

Pakistan's Tactical Nuclear Weapons: Operational Myths and Realities

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Introduction

In April 2011 Pakistan conducted a test of a new nuclear-capable short-range missile, the HAFT IX (also referred to as the Nasr). Pakistan's Inter-Services Public Relations Directorate described the Nasr as a "quick response weapon"¹ designed to support "full spectrum deterrence" by countering India's growing conventional force advantages.² Four missile canisters are contained on each transporter erector launcher (TEL).³ The Nasr is reported to have a range of 60 kilometers⁴ as well as a terminal guidance system for improved accuracy.⁵ The development of short-range, nuclear-capable systems might entail parallel efforts to build small nuclear warheads that could be employed by a variety of new and existing platforms, possibly including cruise missiles and artillery against advancing Indian conventional forces. Some argue that notwithstanding the small diameter of the Nasr—roughly one foot—Pakistan might be pursuing boosted fission, sub-kiloton yield devices suitable for use on the battlefield. To have high confidence in such yields, Pakistan

¹ ISPR, No PR94/2011, Press Release, Inter Services Public Relations, April 19, 2011, https://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1721.

² No PR133/2013, Press Release, Inter Services Public Relations, September 5, 2013, https://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=2361.

³ Strategic Weapon Systems (Pakistan), Jane's Sentinel Security Assessment - South Asia, October 6, 2014.

⁴ No PR94/2011, Press Release, Inter Services Public Relations, April 19, 2011, https://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1721.

⁵ Tamir Eshel, "Pakistan Tests HATF IX Nuclear-Capable Short Range Tactical Guidance Weapon," Defense Update, April 27, 2011.

might have to resume nuclear testing.⁶

Some might argue that the introduction of short-range ballistic missiles is simply the latest manifestation of an ongoing, but largely stable, arms competition in South Asia. Indeed, India and Pakistan have managed to avoid major conventional or nuclear war in the past decade while doubling the size of their nuclear arsenals. Over time, however, Pakistan's efforts to develop and produce short range nuclear-capable systems will seriously undermine deterrence stability and escalation control on the subcontinent. The introduction of short-range, nuclear-capable systems will also make crisis management more challenging and more imperative than ever. Given its historic role as crisis-manager in South Asia, and its enduring interest in preventing the use of nuclear weapons, U.S. concerns about Pakistani nuclear weapons remain quite high. In a 2011 review, the Obama administration concluded that the stability of Pakistan's nuclear stockpile is one of two long-term strategic objectives in South Asia along with the defeat of al Qaeda.⁷ The danger posed by Pakistan's growing nuclear arsenal, especially short-range systems, is amplified by Pakistan's growing weaknesses in governance, persistent internal instability, and the potential for clashes with India.

During the Cold War, the United States and the Soviet Union defined land-based strategic nuclear delivery vehicles (SNDV) as those with ranges greater than 5,500 kilometers (km). Nuclear warheads atop SNDVs could span oceans and hold each other's urban populations and targetable strategic forces at risk. Weapon systems with much shorter ranges were defined variously as "battlefield," "non-strategic," or "tactical" nuclear

⁶ Jeffrey Lewis, "Pakistan's Nuclear Artillery?" *Arms Control Wonk*, December 12, 2011. <http://lewis.armscontrolwonk.com/archive/4866/pakistans-nuclear-artillery>.

⁷ Karen DeYoung, "New estimates put Pakistan's nuclear arsenal at more than 100," *Washington Post*, January 30, 2011. http://www.washingtonpost.com/world/new-estimates-put-pakistans-nuclear-arsenal-at-more-than-100/2011/01/30/ABNNG6Q_story.html.

weapons. Both India and Pakistan reject this classification system for the subcontinent. Government officials in both countries have stated that the use of any nuclear weapon, regardless of the range of its delivery vehicle, will have strategic consequences. This essay will use the term “tactical nuclear weapons” to describe weapon systems, such as the Nasr, that are designed with a limited range and small explosive yield for use against an opponent’s conventional forces. Their purpose is to deter an attack by a conventionally stronger force, or destroy those forces should deterrence fail.⁸ Shyam Saran, the head of the Indian National Security Advisory Board, observed that Pakistan’s decision to develop tactical nuclear weapons “mimics the binary nuclear equation between the U.S. and Soviet Union which prevailed during the Cold War.”⁹ Senior Pakistani military officers have privately acknowledged to this author that they have examined the NATO experience as they continue their development of a national military strategy, doctrine, and associated force structure that includes tactical nuclear weapons.¹⁰

Consequently, this analysis will consider the historical experiences of the U.S. and Soviet deployment of tactical nuclear weapons during the Cold War. It will build on new analysis which marshals important insights from Cold War-era military journals and other publications. This essay focuses on the operational complexities and risks associated with deploying tactical nuclear weapons in proximity or as part of conventional-maneuver warfare. It will also focus on how tactical nuclear weapons will likely increase pressure to escalate during any future crisis. The essay will demonstrate that assumptions regarding the

⁸ Michael Krepon, “Pakistan's Nuclear Strategy and Deterrence Stability,” in *Deterrence Stability and Escalation Control in South Asia*, ed. Michael Krepon and Julia Thompson (Washington: Stimson Center, 2013), 65-92.

⁹ Indrani Bagchi, “Strike by Even a Midget Nuke Will Invite Massive Response, India Warns Pak,” *The Times of India*, 30 April 2013, <http://timesofindia.indiatimes.com/india/Strike-by-even-a-midget-nuke-will-invite-massive-response-India-warns-Pak/articleshow/19793847.cms>.

¹⁰ Discussions with senior Pakistani military leaders.

use of tactical nuclear weapons to compensate for perceived conventional shortcomings are misguided. A review of the American experience during the Cold War highlights the practical and operational challenges to implementing a strategy that relies on tactical nuclear weapons.

Pakistan's pursuit of nuclear weapons

Pakistan's desire to become a nuclear-armed state is rooted in a conviction to respond to strategic developments in India. The nuclear program evolved into “the most significant symbol of national determination and a central element of Pakistan's identity.”¹¹ It is estimated that Islamabad maintains a stockpile in excess of 100 warheads.¹² For safety and security reasons all of its weapons are believed to be stored in various locations throughout the country rather than directly with delivery vehicles. In recent years, efforts to expand the nation's nuclear arsenal have included the construction of two additional plutonium-producing nuclear reactors at the Khushab nuclear complex to ensure an adequate supply of nuclear material for weapon production.¹³ Pakistan already had two production facilities at this site that produced an estimated 22 kilograms of plutonium annually, which is roughly the amount required for up to four nuclear weapons.¹⁴ Peter Lavoy, former U.S. national intelligence officer for South Asia, observed in 2008 that “despite pending economic catastrophe, Pakistan is producing nuclear weapons at a faster rate than any other country in

¹¹ Feorz Hassan Khan, *Eating Grass – the Making of the Pakistani Bomb* (Stanford, California: Stanford University Press, 2012), 2.

¹² SIPRI Yearbook 2014 (Oxford University Press: Oxford, 2014), <http://www.sipri.org/research/armaments/nuclear-forces>.

¹³ “Khushab Complex,” Nuclear Threat Initiative, <http://www.nti.org/facilities/940/>.

