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Pakistan's Tactical Nuclear Weapons: Implications for Strategic Stability in South Asia

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In 1992, following the breakup of the Soviet Union, the United States removed its land and sea-based tactical nuclear weapons (TNWs) from Europe.¹ This decision was logical from a strategic standpoint, given the collapse of the United States' only peer military adversary, but it was also sound at the tactical level. The induction of precision-guided conventional munitions (PGMs) into the NATO arsenal beginning in the 1970s, coupled with the United States' promulgation in 1982 of AirLand Battle—a warfighting doctrine built around this new technology—had created a “Revolution in Military Affairs” that obviated the battlefield utility of TNWs. PGMs granted NATO a cheaper, more lethal, and more precise alternative to TNWs for destroying the armored formations that would form the spearhead of a hypothetical invasion from the East. PGMs also had the welcome benefit of imparting less escalatory danger to the battlefield.² This

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historical experience has gone unheeded, however, by the security establishment in Pakistan, which is fielding 60km-range nuclear ballistic missiles in the hopes of deterring aggression from its archenemy, India.

The incorporation of TNWs into the deterrence milieu of South Asia is uncertain to yield the security that Pakistan seeks and may instead prove counterproductive. This essay examines four factors in particular that make TNWs a suboptimal security tool in the Indo-Pakistani context. First, TNWs are unlikely to blunt an Indian land invasion, due in large part to their inefficacy against tanks; this limitation undercuts their tactical deterrence value. Second, the strategic deterrence value of TNWs is also dubious. Establishment sources in India are dismissive of TNWs; they argue that India's nuclear doctrinal policy of "massive retaliation" would dissuade Pakistan from the first use of nuclear weapons if the two sides went to war, as long as India's war objectives were limited in nature. Third, command and control (C2) of TNWs in a conflict zone is a complicated affair; centralized C2 can make the weapons tactically unresponsive, whereas pre-delegating launch authority to field commanders increases the risk of premature or unauthorized use. Fourth, TNWs will aggravate the already-heated arms race on the South Asian subcontinent, generating instability and financial costs down the line that Pakistan can ill afford.

This essay develops the argument against TNWs in six sections. The first section is background that examines the threat environment and deterrence rationale underpinning Pakistan's decision to field TNWs. Sections two through five unpack and analyze the drawbacks and risks associated with TNWs as outlined above, followed by a closing section that discusses prospects for Indo-Pakistani strategic stability. This paper ultimately concludes that stability in South Asia would be better served if Pakistan reversed course on TNWs and invested more heavily in conventional deterrence, with a focus on PGMs. The battlefield impracticality of TNWs undermines their deterrence value, and they are far too crisis destabilizing to merit deployment, especially in the nuclear powder keg of South Asia.

Strategic Drivers and Deterrence Rationale of Pakistan's TNWs

On April 19, 2011, Pakistan's Inter-Services Public Relations directorate (ISPR) issued a press release declaring that Pakistan had successfully flight-tested a new nuclear delivery system. Identified as the *Hatf-IX/Nasr*, the system is a solid-fuelled, 60km-range ballistic missile designed for launch from a road-mobile, four-tube platform.³ The press release gave no clue regarding the potential explosive yield of a *Nasr* warhead, but analysts in various Track II forums have speculated it might be in the range of 2-4 kilotons. For comparison, the yield of the atomic bomb dropped on Hiroshima was 15 kilotons.

The impetus for Pakistan's TNW gambit can be traced back to April 2004, when the Indian Chief of Army Staff revealed a controversial new war doctrine known as "Cold Start."⁴ Cold Start envisions a short-duration conventional war, limited in scope, to punish the Pakistani military for its support of jihadi outfits that have victimized India over the years.⁵ Operationally, Cold Start would entail incursions by up to eight Indian Army divisions (known as Integrated Battle Groups, or IBGs) across the international border, 72-96 hours after the order to mobilize is handed down.⁶ In concert with close air support, the IBGs would proceed to make "shallow territorial gains, 50-80 kilometers deep that could be used in post-conflict negotiations to extract concessions from Islamabad."⁷ New Delhi believes keeping the ground penetration limited will avoid triggering Pakistan's nuclear redlines.⁸

The deterrence logic behind the introduction of *Nasr* was that Pakistan could not credibly deter India's limited war doctrine with a stockpile of strategic, high-yield nuclear weapons. Pakistan believes that lower-yield weapons such as *Nasr* pose a more proportionate (and therefore credible) threat

against localized, shallow border incursions by IBGs, thereby achieving what the Pakistani military refers to as “full-spectrum deterrence.”⁹ Pakistan’s security establishment believes that TNWs will strike fear into the hearts of India’s political masters and military brass, thereby either dissuading an Indian blitzkrieg in the first place or achieving intra-war deterrence by threatening TNW strikes on attacking IBGs, forcing India to severely reconsider the scope and intensity of a Cold Start campaign.¹⁰

In short, the Pakistani security establishment is confident that TNWs are a boon for deterrence stability, and this sentiment is well represented in public statements by prominent officials. Following a *Nasr* flight test in May 2012, Lt. Gen. Khalid Kidwai, then-Director General of Pakistan’s Strategic Plans Division (SPD), hailed *Nasr* as a “weapon of peace.”¹¹ Air Cdre. Adil Sultan, Director of the SPD’s Arms Control and Disarmament Affairs wing, echoes Kidwai in a recent essay: “The development of short-range missiles does not necessarily mean that Pakistan would use these weapons for fighting a nuclear war. The sole purpose of these remains deterrence of aggression.”¹² Sultan goes on to posit that Pakistan’s TNWs have “neutralized” the Cold Start doctrine.¹³ Despite these optimistic forecasts, however, TNWs have significant drawbacks that undermine their perceived security benefits.

