a credible impression upon India.

India's greater strategic depth allows it to disperse its strategic nuclear forces to areas beyond the normal range of enemy ground and air operations. Longer-range platforms, such as the SU-30 aircraft and the Agni 2 missiles, further decrease Indian vulnerability. When combined with India's presumed retaliatory-only nuclear doctrine, this would seem to minimize the possibility of Pakistan degrading India's strategic deterrent capability so severely that India is pushed into a "use them or lose them" situation.

Command and Control Threatened

Large-scale conventional warfare between India and Pakistan also could threaten vital strategic command and control functions. This is particularly true for Pakistan since India has made a major investment in intelligence gathering and precision-strike capability.^[11] There also may be a significant overlap between Pakistan's normal conventional operational command and control structures that would be subject to attack in a large-scale war and its strategic command and control structure. If Pakistan lost command and control of its strategic forces, would national command authorities consider ordering the use of remaining strategic nuclear forces while they could still affect some degree of deterrence?

Pakistan's presumed inability to identify and attack India's C4I probably precludes any appreciable loss of command and control over India's strategic force during a conventional war. This is reinforced by a several factors, including India's reliance on negative control features, and its greater strategic depth. A conventional attack on India's command and control structures probably would cause only a delay in retaliatory nuclear strikes, and not lead to the inadvertent use of nuclear weapons.

There are no indications that India has pre-delegated nuclear release authority. However, New Delhi might find that its strategic command and control functions are unable to cope with the effects of a full-scale conventional war. Under such circumstances India's senior leadership may have to cobble together a system while under pressure. There are no indications that Pakistan has pre-delegated nuclear release authority. However, it too may find that its strategic command and control functions are unable to cope with the effects of a full-scale war. Pakistan would be under tremendous pressure to create a workable system if its strategic command and control

system is at risk. Pakistan's reliance on nuclear deterrence could force it to adopt pre-delegation of nuclear release authority if there were no other method to ensure delivery.

Fear of Pre-emption

Large-scale conventional warfare between India and Pakistan almost certainly would include air and ballistic missile attacks. Attacks by these inherently dual-use systems have the potential to be interpreted as pre-emptive attacks to destroy or neutralize the adversary's nuclear capability. This is especially true for Pakistan since India has invested heavily in improving its intelligence gathering and precision-strike capability. India also has made a major investment in defensive measures, including a limited ballistic missile defense.^[12] Pakistan may believe that India is trying to gain the ability to launch a pre-emptive attack and deny Pakistan the ability to counter with an effective second-strike with a reduced force. Could this concern lead Pakistan to adopt a launch-on-warning or launch-under-attack posture where any Indian air- or ballistic missile attack could be interpreted as a pre-emptive strike and cause Pakistan to launch its nuclear weapons?

Pakistan's limited ability to identify and attack India's strategic nuclear assets probably precludes any appreciable loss of India's retaliatory capability even if Pakistan launched a pre-emptive attack. This condition is reinforced by India's greater strategic depth, and its superior air and ballistic missile defenses. An air- or ballistic missile attack on India probably would elicit a strong response, but probably not a nuclear response.

Conclusion

India and Pakistan do not want war; and they certainly do not want to fight a nuclear war. As strong as this desire is, however, New Delhi and Islamabad are caught in a spiral of tension and mistrust that could cause the next regional crisis to flair into armed conflict. If India and Pakistan do find themselves engaged in a large-scale conventional war, escalation to a nuclear exchange probably would be averted because of the strategic balance that now obtains. However, their asymmetrical conventional force capabilities and doctrines could create pressures for one side to launch nuclear weapons, even if they would prefer not to. The three scenarios of inadvertent war outlined above show how India's superior conventional military power might so seriously degrade the Pakistan national command authority's confidence in its nuclear deterrent that a nuclear war begins that nobody wants. Even if the risk of inadvertent nuclear war is judged to be low, steps should be taken to ensure that India and Pakistan do not become embroiled in even a limited war. The United States can play a constructive role in the region by taking steps to help keep the peace and reorienting its arms transfer policy to help stabilize the military balance.

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For related links, see our [South Asia Resources](#) and [WMD Proliferation and CounterProliferation Resources](#).

References

1. For a more detailed elaboration of the points contained in this essay, see Stephen A. Smith, [Assessing the Risk of Inadvertent Nuclear War Between India and Pakistan](#), NPS Master's Thesis (December 2002).
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5. [U.S. Department of Defense, Proliferation: Threat and Response](#), January 2001, 21-30 (PDF).

6. More detailed information on the India-Pakistan strategic balance can be found in Peter R. Lavoy, "Fighting Terrorism and Avoiding War in South Asia," forthcoming in [Joint Forces Quarterly](#), Autumn 2002.

7. This estimate is calculated by taking the low, medium and high figures contained in David Albright, [India and Pakistan's Fissile Material and Nuclear Weapons Inventory, End of 1999](#) (11 October 2000), and adding 75-120 kg plutonium to update the estimate to 2002.

8. The information used to compile this table comes from recent issues of *Jane's Sentient Security Assessment—South Asia*; *Jane's All the World's Aircraft*, *Jane's Strategic Weapon Systems*, and various media reports.

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