¹⁴ Peter Crail, “Pakistan's Nuclear Buildup Vexes FMCT Talks,” *Arms Control Today*, March 2011, http://www.armscontrol.org/act/2011_03/Pakistan.

the world.”¹⁵

Most observers trace Pakistan’s decision to produce tactical nuclear weapons to developments following the 1999 Kargil War. Units of the Pakistani Army’s Northern Light Infantry regiment achieved an element of surprise when its forces crossed the Kashmir divide into the Kargil-Dras sector. This provocative infiltration was detected by India in early May, and resulted in a limited war that only ended after intense pressure was placed on Pakistan by the United States to withdrawal its forces. In many ways this crisis was a watershed in Indo-Pakistani security relations because it demonstrated that even the presence of nuclear weapons on both sides did not dampen the possibility of conflicts.¹⁶

During the Kargil War, Indian military officials were frustrated by their inability to rapidly deploy large-scale conventional forces along their border in response to this incursion. Two years after Kargil the Indian Army was again embarrassed by the largely futile Operation Parakram in 2001-2002. The mobilization of massive Indian conventional forces along its western front in the aftermath of the terrorist attack against the Parliament in December 2001 took nearly a month. By then the United States had prevailed on the government in New Delhi to show restraint, and Pakistan had significantly improved its defenses.¹⁷

Its inability to mount a conventional military response against Pakistan in 1999 and 2001-2002 prompted the Indian Army to consider a new strategy to improve its ability to deploy forces quickly and take advantage of its conventional advantages over Pakistan. In

¹⁵ Karen DeYoung, “New Estimates Put Pakistan's Nuclear Arsenal at More Than 100,” *The Washington Post*, 31 January 2011, <http://www.washingtonpost.com/wp-dyn/content/article/2011/01/30/AR2011013004136.html>.

¹⁶ Benjamin Lambeth, “Airpower at 18,000: The Indian Air Force in the Kargil War,” *Carnegie Endowment for International Peace*, September 2012, <http://carnegieendowment.org/2012/09/20/airpower-at-18-000-indian-air-force-in-kargil-war>.

¹⁷ Raja Pandit, "Cold Start in focus, but does it exist?" *Times of India*, 2 December 2010, <http://timesofindia.indiatimes.com/india/Cold-Start-in-focus-but-does-it-exist/articleshow/7025745.cms>.

2004, advocates within India made public references to a new military concept, which was labeled as “Cold Start” or “Proactive Operations.”¹⁸ These advocates sought a reorganization of the Indian Army into smaller integrated battle groups that would be prepared to launch rapid simultaneous conventional attacks against Pakistan along multiple avenues of advance. Following two major exercises (Vijayee Bhava and Sudarshan Shakti), then-Indian Chief of Staff, General V.K. Singh, argued in early 2012 that what had taken the Indian Army fifteen days to accomplish in 2001 could now be done in seven days. He further asserted that by 2014 the Army's aim was to reduce that time to three days.¹⁹ Advocates of these shifts in Indian military posture argued that agile conventional campaigns could be fought under the nuclear threshold, even when operations were carried out 50 to 80 km inside Pakistani territory.²⁰

There is considerable skepticism in India about these plans. In the decade since it was proposed, Cold Start has faced serious conceptual, logistical, and political challenges.²¹ India has not enacted necessary defense procurement reforms needed to equip Cold Start, and chronic inter-service rivalries within the military render joint operations aspirational at best. Most importantly, Cold Start does not appear to have political support required for it ever to be authorized. The Government of India did not respond militarily to the 2008 Mumbai attacks, and Chief of Army Staff (COAS) V.K. Singh claimed in 2010 that “there’s no such

¹⁸ “Indian Army Commanders Discuss ‘Cold Start,’” Daily News (Pakistan), April 16, 2004. <http://archives.dailytimes.com.pk/main/16-Apr-2004/indian-army-commanders-discuss-cold-start>.

¹⁹ “Current Indian Strategy,” *Economic Times of India*, January 16, 2012.

²⁰ See, for example, Gurmeet Kanwal, “India’s Cold Start Doctrine and Strategic Stability,” *IDSAC Comment*, June 1, 2010. http://www.idsa.in/idsacomments/IndiasColdStartDoctrineandStrategicStability_gkanwal_010610.

²¹ See, for example, Shashank Joshi, “India’s Military Instrument: A Doctrine Stillborn,” *The Journal of Strategic Studies*, Vol. 36, No. 4, 512–540, 2013.

thing as Cold Start.”²²

Despite the evident difficulties in implementing Cold Start, the prospect of a limited war, combined with New Delhi's growing conventional force advantages, interest in developing ballistic missile defense capabilities, and potential to achieve air superiority create serious security dilemmas for Rawalpindi. Pakistan's military views Cold Start as a goal that New Delhi intends to achieve over the next several years and to which Rawalpindi must find and deploy a response. Pakistan's operational challenges during a crisis would be complicated by its need to reposition forces from its western frontier to counter an Indian attack. These forces would have to be transported by rail, a challenging prospect as their movement would be vulnerable to attack by increasingly-capable Indian aircraft or special operations forces. Pakistan's security interests in Afghanistan and the security challenge posed by the Pakistani Taliban in the Federally Administered Tribal Areas (FATA) and Waziristan, particularly after the departure of U.S. forces from Afghanistan by 2016, will demand resources from the Pakistani military be deployed in the western part of the country that would normally be positioned along the border with India. Rawalpindi's security concerns also extend to Baluchistan, where India is allegedly fomenting unrest.

Pakistan's perceived need for tactical nuclear weapons is rooted in these challenges, which are all magnified by growing Indian conventional capabilities.²³ As one general explained to this author, “the wider the conventional asymmetry, the lower the nuclear threshold.”²⁴ The perceived need for tactical nuclear weapons is rooted in a “deterrence gap”

²² “India has no 'Cold Start' doctrine: Army chief,” *The Economic Times* (India), December 2, 2010, http://articles.economictimes.indiatimes.com/2010-12-02/news/28400780_1_indian-army-doctrine-army-chief.

²³ Toby Dalton and Jaclyn Tandler, “Understanding the Arms "Race" in South Asia,” *Carnegie Endowment for International Peace*, September 2012, <http://carnegieendowment.org/2012/09/13/understanding-arms-race-in-south-asia/dtj0>.

²⁴ Mark Fitzpatrick, *Overcoming Pakistan's Nuclear Dangers* (London: The International Institute for Strategic

below the strategic threshold. Without tactical nuclear weapons, Pakistan faces the “grim option of either calling for a massive and suicidal nuclear attack against Indian cities in response to India's limited conventional aggression or surrendering.”²⁵ Tactical nuclear weapons therefore offer the prospect of “throwing cold water on Cold Start.”²⁶ Stephen Cohen observed that Pakistani military exposure to “Western nuclear strategizing” has resulted in current nuclear planning and doctrine that “very much resembles American thinking with its acceptance of first-use and the tactical use of nuclear weapons against onrushing conventional forces.”²⁷ As was the case during the Cold War, the production of tactical nuclear weapons in Pakistan will likely precede the formulation of associated military doctrine and operational planning.

Down-side risks

A relationship exists between the types of nuclear weapon delivery vehicles in a nation’s arsenal and the impact they have on crisis stability and escalation control. If the nuclear forces of India and Pakistan are designed and postured for a reliable, second strike capability, then the addition of new weapon systems or the replacement of older systems need not alter overall deterrence stability. The acquisition of tactical nuclear weapons, however, could increase the likelihood for rapid escalation during a crisis or war and disrupt deterrence stability.²⁸ Some Pakistani strategists have acknowledged that the introduction of

Studies, 2014), p. 32.

²⁵ Dr. Zafar Nawaz Jaspal, "Tactical Nuclear Weapons: Deterrence Stability between India and Pakistan," http://www.nps.edu/Academics/Centers/CCC/PASCC/Publications/2012/2012_002_Jaspal.pdf.

²⁶ Multiple conversations with Pakistani senior officers.

²⁷ Stephen Philip Cohen, *The Idea of Pakistan*, (Lahore: Vanguard Books, 2005), 102.

²⁸ Charles L. Glaser, *Analyzing Strategic Nuclear Policy*, (Princeton, New Jersey: Princeton University Press),

tactical nuclear weapons into the ongoing competition with India “taxes the strategic stability and thereby could jeopardize deterrence stability.”²⁹

Deterrence is the power to prevent, discourage, or dissuade a potential adversary from taking a particular course of action. It can be summarized by the following equation:

$$\text{Deterrence} = \text{Capability} \times \text{Credibility}$$

The capability residing in nuclear weapons also requires command and control networks to convey nuclear orders, security of the weapons systems prior to use, as well as associated launchers, communications, intelligence gathering, and target analysis modeling. Missile testing and the public announcement of national security strategies, redlines, training exercises, and military doctrines are essential aspects of the “credibility” portion of this equation.