Tactical Limitations against Indian Forces

The Pakistani deterrence calculus outlined above stems—at least in part—from the belief that TNWs would tactically checkmate an Indian invasion. Writes Zafar Jaspal, prominent Pakistani academic and defense commentator, “...Pakistani defensive formations would be capable of using [tactical] nuclear strikes to annihilate the adversary’s advancing rapid cavalry/armored thrust in the Southern desert theatre or taking advantage of the short distance from the border to takeover Lahore.”¹⁴ This bold statement is premised on three key assumptions: (1) TNWs are effective against armored units, (2) Pakistan is able to readily locate and target said units, and (3) Indian forces are ill-prepared to fight through a nuclear warzone. Closer inquiry, however, reveals each of these assumptions to be problematic.

Regarding the first assumption, technical analysis suggests that TNWs are relatively ineffective when it comes to destroying heavily armored vehicles such as main battle tanks (MBTs), particularly if the tanks are spaced in a dispersed fashion. This muddles the deterrence value that TNWs bring to bear against India’s Cold Start doctrine, because MBTs would form the spearhead of a Cold Start attack. Of note, India has over 800 fourth-generation T-90S MBTs in inventory and more on the way, in addition to a sizeable stock of 1,950 third-generation T-72M1s.¹⁵

According to researchers A. H. Nayyar and Zia Mian, through a combination of blast damage and prompt radiation, upwards of 80-100 TNWs of 15 kiloton (KT) yield would be needed to disable an invading force of 1,000 MBTs spaced over 300 meters apart.¹⁶ Accordingly, a single 15 KT weapon, if delivered accurately, would be expected to disable between 10 and 12.5 MBTs with the above spacing.¹⁷ Any tanks that managed to survive direct blast damage would likely see their crews incapacitated by radiation exposure. It is important to reemphasize here that most estimates place Pakistani TNW yield in the 2-4 KT range, meaning far larger numbers of weapons would be needed to approximate a 1,000-tank destruction threshold.

David Smith, a former U.S. defense attaché to Pakistan, cites additional reasons that TNWs would prove indecisive against armor. For one, India’s armored battalions would be in a constant state of maneuver if pressing an assault. The security protocols and launch authorization procedures of TNWs would delay targeting and engagement and make it challenging for Pakistan to land a precise hit.¹⁸ Furthermore, even if one assumes that Pakistan could somehow destroy India’s forward combat forces

with TNWs (a task that would require far more TNWs than Pakistan is capable of producing in a reasonable timeframe, considering Pakistan's fissile material production constraints), India's follow-on forces and reserves are expected to outlast Pakistan's in a prolonged war.¹⁹

As for the second assumption (that Pakistan can readily locate India's maneuvering tank forces), Pakistan's capacity for real time awareness of enemy troop movements in areas of open terrain is limited.²⁰ Pakistan would therefore have difficulty targeting Indian tanks rolling across the deserts of Sindh province, but things would be easier in Pakistani Punjab, where the riverine terrain with its numerous canals and bridges would slow Indian ingress. The increased ground friction would grant Pakistani surveillance assets (e.g., fixed-wing piloted aircraft and drones) more time for spotting and relaying targeting data to *Nasr* platforms. This is the most likely region that Pakistan could employ TNWs to any substantial effect. But the Punjab is also densely populated, and any use of a nuclear weapon in the vicinity would incur significant friendly civilian casualties, particularly through fallout. To whatever extent that Indian decision-makers doubt Pakistan's willingness to irradiate its own high-value heartland, the deterrence value of Pakistan's TNWs decreases in kind.

Regarding the third assumption (that India is unable or unwilling to fight through a nuclear exchange), India has taken visible steps to prepare its forces for such a contingency. Indian tanks and their crews are equipped to operate in a nuclear warzone, and the Indian military has conducted numerous field exercises to train its units in nuclear, chemical, and biological countermeasures.²¹ Indeed, as one Indian corps commander publicly commented in 2006, "We firmly believe that there is room for a swift strike even in case of nuclear attack."²² Through procurement, training, and public statements, New Delhi is attempting to signal that weapons of mass destruction will not deter India from achieving its military aims. These signals, combined with the inefficacy of TNWs against heavily armored MBTs and Pakistan's limited capability for real-time battlespace awareness, raise considerable doubts as to whether the Indian military will be deterred by TNWs in the midst of a crisis or conflict.