Pakistan's decision to develop and produce tactical nuclear weapons could, therefore, represent a shift in deterrence thinking away from one focused on a “doomsday” or “massive retaliation” approach to a more nuanced targeting strategy and threat analysis. This could be construed as a shift from a deterrence strategy focused on “deterrence through punishment” that holds Indian cities hostage in time of crisis. It could also imply a strategy of “deterrence through denial” that attempts to convey to Indian military leaders that a conventional attack would be futile. Pakistani spokespersons have begun using the formulation of “full spectrum deterrence” and “flexible deterrence options” to describe their nuclear posture.³⁰ Some experts believe this now portends a shift from Pakistan's “minimum credible deterrence” to

1990, 46.

²⁹ See, for example, Jaspal, 2.

³⁰ ISPR Press Release, May 29, 2012, https://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=2074.

one that actually considers nuclear warfighting.³¹

In formulating a deterrence strategy that includes the possible use of tactical nuclear weapons, Pakistan has determined that, given growing Indian advantage in conventional forces, Islamabad cannot commit itself to a policy of “no first use” of nuclear weapons.³² Instead, Pakistan has maintained doctrinal ambiguity to engender uncertainty in the minds of Indian decision-makers. General Khalid Kidwai, former Director General of Pakistan's Strategic Plans Division, came the closest to articulating an official nuclear-use doctrine for Pakistan when, in an interview with Italian researchers in 2002, he outlined the following as nuclear red-lines in a conflict with India:

- India attacks Pakistan and conquers a large part of its territory (space threshold).
- India destroys a large part of either Pakistan's land or air forces (military threshold).
- India proceeds to the economic strangulation of Pakistan (economic threshold)
- India pushes Pakistan in political destabilization or creates a large scale internal subversion in Pakistan (domestic destabilization).”³³

Lessons from the Cold War

The development of tactical nuclear weapons by Pakistan to confront growing

³¹ Michael Krepon, "Pakistan's Nuclear Strategy and Deterrence Stability," in *Deterrence Stability and Escalation Control in South Asia*, ed. Michael Krepon and Julia Thompson (Washington: Stimson Center, 2013), p. 44.; Shashank Joshi, “Pakistan’s Tactical Nuclear Nightmare: De ‘ja’ Vu?”, *Washington Quarterly*, 36:3, 2013, 159-172.

³² Rifaat Hussain, *Nuclear Doctrines in South Asia*, London, United Kingdom: South Asian Strategic Stability Unit, 2005, 14; “Kayani doesn't back Zardari's 'no-first-use' nuclear-policy: WikiLeaks,” *Times of India*, May 6, 2011, <http://timesofindia.indiatimes.com/world/pakistan/Kayani-doesnt-back-Zardaris-no-first-use-nuclear-policy-WikiLeaks/articleshow/8179491.cms>.

³³ Paulo Cotta-Ramusino and Maurizio Martellini, “Nuclear safety, nuclear stability and nuclear strategy in Pakistan,” January 21, 2002, <http://www.centrovolta.it/landau/content/binary/pakistan%20Januray%202002.pdf> Christopher Clary, *Thinking about Pakistan's Nuclear Security in Peacetime, Crisis, and War*, New Delhi, India: Institute for Defence Studies and Analyses, August 2010, 28. See also Rajaram Nagappa, Arun Vishwanathan, and Aditi Malhotra, *Hatf-IX/ NASR - Pakistan's Tactical Nuclear Weapon: Implications for Indo-Pak Deterrence* (Bangalore, India: National Institute of Advanced Studies, July 2013).

conventional superiority by India is similar, but not identical, to the challenge that confronted the United States during the Cold War. The U.S. military sought to develop its own stockpile of tactical nuclear weapons as well as associated doctrines and operational plans to blunt a Soviet conventional offensive in Central Europe. Over time, many, if not most American military planners realized the enormous operational and practical challenges associated with the effort to integrate nuclear fire planning and operational maneuvers in an effort to enhance deterrence. Pakistani leaders and military planners might usefully consider these problems when contemplating the impact such weapons have on stability, particularly during a crisis.

While analogies are useful analytical tools, they are by definition imperfect, and it is important to point out the differences between the U.S.-Soviet Cold War experiences as compared to the India-Pakistan context in the 21st century. First, India and Pakistan have no intervening terrain between them, whereas the United States and Soviet Union were planning the use of tactical nuclear weapons largely on the territory of East and West Germany. Second, the United States ostensibly planned to consult with its NATO partners prior to initiating the use of such weapons and actually deployed a significant number of tactical nuclear weapons to American “custodial detachments.” These were relatively small units stationed with allied delivery units. Upon the receipt of duly authenticated nuclear command orders they would have transferred weapons to an allied delivery unit. No such system of allied collaboration exists in South Asia. Third, the United States and USSR never fought a direct war with each other during the Cold War, though they were involved in several "proxy" conflicts. India and Pakistan have fought four wars since independence, one since acquiring nuclear weapons.

Fourth, the United States and the USSR did not use extremist groups to conduct

attacks on each other's soil. Pakistan has employed these tactics against India, and claims that India has, as well. Some analysts have concluded that Pakistani military leaders rely on their nuclear deterrent as a cover for waging low-intensity warfare against New Delhi in Kashmir and elsewhere.³⁴ During the Cold War, leaders in the United States and USSR fully understood that it would be folly to "contract out" the use of violence to extremist groups that might not be controllable. In the South Asian context this has profound implications for managing deterrence. This has not been the case in Pakistan, where a dramatic attack on Indian soil by groups that have found safe haven in Pakistan might well result in an Indian conventional retaliation which in turn could trigger a Pakistani decision to resort to nuclear weapons.

Comparing and contrasting Cold War experience with South Asian dilemmas with regard to tactical nuclear weapons might be particularly useful in four areas: military doctrine, operational aspects, peacetime stockpile safety/survivability in peacetime, and technology/cost.

Doctrine

"Doctrine" refers to how armed forces are to fight tactically; how tactics and weapons systems are to be integrated; and how forces are to be trained, deployed, and employed in combat. Doctrine is not absolute or rigid, but must be continuously reevaluated in light of improvements in technology and changes in the threat environment. From a military standpoint, doctrine for the use of tactical nuclear weapons must be operationally credible so

³⁴ Cohen, Stephen P., *Shooting for a Century: The India-Pakistan Conundrum*, p. 103, (Washington: Brookings, 2013); S. Paul Kapur, "India and Pakistan's Unstable Peace: Why Nuclear South Asia Is Not Like Cold War Europe," *International Security*, Vol. 30, No. 2 (Fall 2005), 127–152.

as to enhance deterrence. Consequently, it is logical to believe that any professional military force would proceed in an analytical fashion to integrate a new system (such as tactical nuclear weapons) into its overall operational planning. Such an analysis would seek to maximize the “capability” and “credibility” portions of the deterrent equation. In the case of American Cold War thinking, the employment of tactical nuclear weapons was to be considered when one or more of the following conditions existed: (1) reinforcements, combat support, and combat service support were not available to sustain the force, (2) survivability of the force was in question, to include nuclear weapons and delivery systems attrition, (3) there was evidence of an impending nuclear strike by the enemy, and (4) future operations required the additional combat power of nuclear weapons.³⁵

Some experts argued that several if not all of these conditions would have existed at the very onset of any conflict between NATO and the Warsaw Pact. Likewise, Western military strategists were almost unanimous in their view that the use of tactical nuclear weapons, if necessary, would have had to occur prior to the point where NATO conventional forces had been excessively attrited.³⁶ Consequently, it was widely believed by U.S. defense experts that NATO could not lose conventionally and expect to win with nuclear weapons.³⁷ This “use them or lose them” dilemma clearly placed increased pressure on escalation during the Cold War and would also be the case in any crisis involving India and Pakistan.

The need to initiate battlefield nuclear use prior to the collapse of the defense is, therefore, important for two primary reasons. First, the defense must still be strong enough so

³⁵ U.S. Department of the Army, *FM6-20 Support in Combined Operations*, Washington, DC: U.S. Printing Office, 1977, 6-17.

³⁶ NATO Information Service, *The North Atlantic Treaty Organization - Facts and Figures*, Brussels: NATO Information Service, 1981, 139.

³⁷ General Sir Robert Close, *Europe Without Defense?* New York: Pergamon Press, 1979, 27. See also Johan Holst, ed., *Beyond Nuclear Deterrence*, New York: Crane, Russak, and Company, Inc., 1977, 279.

that an attacker is forced to mass his forces in order to have any hope of breaching the defense—thus presenting large, profitable targets.³⁸ Secondly, the military significance of the use of nuclear weapons on the battlefield must be related to the defender's ability to then exploit their detonation to restore the situation to at least the "status quo ante." In NATO's case, this meant, at a minimum, the restoration of the international border. Consequently, NATO's employment of tactical nuclear weapons was not intended to be simply a "signal flare" in the event that the conventional defense was totally lost. Instead, the use of tactical nuclear weapons was supposed to result in concrete and finite gains on the battlefield. Such an outcome was unlikely during the Cold War. If Pakistan's use of tactical nuclear weapons is not as a signal flare, and instead is designed to achieve military gains, this outcome is as unlikely in contemporary South Asia as during the Cold War.

In 1973 the U.S. Army published a new policy for the limited use of nuclear weapons which attempted to incorporate NATO's "Flexible Response" doctrine and the Provisional Guidelines for the Employment of Nuclear Weapons which had been agreed within the Alliance. It distinguished five general categories for the constrained use of nuclear weapons by the U.S. Army: (1) demonstration, (2) limited defensive use, (3) restricted battle area use, (4) extended battle area use, and (5) theater wide use.³⁹ Planning for these contingencies was largely conducted at the Army corps headquarters level.

In planning for a U.S.-Soviet nuclear crisis, once a Corps Commander decided that his situation was rapidly deteriorating, and many (if not all) of the criteria previously outlined had either occurred or were about to occur, he would initiate a "request" for the "release" of

³⁸ John M. Collin, *U.S.-Soviet Military Balance*, New York: Pergamon Press, 1980, 320.

³⁹ U.S. Department of the Army, *Deployment and Employment Policy for Tactical Nuclear Weapons*, Washington, D.C.: Office of the Deputy Chief of Staff for Operations and Plans, 25 April 1973. Cited in Jean D. Reed, *NATO's Theater Nuclear Forces*, Washington, D.C.: National Defense University, 41.

nuclear weapons. This request would be passed to the National Command Authority (NCA). The issuance of a request presented an enormous problem for the development of doctrine, since the timing of such a request was dependent on the respective Corps Commander's ability to foresee the future course of the battle so that the request for release could be made far enough in advance of the actual necessity to employ nuclear weapons.

Models were created during the Cold War to depict the "request/release" sequence. These models consistently failed to provide a sound depiction of the required complex operation. Many experts believed this was due to a lack of understanding of how tactical nuclear war would actually progress.⁴⁰ Even the best operational modeling concepts did not allow for the introduction of developments that could possibly or likely occur. The process between the NCA and tactical echelons (even when political factors were ignored) was seldom modeled dynamically with respect to the ground battle. During Cold War exercises some prior release was normally assumed so escalation was not played as part of decision making as a conventional war unfolded. Non-technical effects of tactical nuclear weapons, especially regarding command, control, and communications as well as tactical unit integrity were also not depicted.⁴¹ Furthermore, the effect of catastrophic damage to an intermediate headquarters on overall operational cohesiveness was rarely if ever examined.

Prior to their actual use, positive control of nuclear weapons—the assurance that nuclear weapons would be used when ordered by a designated officer or official—was maintained by a series of mechanical/electronic devices (referred to as "Permissive Action Link" or PALs) and established security procedures. Release, or the authority to use nuclear weapons, would be conveyed from the NCA for all weapons through the operational chain of

⁴⁰ Lawrence Dondero, *Theater Force Mix Issues*, McClean, Virginia: General Research Corporation, 1976, 8.

⁴¹ *Ibid*, 72.

command. This was accomplished by the use of the Nuclear Release Authentication System (NRAS). This system comprised an established set of guidelines for operations, and a means of authenticating messages as to their veracity by use of code books and/or sealed authenticators to alter a unit's nuclear readiness posture. Trained operators were assigned at all intermediate levels to receive, act, and relay message traffic.⁴²

Negative control—the assurance that weapons would not be used prior to release by the NCA—was also maintained by the use of the “two-man rule” and the presence of permissive action links (PALs) on all tactical nuclear warheads. The “two-man rule” was a command directive that any time access to nuclear weapons or control orders was authorized, at least two individuals properly cleared and trained in the task being performed would be present to ensure that no unauthorized act took place. PALs were mechanical or electromechanical devices which, when installed on the warhead, positively disabled the weapon by interrupting the assembly or firing sequence. A warhead equipped with PALs could only be used by enabling the device or by applying the correct combination to the lock and removing it from the warhead.⁴³ All of the steps in the command chain were deemed necessary to ensure adequate control and maintain the maximum possible degree of security against accidental or unauthorized use. This process could greatly slow down and complicate the effective employment of tactical nuclear weapons when deemed necessary.

During the Cold War, American doctrine for tactical nuclear weapons release was designed to seek approval for the employment of a discrete number or “package” of weapons. The “package” was to be employed for a specified period of time, at particular

⁴² U.S. Department of the Army, *Coordinating Draft of TC 6-50-2 Nuclear Operations*, Ft. Sill Oklahoma: U.S. Army Field Artillery School, 1981, 4-7. See also LTC William M. Carrington (USAF), "Limited Defense Options," *Field Artillery Journal*, April 1977, 40.

⁴³ U.S. Department of the Army, *FM 100-50 Operations for Nuclear Capable Units*, Ft. Monroe, Virginia: U.S. Army Training and Doctrine Command, 1979, 3-1 to 3-3.

geographic locations, in accordance with any other additional constraints established by the NCA in consultation with other Alliance members. Additional constraints could include placing limits on the maximum yield that could be used or adjusting targets to avoid damaging population centers.⁴⁴ While little is known about its operational planning, it would not be surprising if Pakistan followed similar procedures.

The package was the creation of the Corps Fire Support Element (FSE). It included their best efforts to plan for the use of weapons on certain targets that presented themselves, likely enemy locations, or avenues of approach. The FSE served as the focal point in performing the mission of “fire planning” (or target selection) and the additional mission of “weapons employment” (or the calculation of which weapon to use on a selected target). Packages were designed to “contain enough weapons to achieve a desired objective;” and the objective was to change the tactical situation decisively.⁴⁵ Such planning for tactical nuclear weapons use had to include procedures to warn friendly units about impending nuclear employment and efforts to maintain accurate, up-to-date information on the civilian population so as to preclude collateral damage to populated areas to the maximum degree possible.

For these reasons, American military planners realized that nuclear fire planning had to be integrated very closely with the conventional scheme of ground maneuver.⁴⁶ Five variables were critical in this effort. First, the maneuver commander had to ensure that weapons to be employed were the right type, number, and size. They also had to have been transferred to the delivery units (missile or artillery batteries) that could execute the package

⁴⁴ U.S. Department of the Army, *FM 100-5 Operations*, Washington, D.C.: U.S. Government Printing Office, 1982, 10-7 to 10-9.

⁴⁵ *Ibid*, 6-10 and 6-10.

⁴⁶ U.S. Department of the Army, *FM 6-42 Field Artillery Battalion Lance*, 9-2.

once authority to employ them had been granted. This would likely require repositioning nuclear weapons and associated launchers throughout the corps sector to ensure mission responsiveness once release was granted. Second, targets had to be prioritized. If additional restraints were placed on the total number of weapons that could be employed, the most important targets would be the ones that were struck first.⁴⁷ Third, fire planning had to be sensitive to the survivability of the entire fire support system (target acquisition, target employment, planning, coordination and post-strike analysis).⁴⁸ Fourth, all efforts had to be made, as noted above, to preclude “excessive damage to population centers while employing the largest yields on probable enemy locations within the remaining areas.”⁴⁹ Thus, information had to be continuously available about the flow of refugees and the creation of evacuation centers. Last, the fire planning process had to consider that release might not be granted in time to be consistent with other tactical plans or could be denied entirely. Tactical operations could not be solely dependent on the availability of nuclear fire support,⁵⁰ and non-nuclear strike operations had to be planned. During repeated field training exercises throughout the Cold War, American military planners discovered significant problems with this doctrinal process that would have only been exacerbated by the chaos of combat.