India's "Massive Retaliation" Nuclear Doctrine

Based on the above analysis, TNWs appear to be an uncertain insurance policy against Cold Start, at least in tactical military terms. But what of the strategic deterrence value of TNWs? Could they deter India's civilian leadership from authorizing an invasion into Pakistan? Deterrence is ultimately a mind game, so the possibility cannot be ruled out. Yet many influential Indian strategists remain convinced that the limited, localized conventional war envisioned under Cold Start can be fought and won against Pakistan without triggering a TNW salvo. These strategists point to India's nuclear doctrine, which promises "no first use" but warns that a nuclear attack launched at Indian forces, no matter how small the yield or location of the blast, will invite massive nuclear retaliation "designed to inflict unacceptable damage."²³ The idea is that the specter of massive retaliation makes TNWs too risky a tool for blunting a Cold Start invasion.

Many in Pakistan, however, doubt that massive retaliation is a credible threat against a tactical nuclear strike, condemning it as the nuclear "Samson" option.²⁴ Would India truly be willing to subject New Delhi and other major cities to Pakistan's second strike, simply to punish Islamabad for a defensive TNW salvo on its own territory? It is valid to question whether massive retaliation is credible in this case, given the devastation that India would suffer from Pakistan's surviving nuclear forces. Yet two considerations bear mention here that may increase the possibility that New Delhi would honor its doctrine, if tested.

First, the doctrine's publicly declared nature could create a commitment trap in the event that Pakistan employed TNWs. If India failed to retaliate massively, New Delhi's credibility to deter nuclear coercion would be in tatters. Thus the likelihood that India can afford to do nothing in response to a TNW strike appears tenuous. Even Pakistani analysts agree that TNW employment would elicit some degree of nuclear retaliation from India and escalate out of hand. According to SPD official Col. Zahir Kazmi, "There is nothing tactical about these weapons, as their use would have strategic fallouts. . . . There will be no winners in a nuclear war."²⁵

The second consideration is India's burgeoning ballistic missile shield. Insofar as India believes that its missile shield will blunt Pakistan's second strike, New Delhi could be more likely to honor its promise to retaliate massively. Advanced military technologies such as missile defenses have the unfortunate tendency to fuel bravado and hubris, emotions that can prompt excessive risk-taking during a political crisis or military confrontation. The Indian Defence Research and Development Organisation's sensational boast that the missile shield has a 99.8 percent interception rate could exacerbate this dynamic.²⁶ Indian civilian leaders and military brass, blinded by their pride in this technological feat, may calculate that the dangers of initiating Cold Start and massively retaliating against any Pakistani TNW strike are within acceptable risk parameters.²⁷

The considerations examined above may provide some insight into the thinking of Indian strategists who hail massive retaliation as a credible shield against TNWs. In their view, the Pakistani employment of TNWs against a limited Indian incursion in the flavor of Cold Start is so certain to trigger massive retaliation that the notion of Pakistani first use seems disproportionate, incredible, and improbable. As Indian Lt. Gen. (Retd.) A. M. Vohra contends, "[Limited conventional war is] not likely to lead to a nuclear weapons exchange due to the devastation this would cause, which could lead to the annihilation of both [India and Pakistan]."²⁸ Brig. (Retd.) Gurmeet Kanwal, former director of Centre for Land Warfare Studies in New Delhi, similarly argues, "The army leadership believes that . . . the Pakistanis . . . are unlikely to act irrationally and use tactical nuclear weapons to checkmate an Indian offensive, knowing fully well that a massive Indian nuclear countervalue and counterforce response will mean the end of Pakistan as a viable nation-state."²⁹

Kanwal has argued that this deterrence assessment also has buy-in among India's political leadership.³⁰ And today, with the hawkish Bharatiya Janata Party (BJP) in power, headed by Prime Minister Narendra Modi, the notion that a limited conventional war can be successfully waged against Pakistan may have many more subscribers in the halls of South Block.³¹ It is also widely believed that the BJP would be more willing to authorize kinetic military options against Pakistan during a major crisis than the previous National Congress led government, which spurned reprisal in the wake of the 2008 Mumbai attacks. As Indian Home Minister Rajnath Singh ominously hinted in October of last year, "Pakistan should think twice before indulging in any [provocation] as the government is being headed by Narendra Modi."³² In a period of acute tensions on the subcontinent, brought on perhaps by a major terrorist attack perpetrated by Pakistani militants on an Indian city, the prospect that cooler heads will prevail and deterrence will hold appears slimmer under the current BJP administration.

If this analysis is correct, and New Delhi believes it has the space to prosecute Cold Start regardless of Pakistan's stock of TNWs, how then can Islamabad reestablish deterrence stability? Islamabad knows well that it has dissuaded Indian aggression in the past without TNWs, relying instead on a mix of conventional means and strategic-level nuclear deterrence. In December 2001, following a terrorist attack by Pakistani militants on the Indian parliament building in New Delhi, India mobilized its three strike corps toward the international border with Pakistan, seemingly in preparation for war. Pakistan, however, taking advantage of its shorter interior lines of communication, was able to mobilize

and fortify its own forces before the bulk of India's lumbering strike corps reached the international border three weeks later. A million-man standoff ensued.³³ By this time, a combination of international pressure and Pakistan's military readiness convinced India's leadership that cross-border hostilities were no longer a feasible option. Deterrence held, despite the fact that Pakistani troops were outnumbered by Indian forces by a ratio of 1.0 to 1.15.³⁴ The case of the 2001-02 crisis suggests that Pakistan is more likely to deter India if it can mobilize and fortify its ground forces faster than India can ready its own strike forces for invasion.