“Weapons employment” pertains to the selection of the proper system for a prescribed target. The weapon selected has to accomplish the desired effect while limiting collateral damage and staying within prescribed constraints. If the use of tactical nuclear weapons is designed to achieve tactical advantages, the maneuver commander’s guidance to his staff is

⁴⁷ U.S. Field Artillery School, *Field Artillery Division 86 Historical Report*, Ft. Sill, Oklahoma: U.S. Army Field Artillery School, 1979, 4A4-1.

⁴⁸ U.S. Field Artillery School, *Fire Support in Integrated Operations*, Ft. Sill, Oklahoma: U.S. Army Field Artillery School, 1980, 2.

⁴⁹ U.S. Department of the Army, *FM 6-42 Field Artillery Battalion Lance*, 9-2.

⁵⁰ U.S. Army Field Artillery School, *Fire Support in Integrated Operations*, 2 and 15.

vital. This guidance includes a statement of desired results from the employment and defeat criteria (that is, the specified damage desired for the target).⁵¹ It should further include any subsequent use if the initial effort did not accomplish the desired result, the level of risk authorized with respect to friendly units, collateral damage preclusion criteria, and guidance for intelligence collection/target acquisition.⁵²

Cold War models for weapons employment used “radiation” as the primary casualty producer for tactical weapons. Consequently, the “defeat criteria,” or the level of casualties and damage required, is established in terms of the amount of radiation derived from an attack, which also has to consider the target “posture” (e.g., troops in the open or armored formations. U.S. nuclear fire planning for integrated combat sought to subject frontline enemy forces to 3000-8000 rads,⁵³ enemy to the rear to 650-3000 rads, and avoid over 100 rads to friendly forces.⁵⁴ It was believed that this was necessary either to blunt an enemy attack immediately and/or pave the way for subsequent counter-offensive operations. During the Cold War, military planners discovered that operational difficulties with the fire support system and calculation of appropriate weapons yield served to decrease overall effectiveness. For example, since a Soviet-Warsaw Pact armored offensive was the most likely scenario, the tactical requirement to achieve immediate transient incapacitation of enemy personnel in

⁵¹ U.S. Department of the Army, *FM 6-20 Fire Support in Combined Operations*, 6-9.

⁵² U.S. Department of the Army, *FM 101-31-1 Nuclear Weapons Employment Doctrine and Procedures*, Washington, D.C.: Headquarters Department of the Army, 1982, 9.

⁵³ According to the Nuclear Regulatory Commission, a rad (radiation absorbed dose) is “one of the two units used to measure the amount of radiation absorbed by an object or person, known as the ‘absorbed dose,’ which reflects the amount of energy that radioactive sources deposit in materials through which they pass. The radiation-absorbed dose (rad) is the amount of energy (from any type of ionizing radiation) deposited in any medium (e.g., water, tissue, air).” U.S. Nuclear Regulatory Commission: Glossary, website, <http://www.nrc.gov/reading-rm/basic-ref/glossary/rad-radiation-absorbed-dose.html>.

⁵⁴ U.S. Department of the Army, *FM 100-5 Operations*, 10-3.

tanks would be a minimum of 3,000 rads over the radius of the target.⁵⁵ Any weapon's capability to expose an enemy armored force to this amount of radiation would be reduced due to the shielding provided by the tank.⁵⁶ Consequently, a larger-yield weapon would be required to achieve the same effects as opposed to an unprotected target (i.e., troops dispersed in the open).⁵⁷ Some American military experts argued that this made "small yield" weapons ineffective as most employment scenarios emphasized the use of tactical nuclear weapons to blunt Soviet armor advances. Furthermore, since the model encouraged the selection of higher-yield weapons this naturally conflicted with the need to protect friendly troops and avoid unnecessary collateral damage that might obstruct maneuver or a counterattack.

In 1982 the U.S. Army announced a new warfighting doctrine called "AirLand Battle," which emphasized close coordination between ground and air forces. AirLand Battle acknowledged that any use of tactical nuclear weapons on the battlefield had to be done at an early phase in a conflict if they were to produce any tangible results. Available studies on the integration of nuclear weapons and AirLand Battle underscored the following principles for when tactical nuclear weapons might be used on the battlefield:

1. To exploit an attack.
2. As an economy force.
3. To decisively alter combat ratios.
4. To attain the commander's purpose or objective.

⁵⁵ Dennis P. Wilkins, *Tactical Nuclear Doctrine - Part 1: Methodology*, Adelphi, Maryland Harry Diamond Laboratories, 1980, 12.

⁵⁶ Nagappa, Vishwanathan, and Malhotra, 27.

⁵⁷ U.S. Army Command and General Staff College, *RB 100-34 Operations on the Integrated Battlefield*, Ft. Leavenworth, Kansas: Command and General Staff College, 1981, 6-10.

5. In a timely manner – achieving surprise over the enemy.
6. As a reserve.⁵⁸

In applying these principles, one of the primary missions was “interdiction,” or the destruction or disruption of enemy forces before they could formally be introduced into battle. AirLand doctrine assumed Soviet use of echelon formations. However, many experts believed it was highly questionable that these targets could be acquired and the information processed promptly due to their range. For example, while the range of the U.S. Lance missile was roughly 120 km (twice that of the Pakistani Nasr), it would only be able to strike targets up to 80 km into enemy territory due to the fact that launchers were normally planned to be positioned so that only two-thirds of their range was beyond the front line of friendly troops (FLOT).

Pakistani military experts have also suggested that they would seek to employ the Nasr against Indian follow-on forces and logistics. Consequently, they would be confronted with the operational challenges that are inherent in employing such weapons in an interdiction role. If the Nasr were positioned 20 km (roughly one-third of its range) back from the FLOT, it would only be able to strike targets forty kilometers beyond front line forces. If the decision were made to move the launcher closer to the FLOT to expand its range, then its survivability would be placed at greater risk. Furthermore, the closer to the FLOT a launcher were positioned, the higher the corresponding requirement to de-conflict terrain with friendly maneuver forces to determine where the launcher could and should be positioned. Moreover, positioning systems closer to the FLOT could increase security concerns as interaction between Pakistan’s Strategic Forces Command and conventional units

⁵⁸ U.S. Army Command and General Staff College, "Air-Land Battle--Nuclear Weapons Evaluation," Ft. Leavenworth, Kansas: Command and General Staff College, 1982, 3-10.

increases.

The U.S. AirLand Battle doctrine further envisioned a use of tactical nuclear weapons against close-in targets.⁵⁹ Pakistani military planners might also be forced to consider this option in order to halt an Indian armored breakthrough. The use of tactical nuclear weapons in this manner would require immediate relay of targeting information from intelligence assets to the planning headquarters for target refinements and then to the units that would actually employ the weapons. This would further assume that the decision to release nuclear weapons had already been made, in a fashion that allowed for maximum flexibility. Furthermore, tactical nuclear weapons would have to be properly distributed so that weapons of the right variety were positioned in appropriate locations. All of this would have to be accomplished in an area of use that would encompass the maximum number of constraints—protection of friendly troops, avoidance of obstacles that might preclude effective exploitation of the attack, preclusion of unnecessary collateral damage and limited civilian casualties—during a period of maximum chaos and confusion.

Furthermore, the likely fire planning models employed by Pakistan might not provide a full depiction of other results, or the so-called “bonus effects” resulting from the use of tactical nuclear weapons. These include the electromagnetic pulse (EMP) generated by any weapon that could damage friendly as well as enemy command and control. In addition, emphasis on radiation as the governing effect for damage calculation does not permit the model to predict with any accuracy the thermal effects (fires), low level and residual radiation, casing radiation, or dazzle effects.⁶⁰ These weapon effects would be critical, especially if the weapons were employed prior to the commencement of counteroffensive

⁵⁹ U.S. Department of the Army, *TRADOC Pamphlet 525-5 The Airland Battle and Corps* 86, 46.