Pakistan can also give India greater pause by bolstering its conventional armaments. Indeed, Indian military officials have noted that the conventional balance with Pakistan is a core element of the bilateral deterrence equation. In the wake of the 2001-02 crisis, Indian Vice Adm. (Retd.) Premvir Das wrote, "We do not enjoy the type of asymmetry in military power against our adversary that we need to have. Without decisive superiority, it is just not feasible to undertake punitive measures of any real value."³⁵ By implication, the Pakistani military should make a concerted effort to shore up its conventional defenses, with a focus on PGMs. Compared with TNWs, PGMs are a more accurate and decisive option against the armored battalions that would form the spearhead of a Cold Start assault. The acquisition of sufficient numbers of PGMs will help ensure that the conventional balance of forces in South Asia remains manageable, complementing deterrence stability in the process.

Command and Control Challenges

Command and control of TNWs is a complicated affair, which is no surprise because the phrase "tactical nuclear weapon" is inherently dichotomous. The word "tactical" connotes that TNWs are frontline warfighting tools for military commanders, but the word "nuclear" makes them political instruments of deterrence. Equally binary are the C2 articulation models that Pakistan can employ to govern its TNWs during wartime. One model is to maintain centralized control over the weapons at all times by the highest political command body, the National Command Authority (NCA).³⁶ The other approach is to pre-delegate launch authority to field commanders. Both models entail significant risks.

If Pakistan opts to assert centralized C2 over its TNWs, it risks making them tactically unresponsive and ineffective. In the time it would take for (1) the *Nasr* battery to request permission to fire at a target of opportunity (for instance a massed Indian army formation), (2) the NCA to arrive at the grueling decision to authorize nuclear use, and (3) for launch codes to be transmitted back to the battery operators, the window of tactical opportunity could easily have passed. Further delays and complications can be expected if India has attrited Pakistan's C2 network through communications jamming and kinetic strikes against C2 nodes. Centralized C2 therefore risks making TNW batteries ineffectual at best or sitting ducks at worst in a dynamic combat environment. This could handicap the deterrence value of the batteries and spur preemption by the Indian military – particularly the air force.

Alternatively, Pakistan may opt during a crisis or conflict to decentralize C2 of its tactical nuclear forces, pre-delegating launch authority to commanders in the field. The drawbacks of this C2 articulation model, however, are worse. Although pre-delegation mitigates the problem of tactical responsiveness and nominally enhances the deterrence value of the weapons (though failing to address the inefficacy of TNWs against armor and India's signaled willingness to fight through), it does so at the price of political control over the decision to go nuclear, increasing the potential for unintended escalation.

Imagine a situation where a Pakistani *Nasr* battery commander with pre-delegated launch authority is surrounded or comes under direct attack by the adversary. At this moment, the commander

will be faced with the unenviable decision to “use or lose” his nuclear assets. The potential for this dangerous scenario coming to pass is significant if deterrence breaks down and India initiates Cold Start. The *Nasr*, for example, has just a 60km range, so the launch platforms would need to be deployed relatively close to the international border in order to hold invading Indian tank battalions at risk. Yet this proximity increases the potential for a direct encounter with Indian ground forces, particularly in the deserts of southern Pakistan where the terrain is highly suited for tank mobility. Furthermore, if India's surveillance assets are able to detect the launchers, Indian Brig. (Retd.) Gurmeet Kanwal argues they will be preempted at range by Indian army units (e.g., missile launchers) or destroyed via airstrikes.³⁷ If Pakistani field commanders find themselves in danger of losing their frontline nuclear forces to the adversary, nuclear escalation will be a distinct possibility. Unauthorized use is also possible, evoking Henry Kissinger's cautionary tale of the “mad major” who acts in contravention to employment guidelines.³⁸

Pakistan is well aware that a decentralized C2 modality—or the mere forward presence of TNWs in a battlefield environment—could increase the potential for a nuclear conflagration. But according to Maj. Gen. (Retd.) Qasim Qureshi, former director of the Operations and Plans branch at SPD, the escalation risks of TNWs are not a bug but a feature of Pakistan's deterrence posture. Qureshi states, “The chances that something goes wrong resulting in a nuclear exchange cannot be ruled out. It is precisely this danger and uncertainty that from Pakistan's point of view will ensure stability of deterrence in the conventional domain.”³⁹ Perhaps Qureshi's deterrence computation will hold true, paralyzing India's political masters with uncertainty and trepidation when the next crisis brings India and Pakistan to the brink of conflict. Then again, for reasons already explained—namely the tactical limitations of TNWs against Indian armor, coupled with India's belief that its nuclear doctrine would dissuade Pakistani TNW use in the first place—New Delhi may judge that a limited conventional war against Pakistan is a practicable option.

Implications for the Indo-Pakistani Arms Race

When Pakistan conducted its first flight test of the *Nasr* in April 2011, India responded in kind just three months later with a test of the 150km-range *Prahaar*. According to an Indian government press release, *Prahaar* is a “battlefield tactical missile” that, like the *Nasr*, is solid-fueled and designed for launch from a road-mobile, multi-tube platform. The press release also stated that *Prahaar* is “capable of carrying different types of warheads,” a coded way of saying that it is a dual capable missile that can carry either a conventional or nuclear payload.⁴⁰

The tit-for-tat case of *Nasr* and *Prahaar* is a microcosm of the security dilemma and resultant arms race that consumes India and Pakistan. In the context of an arms race, a novel system or unique capability developed by one side creates an incentive for the other side to (1) match it, if not create something better, (2) seek the means to nullify whatever advantage the adversary gained, or (3) some combination of the two. Regrettably, these dynamics are in full swing on the South Asian subcontinent and appear to be magnified in the nuclear domain. Since the 1998 nuclear tests in which India and Pakistan became *de facto* nuclear weapons states, India has fielded nine nuclear delivery systems, and Pakistan has followed suit with eight of its own.⁴¹ Both countries have several more systems in the pipeline, including submarine-launched missiles. India, meanwhile, is developing an indigenous ballistic missile shield to blunt its vulnerability to nuclear strikes, and Pakistan is reportedly developing penetration aids to counter it, in the form of maneuverable reentry vehicles (MaRVs) and multiple independently-targetable reentry vehicles (MIRVs) for its 2,500km-range Shaheen-II ballistic missiles.⁴²

With regard to *Nasr*, India's most obvious riposte would be to develop its own TNWs, potentially with *Prahaar*. One problem with this course of action, however, is that TNWs appear to be incompatible with Indian nuclear doctrine, which pledges "no first use" but stipulates that an enemy nuclear attack on Indian forces would prompt massive nuclear retaliation, a volley of high yield strategic nuclear weapons against Pakistani cities and military installations. In an "all or nothing" nuclear doctrine such as India's, there appears to be little rationale for TNWs given their comparatively low yield. Thus, if India moves forward with developing TNWs, it may be accompanied by a doctrinal revision from "massive retaliation" to something more akin to "flexible response."⁴³

If New Delhi declines to develop its own TNWs in response to *Nasr*, there are conventional avenues through which India can counter the system. India will almost certainly seek to expand its means to detect, target, and conventionally destroy forward deployed Pakistani missile launchers. Indeed, there is evidence that India is already augmenting its capabilities in these areas. According to analysis by IHS Jane's, the Indian Air Force is "seeking an unspecified number of 'state-of-the-art' long-endurance [unmanned combat air vehicles] with a high operational ceiling and equipped with precision weapons and satellite datalinks."⁴⁴ By augmenting its real time battlefield awareness through drone overflights, India can increase its probability of spotting deployed *Nasr* batteries. The drones can then feed targeting data to India's manned aircraft, or they can interdict the Pakistani missile launchers with their own armaments. India can also choose to outrange the 60km *Nasr* with its own conventional missile launchers, for example the 9A52 *Smerch*, (70km firing range), or the *Pinaka*, (120km firing range, in development).⁴⁵ Of course, as the *Scud* hunters of the Persian Gulf War would attest, detecting missile launchers in a combat zone is not the easiest of tasks. However, *Nasr*'s limited range means it would likely be deployed close to the international border during conflict, greatly reducing the area that Indian reconnaissance operators must search. Furthermore, the enhanced security footprint that one might expect of a nuclear asset could make target detection and discrimination a simpler task.

In the final analysis, Pakistan's development of TNWs will intensify the arms race in South Asia, dimming the long-term outlook for strategic stability. As India augments its means to counter *Nasr*, be it through nuclear, doctrinal, or conventional methods, Pakistan will be pressed to respond with novel capabilities of its own. Yet in its quest to achieve "full-spectrum deterrence," Pakistan could impose unmanageable expenses on its defense budget and risk pauperizing itself. TNWs come at a significant financial cost. Associated expenses include enhancements to uranium extraction methods, new plutonium processing infrastructure, weapons research and development, secure storage and maintenance of warheads, specialized training for weapons handlers, warhead safety and surety measures, a robust C2 network, doctrine development, and in the case of *Nasr*, the cost of the road-mobile launch platform. These expenses are difficult to quantify precisely, but PGMs appear the economical alternative as many of the abovementioned expense categories do not apply, and the munitions themselves can be purchased relatively cheaply. In fiscal year 2014, for instance, the cost of a U.S. TOW 2 missile was \$58,600.⁴⁶ It also bears mention that, since 2001, Pakistan has obtained 2,007 TOW missiles at zero expense through the U.S. Foreign Military Financing program, which provides grants to partner nations for the procurement of defense articles.⁴⁷

Pakistan need not exclusively look to the United States for PGMs, however. Pakistan operates a Chinese anti-tank system similar to the TOW—the HJ-8 *Red Arrow*—and may be able to purchase or locally produce more at a bargain, leveraging a bilateral partnership that Pakistani Prime Minister Nawaz Sharif has called "higher than the Himalayas" and "deeper than the deepest sea in the world."⁴⁸ In any case, TNWs impose opportunity costs on Pakistan, as the funds and resources allocated for their development cannot be utilized for conventional weapons procurement.