⁶⁰ “Dazzle” is temporary loss of vision caused by exposure to high-intensity light.

action. Furthermore, these so-called “bonus effects” demand close coordination between the ground and air commanders to ensure that friendly aircraft as well as frontline troops were not endangered by the blasts, radiation, EMP or dazzle-effect associated with tactical nuclear weapon employment.

The Pakistan military is confronted with very similar doctrinal challenges as it seeks an arsenal of tactical nuclear arsenal for use beyond very limited demonstration effect. If, instead, Pakistan’s military seeks tactical nuclear weapons for military effects and to better synergize the employment of such weapons with its conventional defense posture, Rawalpindi will face the same dilemmas as the U.S. Army decided it would be better off without them. Pakistan’s Inter-Services Public Relations announced a revised military doctrine in 2012, but this press release provides very little detail on military thinking about the integration of nuclear weapons with conventional defense. It does note that Pakistan’s “nuclear capability is aimed at complementing comprehensive deterrence.” It further argues that this effort must reinforce the “combat potential of conventional forces, dis-incentivizing aggressiveness, inflicting unacceptable losses on the aggressor in case of a misadventure, war termination and post-war bargaining.”⁶¹ It appears that the Strategic Plans Division’s doctrinal development process is proceeding in a similar fashion to the U.S. Cold War experience: one senior Pakistani general described their development of a doctrine for the use of nuclear weapons as well as the associated means to analyze targets as “a work in progress.” He observed that the Army had yet to consider how to conduct integrated military operations involving both conventional and tactical nuclear weapons.⁶²

⁶¹ *Pakistan Army Doctrine 2011*, Islamabad, Pakistan: Doctrine and Evaluation Directorate, Concepts and Doctrine Division, Pakistan Army, December 2011, 11.

⁶² Conversations with Pakistani officials.

In summary, the doctrinal aspects of tactical nuclear weapons use during the Cold War were plagued by a paradox that would confront the Pakistani military today. It required the greatest degree of flexibility to the corps commander due to the massive coordination effort necessary for effective use. But it also demanded maximum central control at the highest political level in order to control escalation and crisis management. This paradox results in three general problem areas that Pakistani military planners would have to resolve. First, the problem of refining targets quickly, which would be extremely difficult, if not impossible. During the Cold War an American expert argued that in fact the doctrine assumed two “*sine qua non*” conditions—“the existence of a worthwhile target (i.e. a sufficiently large and concentrated formation to justify the use of a tactical nuclear weapon); and a certain permanence of the target in order to permit its identification, its pinpointing, the transmitting of necessary data and the final engagement.”⁶³ Second, an implicit requirement existed to maintain three plans—one nuclear, one conventional, and one integrated—while the request-release process would be ongoing (making the prospects of success seem even further remote). Third, it demanded that all necessary coordination to employ tactical nuclear weapons be done in a manner consistent with conventional fire planning and tactical maneuver. This paradox and the resulting problem areas described were endemic during the Cold War and would be also true for any future doctrinal concept for the use of tactical nuclear weapons by Pakistan.

Pakistan would not only be confronted with all of these problems, but also serious geographic challenges. It is less than 300 kilometers from the international border to Islamabad, and Lahore is 25 km from the border between the two countries. Consequently,

⁶³ Close, *Europe Without Defense*, 27.

Pakistani forces have little space to withdraw during the conventional phase of hostilities before deciding to escalate to the use of tactical nuclear weapons. This is further complicated by the relative short range of systems like the Nasr. As a result, it is very likely that any employment of tactical nuclear weapons by Pakistan would have to come either at the very onset of hostilities or have a high probability of striking Pakistani territory. Pakistani military and political leaders will likely be faced with the classic dilemma of “using” its tactical nuclear weapons very early in order to stem an Indian conventional assault or “losing” them due to their outright destruction or detonating nuclear weapons on Pakistani soil.

Operational Aspects

If doctrine explains how-to-do an activity, then operations are the actual implementation of that prescription.⁶⁴ Operational difficulties in implementing a doctrine of tactical nuclear weapon employment are derivatives of the fire support system (target acquisition, information processing, weapon availability, and employment) and command, control, and communications (C³) which is the exercise of authority by a properly designated commander over forces assigned to accomplish a stated mission. According to C.M. Herzfeld in a study done for the International Institute for Strategic Studies during the Cold War, command and control functions are performed through an arrangement of personnel, equipment, communications facilities, and procedures which are employed by the commander in planning, direction, and controlling his forces.⁶⁵

⁶⁴ U.S. Department of Defense, *Dictionary of Military and Associated Terms*, Washington: U.S. Government Printing Office, 1979, 244.

⁶⁵ C.M. Herzfeld, *Adelphi 145: Command, Control, and Communications*, London: International Institute for Strategic Studies, 1978, 40-41.

“Responsive” communications were deemed to be a critical factor in nuclear operation during the Cold War.⁶⁶ Serious communications delays in the passage of nuclear command and control orders were considered likely, however, since tactical headquarters involved in tactical nuclear employment might be attrited during the conventional phase of hostilities.⁶⁷

Military experts have learned that the demands on the communications system always exceed its capability.⁶⁸ Henry Rowen concluded that this was a natural result of the necessity for dispersal, concealment, and mobility in weapons systems which increased the necessity for control, but diminished its likelihood.⁶⁹ In sum, increased information flows and concentrated arrival points increase delays. Any system for the use of tactical nuclear weapons demands a level of precision and timing that will almost certainly be seriously degraded by communications delays.

Ensuring timely and continuous communications on the nuclear battlefield was critically important to the United States during the Cold War. Special care was exercised during Cold War planning and exercises to ensure that friendly unit communications equipment was not degraded or destroyed by EMP effects. Disruption of communication systems as a result of friendly use of nuclear weapons was cause for great concern within NATO – and would be for Pakistan as well. This was especially true since most scenarios for the use of tactical nuclear weapons occurred at a time (such as prior to the commencement of a counterattack) when the demand for tactical communications would be the greatest.

⁶⁶ U.S. Department of the Army, *FM6-20 Fire Support in Combined Operations*, 6-19.

⁶⁷ U.S. Army Field Artillery School, *Fire Support in Integrated Operations*, 28.

⁶⁸ Seymour J. Deitchman, *Limited War and American Defense Policy*, Cambridge, Massachusetts: MIT Press, 1969, 186.

⁶⁹ Henry Rowen, *Adelphi 145: New Weapons Technologies and East-West Security*, London: International Institute for Strategic Studies, 1978, 3.

Consequently, a doctrine that depends on reliable communications for coordination of both fire support and maneuver may be ineffective due to the effects of EMP.⁷⁰

The necessity of adequate command and control for tactical nuclear weapons employment makes it a high priority for attack by either conventional means or by electronic warfare. The Soviet General Staff understood well that combatting NATO's nuclear means of attack included the neutralization of command and control as well as the physical destruction of weapons and launchers before they could be used. They referred to this as “command and control disruption” (*narusheniye upravleniyal*).⁷¹ The key task in this effort is to destroy or disrupt command and control in order to gain time and slow your opponent’s decision-making cycle.⁷²

During the Cold War a large part of the command and control disruption mission was performed by electronic warfare. Indian military plans would likely employ similar efforts. Electronic warfare consists of efforts to destroy or degrade an adversary's ability to communicate by denying him use of the electromagnetic spectrum, and acquisition of an enemy's location by the use of communication direction finding equipment which can then be passed on to more conventional means (by ground troops, indirect fire assets, or aircraft) to attack and destroy. The Soviet Union expanded these capabilities dramatically throughout the Cold War,⁷³ with NATO nuclear-capable units being their first priority. Soviet efforts to degrade NATO's command and control capability could have reduced “battlefield

⁷⁰ LTC John P. Rose, "Tactical Nuclear Weapons Are Just One More Form of Combat Power on the Battlefield," *Marine Corps Gazette*, April 1979, 50.

⁷¹ Dr. James C. McDade, "Command and Control Disruption," *Journal of Electronic Defense*, July 1983, 20.

⁷² Ibid.

⁷³ Mark O. Oetken, "Countering the Soviet EW Threat to Field Artillery Communications," *Field Artillery Journal*, April 1980, 44-45.

communications to that of 1916” according to one expert.⁷⁴ There can be little doubt that India would seek to degrade Pakistan's command and control networks through the use of electronic warfare, perhaps even prior to the onset of hostilities. This could be further exacerbated by the advent of cyberweapons that could degrade Pakistani command and control networks. In addition, Soviet special operations forces were designed to operate behind NATO lines with the mission of locating and destroying command and control assets or nuclear-capable units.⁷⁵

The Pakistani military will be confronted with similar operational issues as they seek to prepare the necessary plans for the implementation of tactical nuclear use. Their command and control systems will be subject to degradation due to EMP effects following any employment of nuclear weapons. In addition, Indian forces are likely to employ both electronic warfare and cyberattacks to undermine Pakistan's command and control networks. Finally, the actual tactical nuclear forces as well as command and control facilities should expect assaults by Indian special operations units during a crisis or the initial phase of hostilities between the two countries.

In 2006, Lt. General Kidwai reportedly acknowledged that Pakistan employs at least “the functional equivalent” of the two-man rule when dealing with nuclear weapons. He had previously suggested in 2002 that Pakistan might use a “three-man rule,” but this has never been confirmed.⁷⁶ If Pakistan does employ a “three-man rule,” it could include a launch team commander, representative from the Strategic Plans Division (SPD), and a head technician.

It is also widely believed that Pakistan employs some combination of technical

⁷⁴ David C. Isby, *Weapons and Tactics of the Soviet Army*, New York: Jane's 1981, 353.

⁷⁵ Viktor Suvorov. "Spetsnaz: the Soviet Union's Special Forces," *International Defense Review*, September 1983, 1209.

⁷⁶ Clary, 17.

measures to deny access to unauthorized personnel. Pakistani officials, however, have largely been reluctant to discuss details regarding PALs for their weapon systems. Former Pakistani nuclear scientist Samar Mubarakmand stated in a 2004 television interview that every nuclear warhead was fitted with a “code-lock device” which requires a proper code to enable the weapon.⁷⁷ Still, it is unclear whether PAL devices, if employed by Pakistan, are merely locks or more sophisticated devices that require two personnel to implement in concert with prescribed release procedures.

In summary, NATO's command and control network was highly vulnerable to disruption and attack, would have been degraded during the conventional phase of any conflict, and weapons were stored in vulnerable fixed sites to prevent unauthorized access. All of these problems are a modern version of Clausewitz's “friction of war”—that even the easiest task becomes difficult in warfare. Although efforts to model the command and control sequencing were always deemed to be incomplete, most experts were in agreement that the 24 hours from request to release was grossly optimistic. The Pakistani military and NCA would be confronted with all of these problems in times of crisis or war.

Peacetime Stockpile Security

In addition to the disruption of NATO command and control and the destruction of nuclear capable units during combat, Soviet or East German special operations attacks against NATO nuclear storage sites were considered very likely during periods of crisis. During one mock exercise, five-to eight-member American Special Forces teams (analogous to Soviet “*spetsnaz*” forces or to a terrorist group) stormed the fences of several sites,

⁷⁷ Ibid.

overwhelmed the guards, and claimed possession of the nuclear warheads in less than thirty minutes.⁷⁸ A 1978 CIA report identified these nuclear storage depots as, “the most vulnerable and, therefore, most likely targets for future terrorist activity.”⁷⁹ There were numerous actual terrorist threats against such sites during the Cold War.⁸⁰ For example, in January 1977 the Red Army Faction conducted an attack against a NATO nuclear storage site in Giessen, Germany. The group's leadership later described their desire to destroy or capture a nuclear weapon, but the attack failed when the group's plans went awry.⁸¹

Securing tactical nuclear weapons and their delivery vehicles pose greater problems than strategic weapon systems due to their relatively small size and portability. Furthermore, an inherent contradiction exists between the requirement for ensuring warhead security in peacetime and survivability in a crisis, and providing operational availability in wartime. This posed a monumental dilemma to NATO force planners. Efforts to upgrade site security that are largely directed against a peacetime terrorist threat hinder the rapid evacuation of sites during a crisis or war. As the NATO tactical nuclear stockpile grew, there was a corresponding need for more storage sites to disperse the weapons in order to preclude them from being destroyed in the initial Soviet onslaught.

Finally, the decision to evacuate nuclear weapons from their peacetime storage locations could be delayed during a crisis due to concerns that such a decision would be viewed as escalatory. American military experts during the Cold War believed that an order

⁷⁸ Frank Greve, "Security Gaps Raise Fears About U.S. Warheads in Europe," *Philadelphia Inquirer*, 13 January 1983, 1.

⁷⁹ Frank Greve, "Warhead Sites: NATO's Achilles' Heel," *The Denver Post*, 13 March 1983.

⁸⁰ *Ibid.* See also <http://www.pbase.com/202mpco/image/38474545>.

⁸¹ See Michael Krepon, Rodney W. Jones, and Ziad Haider (eds.) *Escalation Control and the Nuclear Option in South Asia*, Washington: Stimson Publications, 2004. Also see: Michael Krepon, "When Terrorists Were West Germans," *Arms Control Wonk*, February 11, 2010. <http://krepon.armscontrolwonk.com/archive/2623/when-terrorists-were-west-germans>

to disperse NATO's tactical nuclear forces during a crisis to ensure their survivability would have been regarded by the Soviet Union as a highly escalatory step which, given the vulnerability of NATO's peacetime posture, would have likely prompted Soviet preemption.⁸² As Jeffrey Record has written in *NATO's Theater Nuclear Force Modernization Program: The Real Issues*, a decision to disperse NATO nuclear forces in time of crisis could have triggered a “Sarajevo moment.” It would “be tantamount to an act of war similar in consequence to army mobilization orders that rippled through Europe in the summer of 1914.”⁸³

Pakistan faces many of the same challenges when it comes to pre-delegation and nuclear security, especially if Indian military and political leaders believe that authority to employ nuclear weapons would likely be pre-delegated to Pakistani military commanders during a crisis or war. In addition, Indian special operations forces and indigenous groups disaffected from the Pakistani government or interested in sparking a war could pose clear threats to Pakistan's control over its most portable nuclear assets. The *South Asia Terrorism Portal* has estimated that there are 46 domestic and transnational terrorist organizations based or operating in Pakistan.⁸⁴

Pakistani leaders have steadfastly argued that there are no plans for pre-delegation of authority to use nuclear weapons to local military commanders.⁸⁵ Despite these assurances, Indian military and political leaders might assume that release authority had been provided to the delivery unit commander once the weapons were removed from storage and transferred to

⁸² Bracken, 47.

⁸³ Jeffrey Record, *NATO's Theater Nuclear Force Modernization Program: the Real Issues*, Cambridge, Massachusetts: Institute for Foreign Policy Analysis, 981, 26.

⁸⁴ See <http://www.satp.org/>.

⁸⁵ International Institute for Strategic Studies, *Nuclear Black Markets: Pakistan, A.Q. Khan and the rise of Proliferation*, London, UK: IISS, May 2007, 114.

using units during a crisis or war. Furthermore, it seems reasonable to assume that Indian forces would seek to target Pakistani command and control nodes at the onset of any conflict. Furthermore, there is some uncertainty whether Pakistan employs sophisticated PAL devices and how the “two-man rule” would be operationalized. If sophisticated PAL devices are employed, they would technically prevent the use of weapons absent nuclear control orders being transmitted from higher authority. But if access is only barred by procedural restrictions such as the two-man rule, then it would appear likely that a local commander would be provided pre-delegated authority and could decide to employ tactical nuclear weapons.⁸⁶

Published reports of uncertain accuracy estimate that Pakistan maintains 15 or more sites around the country where nuclear weapons are stored. Some may be “dummy” nuclear storage sites to confuse a potential adversary.⁸⁷ Whatever the number of storage sites, they are heavily guarded, and Pakistan appears to depend on absolute secrecy as one of its primary means to protect these weapons. Pakistani officials have repeatedly offered assurances that their nuclear weapons are absolutely secure, safe, and virtually immune to any risk of unauthorized or inadvertent use.⁸⁸ Nonetheless, there have been a number of attacks by extremist groups against heavily guarded military sites, including some that have taken many hours to quell. A Pakistani air base at Kamra was attacked in 2007, 2009, and in August 2012 when eight Taliban stormed the facility with RPGs and automatic weapons.⁸⁹ A subsequent

⁸⁶ Clary, p. 29. See also Jaspal, p. 9 and Hussain, 22.