Conclusions

TNWs are a double-edged addition to the security landscape in South Asia. They are exacerbating an expensive and destabilizing arms race, and their deterrence value against India's limited war doctrine is problematic because they are ineffective against MBTs and may even goad preemption when deployed during a crisis or conflict. In addition, there is a widely held conviction in New Delhi that India has the space to fight and win a limited conventional war under the nuclear overhang, premised on the belief that the threat of massive retaliation would deter Pakistan from firing its TNWs. Although Pakistan can mitigate these deterrence problems somewhat by pre-delegating launch authority to field commanders, doing so creates a serious risk of premature or even unauthorized use.

In light of these complications, Pakistani strategists should take a step back from TNWs and recall the core premise of Cold Start—India's belief that it can challenge and overcome Pakistan's conventional defenses in a short-duration conflict. Indeed, Cold Start's existence implies that India has grown unconvinced by Pakistan's conventional deterrent in the years since the 2001-02 military crisis unfolded. Islamabad can do more to deter India, and with much less risk, by bolstering its conventional forces through the acquisition of PGMs, such as TOW missiles. Such was the lesson learned by NATO during the Cold War, with the epiphany that PGMs (and an accompanying AirLand battle concept) could do more to stop—and by implication, deter—the flow of Soviet armor across the Fulda Gap than TNWs, while also reducing the potential for escalation into total thermonuclear war.⁴⁹

Unfortunately, however, strategic stability in South Asia is elusive at the current juncture because Pakistan is developing TNWs, India is pursuing conventional countermeasures and ballistic missile defenses, both countries are pursuing a sea-based deterrent, and jihadist outfits threaten to disrupt the peace. The continuation of these trend lines bodes poorly for long term peace and stability. Regardless of the way forward on the broader stability debate, however, the drawbacks of TNWs are substantial and merit review by Pakistan. TNWs are at best a wildcard in the Indo-Pakistani deterrence equation, and their appearance on the battlefield could escalate a localized conventional skirmish into an internecine nuclear exchange.

¹ Tactical nuclear weapons (also referred to as sub-strategic nuclear weapons) are nuclear weapons meant for use against battlefield military targets. In terms of explosive yield, the generally agreed-upon consensus for what can be labeled a "tactical" nuclear weapon is wide-ranging – as low as 0.1 kilotons (KT), 10-15 KT as a median estimate, and 1 megaton at the maximum. One KT has the explosive power of approximately 1,000 tons of TNT. See Brian Alexander and Alistair Millar, eds., *Tactical Nuclear Weapons: Emergent Threats in an Evolving Security Environment* (Washington, DC: Brassey's, 2003), 5.

² David O. Smith, *The U.S. Experience with Tactical Nuclear Weapons: Lessons for South Asia* (Washington, DC: Stimson Center, 2013), 19-21, http://www.stimson.org/images/uploads/research-pdfs/David_Smith_Tactical_Nuclear_Weapons.pdf.

³ Pakistan Inter-Services Public Relations Directorate, "PR94/2011-ISPR," news release, April 19, 2011, https://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1721.

⁴ Walter C. Ladwig, III, "An Overview and Assessment of the Indian Army's Cold Start Strategy" (conference paper prepared for "Cold Start: India's New Strategic Doctrine and its Implications," held at the U.S. Naval Postgraduate School, Monterey, CA, May 2008), 6, <http://users.ox.ac.uk/~mert1769/Ladwig,%20Cold%20Start%20NPS%20Paper.pdf>.

⁵ The catalyst that prompted India to develop Cold Start was the 2001 terrorist attack against the Indian parliament building in New Delhi, perpetrated by Pakistan-based terrorist groups Jaish-e-Mohammed and Lashkar-e-Taiba. Following the attack, India initiated Operation *Parakram*, wherein India's three strike corps was ordered to assemble along the international border. The mobilization process was extremely slow, however, taking approximately three weeks. By then, Pakistan's military was well dug-in, the international community had intervened to defuse the situation, and India's political leadership lost its will to retaliate. This failure prompted India to set in motion a doctrine and force structure review process to decrease mobilization times; the outcome of this process was the Cold Start doctrine.

⁶ Ladwig, "An Overview and Assessment of the Indian Army's Cold Start Strategy," 9.

⁷ *Ibid.*, 7.

⁸ Walter C. Ladwig III, "A Cold Start for Hot Wars? The Indian Army's New Limited War Doctrine," *International Security* 32, No. 3 (Winter 2007/08): 164. Of note, it is widely believed that the likely "trigger" that would prompt India to execute Cold Start is another major terrorist attack, like Mumbai 2008, that Indian intelligence links to the Pakistani government.

⁹ Pakistan Inter-Services Public Relations Directorate, "PR210/2014-ISPR," news release, September 26, 2014, https://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=2661.

¹⁰ The fact that Pakistan timed the April 2011 *Nasr* test to coincide roughly with the seven-year anniversary of Cold Start's pronouncement is unlikely to be a coincidence.