⁸⁷ See, for example, Hundley, 5.

⁸⁸ Hussain, 14.

⁸⁹ Shaheryar Popalzai, “Tehreek-i-Taliban claim ‘revenge’ attack on Kamra,” *The Express Tribune*, August 16, 2012. <http://tribune.com.pk/story/422821/attack-on-paf-airbase-live-updates/>.

threat at Dera Ghazi Khan in September 2012 resulted in the deployment of three divisions in southern Punjab to deter the attack and crack down on banned militant groups.⁹⁰

Consequently, Pakistan faces significant challenges with respect to the peacetime safety and security of its tactical nuclear weapons – let alone in crisis or wartime. Efforts to safeguard weapons from any and all threats will further complicate the critical transition from crisis to war. During a crisis, pressure would increase to move nuclear weapons from fixed storage sites to field storage or delivery units to insure their survivability. This transition would also raise serious questions about "pre-delegation" of authority to employ such weapons, which would place additional challenges to escalation control.

Conclusion

This essay analyzes operational issues relating to tactical nuclear weapons during the Cold War, and applies these insights to contemporary South Asia. If U.S. and Soviet Cold War experience is any indication, Pakistani military planners and front-line soldiers will find battlefield nuclear weapons to be a logistical nightmare. Indeed, the unanticipated challenges that arise with the forward deployment and use of tactical nuclear weapons—incorporating nuclear fire planning with conventional maneuver operations, maintaining a clear chain of command in crisis scenarios where nuclear weapons are being used, and hardening communications against EMP blasts, among other dilemmas—offset the deterrent value these systems are purported to provide. Pakistani military authorities appear inclined to make many of the same miscalculations as U.S. and Soviet ground forces during the Cold War.

There is a widespread assumption in Pakistan that the development and deployment

⁹⁰ Abdul Manan, "Taliban threat: Nuclear site in DG Khan cordoned off," *Express Tribune*, August 16, 2012. <http://tribune.com.pk/story/432295/taliban-threat-nuclear-site-in-dg-khan-cordoned-off/>.

of tactical nuclear weapons is a cost-effective way to make up for its growing conventional inferiority to India. Those who have studied Cold War nuclear doctrine for tactical nuclear weapons would disagree. Alain Enthoven and Wayne Smith observed in their celebrated 1971 book, *How Much Is Enough?*, that tactical nuclear weapons were not a replacement for conventional forces, and would not have guaranteed success against a massed Soviet attack.⁹¹ Enthoven, who served as U.S. Assistant Secretary of Defense for Systems Analysis, once wrote that “tactical nuclear weapons cannot defend Western Europe; they can only destroy it....there is no such thing as tactical nuclear war in the sense of sustained, purposive military operations.”⁹²

The nuclear-capable, short-range Nasr raises all of the dilemmas discussed above. An even more destabilizing approach would be for Pakistan to develop artillery-fired atomic projectiles (AFAPs) for its force of 155mm and 203mm howitzers or consider the development of such things as atomic demolition munitions (ADMs). The United States employed some of these platforms for the potential delivery of AFAPs, as did the Soviet Union for its 152mm and 203mm howitzers. This would appear to be technologically feasible if Pakistan can miniaturize the nuclear components for AFAPs.⁹³ Cost consequences would be reduced as platforms already exist, and there are well-trained crews for the operation of the howitzers. AFAPs would provide lower yield weapons unless Pakistani scientists are able to master enhanced radiation warheads, as the United States attempted to produce and deploy to Europe in the 1980s. Such weapons would be delivered by dual-capable (conventional and nuclear) units which would enhance their survivability. They would, however, have

⁹¹ Alain Enthoven and K. Wayne Smith, *How Much Is Enough?* Santa Monica, California: RAND Corporation, 1970, 130.

⁹² Quoted in Kanwal, 2.

⁹³ This would be difficult to accomplish without nuclear testing.

substantially shorter ranges (probably less than 30 km), and this would limit their effectiveness to interdict follow-on Indian conventional forces.

Pakistani leaders appear to believe that the “signals” conveyed by their actions during a confrontation with India with respect to their tactical nuclear forces (i.e., movement of the stockpile from storage and movement of delivery vehicles in the field) would be interpreted clearly by Washington and New Delhi and that risks for escalation would be manageable. It would be wise for Pakistani leaders to carefully consider how any actions in a crisis would influence the leadership in New Delhi, what assumptions they might make, and whether New Delhi would read these messages as intended—as signaling deterrence rather than war preparations.

Pakistani military leaders might assume that India will not seek to blunt the deterrence value of developing and advertising tactical nuclear weapon capabilities by responding in kind. So far, New Delhi has not expressed interest in developing such weapons, as Indian force developers are focused on improved conventional capabilities, a sea-based deterrent, and a family of cruise missiles. India could employ longer-range systems against targets near the FLOT, use conventional air power, or employ short-range missiles such as the 60 km range Prahaar. While Indian defense scientists have publicly noted that the Prahaar could carry “different types of warheads,”⁹⁴ and Pakistani officials claim the Nasr is a response to the Prahaar. Currently, there is no clear evidence that New Delhi is interested in developing tactical nuclear weapons.

The belief held by some Pakistani military leaders that the development, production, and induction of tactical nuclear weapons would cancel out Indian conventional advantages

⁹⁴ Joshi, 161. See also David C Isby, “Pakistan's Hatf 9 promoted as a counter to India's Prahaar,” *Jane's* 360, December 4, 2013, <http://www.janes.com/article/31174/pakistan-s-hatf-9-promoted-as-a-counter-to-india-s-prahaar>.

while facilitating "sub-conventional" warfare is both dangerous and problematic. It assumes that, even after the Mumbai attacks, Indian leaders would continue to show restraint in the event of a large-scale terrorist attack occur on Indian territory. This may turn out to be true, but it seems less likely following the election of Prime Minister Narendra Modi, who has called for a more muscular approach to India's national security policies. With reference to the 2008 Mumbai attacks, he pointedly criticized the previous government led by Manmohan Singh by observing that "Indians died and they did nothing.... Talk to Pakistan in Pakistan's language because it won't learn lessons until then."⁹⁵

The development and production of tactical nuclear weapons is not simply a continuation of existing nuclear trends in Pakistan. Instead, tactical nuclear weapons pose new and more severe dilemmas. The presence of tactical nuclear weapons will naturally result in increased pressure on both India and Pakistan to escalate during any future crisis. Pakistan and India would do well to consider measures to reduce nuclear risks and create channels for crisis management.

Pakistan might also reconsider the practical and operational risks and challenges with regard to tactical nuclear weapons, particularly the difference in risk profiles between a small number of systems and widespread numbers readied for deployment. Perhaps the most important take-away from an historical analysis of the Cold War is that the challenges U.S. and Soviet planners and front-line operators were faced with grew exponentially, rather than linearly, as tactical nuclear weapons were deployed at scale. Communication, coordination, planning, and incorporation into conventional units become manifestly more difficult as arsenals of tactical nuclear weapons grew. This unsettling conclusion might give pause to

⁹⁵ Praveen Swami, "Talking to Pakistan in Its Language," *The Hindu*, June 11, 2014, 8.
<http://www.thehindu.com/opinion/lead/talking-to-pakistan-in-its-language/article6101797.ece>

Pakistani military planners as they consider what portion of their ever-increasing stockpile of fissile material they can afford to dedicate to a class of nuclear weapons that may present more problems than solutions.