¹¹ Zahir Kazmi, "Weapons of Peace," *The Express Tribune* (Pakistan), June 26, 2012, <http://tribune.com.pk/story/399425/weapons-of-peace/>. The Strategic Plans Division is Pakistan's nuclear policy and planning wing. It serves as the secretariat of Pakistan's National Command Authority.

¹² Adil Sultan, "Pakistan's Emerging Nuclear Posture: Impact of Drivers and Technology on Nuclear Doctrine," *Strategic Studies*, Institute of Strategic Studies, Islamabad, 31 & 32, nos. 4 & 1 (Winter/Spring 2012): 162, http://issi.org.pk/wp-content/uploads/2014/06/1340000409_86108059.pdf.

¹³ *Ibid.*, 164.

¹⁴ Zafar Jaspal, *Tactical Nuclear Weapon: Deterrence Stability between India and Pakistan* (Monterey, CA: Naval Postgraduate School, 2012), 9, http://www.nps.edu/academics/centers/ccc/pascc/publications/2012/2012_002_jaspal.pdf.

¹⁵ International Institute for Strategic Studies, *The Military Balance 2014* (London: Routledge, 2014), 242.

¹⁶ A. H. Nayyar and Zia Mian, *The Limited Military Utility of Pakistan's Battlefield Use of Nuclear Weapons in Response to Large Scale Indian Conventional Attack*, Pakistan Security Research Unit report no. 61 (Bradford, United Kingdom: University of Bradford, 2010), 7-9, <http://www.princeton.edu/sgs/faculty-staff/zia-mian/Limited-Military-Utility-of-Pakistans.pdf>.

¹⁷ There are three components to a nuclear blast that factor into this calculation: (1) blast kill, (2) heat kill, and (3) radiation kill. Blast kill refers to the damage done by the shockwave emitted from the detonation of a nuclear warhead. Depending on the weapon strength, only armored vehicles in close proximity to the detonation site of the TNWs would be destroyed. Pakistan would require 100 TNWs at 15 KT each to destroy 1,000 tanks spaced over 300 meters apart through blast kill alone. Heat kill refers to the effects of the fireball, and heavy armor is unlikely to suffer significant damage given the fact that the heat surge is temporary and easily distributed and dissipated over an armored vehicle. For most MBTs, this would result in an estimated vehicle temperature increase of two to three degrees centigrade. Radiation kill refers to the prompt radiation emitted from the detonation of a nuclear warhead, plus the ensuing fallout. Prompt radiation has the greatest propensity for achieving mission-kill on armored targets, because it can penetrate armor and incapacitate the human operators. Again, however, wide unit spacing can mitigate the radiological damage dealt by TNWs. Nayyar and Mian conclude that "it would require the use of over 80 nuclear weapons of 15 KT yield each to disable or kill the crews in a force of 1,000 tanks [spaced over 300 meters apart]." See Nayyar and Mian, *The Limited Military Utility of Pakistan's Battlefield Use of Nuclear Weapons*, 7-9.

¹⁸ David O. Smith, *The Past as Prologue: A Cautionary Tale of the U.S. Experience with Tactical Nuclear Weapons* (Monterey, CA: Naval Postgraduate School, 2012), 9, <https://www.hsdl.org/?view&did=709867>.

¹⁹ Smith, *The U.S. Experience with Tactical Nuclear Weapons*, 27.

- ²⁰ Michael Krepon, "Pakistan's Nuclear Strategy and Deterrence Stability," in *Deterrence Stability and Escalation Control in South Asia*, eds. Michael Krepon and Julia Thompson (Washington, DC: Stimson Center, 2013), 51-2, http://www.stimson.org/images/uploads/research-pdfs/Deterrence_Stability_Dec_2013_web.pdf.
- ²¹ Rajaram Nagappa, Arun Vishwanathan, and Aditi Malhotra, *Hatf-IX/Nasr – Pakistan's Tactical Nuclear Weapon: Implications for Indo-Pak Deterrence*, report no. R17-2013 (Bangalore, India: National Institute of Advanced Studies, 2013), 27, http://isssp.in/wp-content/uploads/2013/07/R17-2013_NASR_Final.pdf; Nayyar and Mian, *The Limited Military Utility of Pakistan's Battlefield Use of Nuclear Weapons*, 4; Exercises in which the Indian military has tested its ability to operate in a nuclear environment include 1986 *Brasstacks*, 2001 *Poorna Vijay*, 2006 *Sanghe Shakti*, and 2012 *Shoor Veer*.
- ²² "Indian Army Tests Its New Cold Start Doctrine," *Hindustan Times* (New Delhi), May 19, 2006, <http://www.highbeam.com/doc/1P3-1039246601.html>.
- ²³ Michael Krepon, "Massive Retaliation," *Arms Control Wonk* (blog), entry posted April 1, 2014, <http://krepon.armscontrolwonk.com/archive/4099/massive-retaliation-2>.
- ²⁴ Zahir Kazmi, "Nothing Tactical about Nuclear Weapons," *The Express Tribune* (Pakistan), May 17, 2014, <http://tribune.com.pk/story/709277/nothing-tactical-about-nuclear-weapons/>.
- ²⁵ *Ibid.*
- ²⁶ "Experts Question Indian Missile Defense Capabilities," Nuclear Threat Initiative, last modified May 14, 2012, <http://www.nti.org/gsn/article/experts-question-indian-missile-defense-capabilities/>.
- ²⁷ Rachel Oswald, "Lethal Asymmetric Technology Will Be More Widespread by 2030: Report," Nuclear Threat Initiative, last modified December 11, 2012, <http://www.nti.org/gsn/article/lethal-asymmetrical-technology-will-be-more-widespread-2030-report/>.
- ²⁸ Gurmeet Kanwal, "Military Dimensions of the 2002 India-Pakistan Standoff: Planning and Preparations for Land Operations," in *The India-Pakistan Military Standoff: Crisis and Escalation in South Asia*, ed. Zachary S. Davis (New York: Palgrave Macmillan, 2011), 75.
- ²⁹ *Ibid.*, 77.
- ³⁰ *Ibid.*
- ³¹ South Block is the part of the Secretariat Building in New Delhi that houses the Prime Minister's Office, the Ministry of External Affairs, and the Ministry of Defence.
- ³² Nitin Gokhale, "India Warns Pakistan It's Not Afraid of Escalating Fire: Sources," NDTV, last modified October 8, 2014, <http://www.ndtv.com/article/cheat-sheet/india-warns-pakistan-it-s-not-afraid-of-escalating-fire-sources-603382>.
- ³³ Zachary S. Davis, introduction to *The India-Pakistan Military Standoff: Crisis and Escalation in South Asia* (New York: Palgrave Macmillan, 2011), 3.
- ³⁴ Kanwal, "Military Dimensions of the 2002 India-Pakistan Standoff," in *The India-Pakistan Military Standoff*, 89.
- ³⁵ *Ibid.*
- ³⁶ The Pakistani NCA is composed of the Prime Minister, the Cabinet, and the Joint Chiefs of Staff.
- ³⁷ Gurmeet Kanwal, "Command and Control in the Context of TNWs," in *Pakistan's Tactical Nuclear Weapons: Conflict Redux*, eds. Gurmeet Kanwal and Monika Chansoria (New Delhi: KW Publishers, 2014), 131.
- ³⁸ Kanwal, "Military Dimensions of the 2002 India-Pakistan Standoff," in *The India-Pakistan Military Standoff*, 75.
- ³⁹ Smith, *The U.S. Experience with Tactical Nuclear Weapons*, 33.
- ⁴⁰ Press Information Bureau, Government of India, "DRDO Launches 'PRAHAAR' - Surface to Surface Tactical Missile," news release, July 21, 2011, <http://pib.nic.in/newsite/erelease.aspx?relid=73407>.
- ⁴¹ Michael Krepon and Julia Thompson, introduction to *Deterrence Stability and Escalation Control in South Asia* (Washington, DC: Stimson Center, 2013), 14, http://www.stimson.org/images/uploads/research-pdfs/Deterrence_Stability_Dec_2013_web.pdf.
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⁴³ One way for India to make this doctrinal transition, according to analyst Manpreet Sethi, would be to replace the promise of “massive retaliation” against a nuclear provocateur with a promise to inflict “unacceptable damage” – a far more nuanced statement with a broader range of interpretation. This new semantic formulation would still commit India to meet a nuclear attack with nuclear force, but it would not require a merciless, all-out bombardment. See Manpreet Sethi, “India’s Response Options,” in *Pakistan’s Tactical Nuclear Weapons: Conflict Redux*, eds. Gurmeet Kanwal and Monika Chansoria (New Delhi: KW Publishers, 2014), 227-8.

⁴⁴ “Procurement: India,” *IHS Jane’s* (Sentinel Security Assessment – South Asia), last modified October 8, 2014.

⁴⁵ “BM-30 Smerch Multiple Launch Rocket System,” *Military Today*, <http://www.military-today.com/artillery/smerch.htm>; “Pinaka Multiple Launch Rocket System,” *Military Today*, http://www.military-today.com/artillery/pinaka_mlrs.htm. Of note, shorter range versions of Pinaka are currently operational.

⁴⁶ Joakin Kasper Oestergaard Balle, “Raytheon BGM-71 TOW,” *AeroWeb*, last modified December 15, 2014, <http://www.bga-aeroweb.com/Defense/BGM-71-TOW.html>.

⁴⁷ Congressional Research Service, *Major U.S. Arms Sales and Grants to Pakistan Since 2001*, by K. Alan Kronstadt, March 26, 2014, <https://www.hsdl.org/?view&did=751781>.

⁴⁸ Agence France-Presse, “China-Pakistan Friendship ‘Sweeter than Honey,’ Says Nawaz Sharif,” *The Telegraph* (United Kingdom), July 5, 2013, <http://www.telegraph.co.uk/news/worldnews/asia/pakistan/10161516/China-Pakistan-friendship-sweeter-than-honey-says-Nawaz-Sharif.html>.

⁴⁹ Smith, *The U.S. Experience with Tactical Nuclear Weapons*, 19-21.