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NUCLEAR COMMAND, CONTROL AND COMMUNICATIONS (NC3): THE CASE OF PAKISTAN

TECHNOLOGY FOR GLOBAL SECURITY SPECIAL REPORT



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FEROZ HASSAN KHAN
SEPTEMBER 26, 2019

I. INTRODUCTION

In this essay, Feroz Hassan Khan describes the unique challenges faced by Pakistan's NC3 given "the volatile nature of national and security situations, compounded by evolving military doctrines warranting sudden transition from peace to crises to war management." Pakistan, he notes, "is grappling with the pace of technological change, particularly cyber threats that pose new risks to national command systems in the digital environment."

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A podcast with Feroz Hassan Khan, Peter Hayes, and Philip Reiner on Pakistan's NC3 is found [here](#).

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II. TECHNOLOGY FOR GLOBAL SECURITY SPECIAL REPORT
BY FEROZ HASSAN KHAN

NUCLEAR COMMAND, CONTROL AND COMMUNICATIONS (NC3): THE CASE OF PAKISTAN
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SUMMARY

The Pakistani command and control (C2) system evolved over a four-decade period following a national consensus that deemed the development of a nuclear deterrent was a critical component of national security. Until the 1998 tests, Pakistan insisted its program was for peaceful purposes only; a culture of secrecy and deliberate ambiguity surrounds the program. Pakistan political governance vacillates between a presidential system and parliamentary system under constitutional amendments, which has affected the credibility of political control over national security. The military is the strongest institution and keeper of national security. The nuclear domain is the exclusive purview of the Strategic Plans Division (SPD) at the Joint Service Headquarters (JSHQ). After the passage of National Authority Act in 2010, JSHQ and SPD were bestowed with powers as the de jure and de facto authority on all nuclear matters on behalf of the Prime Minister.

Pakistani nuclear command, control, and communications (NC3) faces unique challenges given the volatile nature of national and security situations, compounded by evolving military doctrines warranting sudden transition from peace to crises to war management. Peacetime management is optimally stable and efficient; in times of crises, NC3 would likely face an altogether different set of challenges affecting stability in South Asia. Like other nuclear

powers, Pakistan is grappling with the pace of technological change, particularly cyber threats that pose new risks to national command systems in the digital environment.

Soon after the 1998 nuclear tests under international sanctions, India and Pakistan outlined their respective policy priorities about their demonstrated nuclear capability. While India prioritized declaring its nuclear doctrine and underemphasized amplifying command and control aspects, Pakistan went the opposite way. Pakistani policy makers considered articulation of their command and control system as a greater responsibility of an emerged nuclear power than declaring official doctrine; Pakistan believes doctrine should always be kept secret; therefore, any public articulation of it must be kept deliberately ambiguous. The contrast in the two approaches reflects the role of nuclear weapons in their respective national security policies. India's conventional force has favorable asymmetry over most of its neighbors—except with China—thus India can afford a more relaxed nuclear posture. Accordingly, its command and control system evolved with greater emphasis on political control over nuclear policies. Therefore, the role of nuclear weapons in Indian national security policies reflects the currency of power associated with nuclear weapons. Lately, however, Indian policy makers and strategic thinkers have hinted at a potential shift in Indian doctrinal thinking ranging from qualifying its no-first-use doctrine and contemplating preemptive strikes against Pakistan.¹ These shifts in military and nuclear policies are having a corresponding impact on Pakistani doctrines, with implications on the functioning of its NC3 systems as well as on strategic stability.² Pakistan is smaller with greater vulnerabilities and thus relies on its nuclear capability as a critical element of its military strategy. For Pakistan, nuclear deterrence is primarily to offset conventional force asymmetry with India and deter India from use of conventional force and to prevent nuclear coercion. Consequently, integration of nuclear and conventional force plans is a significant priority in responding to a perceived Indian threat. Since the 1998 nuclear tests, synergizing nuclear command, control, and communication (NC3) and conventional command and control system (CC3) was a primary nuclear capability management objective. With no experience in managing nuclear capability, the Pakistani military set out to develop a responsive and robust NC3 system that is deemed vital for credible deterrence.

For years, Pakistan has advertised its national command authority, its organization, and the roles and responsibilities of various sub-organizations. There was, however, no public debate to question the efficacy of national command systems, especially after its transition from peacetime management into crisis or war. Since early 1999, the conception of the nuclear doctrine, NC3, all discourse on nuclear matters has been the exclusive domain of the Strategic Plans Division (SPD) at the Joint Service Headquarters (JSHQ). SPD, the secretariat of National Command Authority (NCA), tightly controls the narrative and direction of all nuclear issues, particularly the development of strategic weapons and functioning of the NC3 systems.

From the early years, strategic planners faced the dilemma of choosing between preserving the nuclear taboo and signaling resolve of an assured use if thresholds were crossed. Should Pakistan indicate a high nuclear threshold, it would allow India the time and space to use conventional force and fail Pakistani deterrent strategy. Conversely, if Pakistan signals a low threshold, India might take a chance and call the bluff. It was determined that the best course of action was to maintain ambiguity and eschew declaring its nuclear doctrine, while keeping its NC3 system and its functioning opaque. For twenty years, Pakistan policy has aimed to convey resolve and let the onus of calculating risk rest with India.

As Pakistan modernizes its nuclear capabilities—especially after introducing triad of nuclear forces—NC3 requirements are compounding. Modernizing NC3 necessitates reliance on space and new information technologies; Pakistan is lagging far behind India in these areas. New technologies also pose fresh challenges to NC3 in terms of availability of resources, redressing vulnerabilities of dispersed nuclear forces, and maintaining secrecy of its deployed forces. In peacetime, nuclear forces train on delivery vehicles in their respective military garrisons, while nuclear warheads are stored in strategic silos under an extremely tight and robust security regime within SPD's security division. In peacetime, the highest safety and security standards are implemented in storage and silo

¹ Christopher Clary and Vipin Narang. "India's Counterforce Temptations: Strategic Dilemmas, Doctrines, and Capabilities." *International Security*, Volume 43, No. 3, (Winter 2018/ 2019), 7-52.

https://doi.org/10.1162/ISEC_a_00340

² Zachary Keck. "Billions Dead: That's What Could Happen if India and Pakistan Wage a Nuclear War." *The National Interest*, February 19, 2019. Also see "South Asia's Evolving Strategic Doctrines" (Henry Stimson Center, July 19, 2017).

facilities; however, security planners are conscious that in crises or wars these sites may be vulnerable to external attacks.

During crisis or war, short-range weapons will likely flush out from peacetime garrisons and be deployed to ensure invulnerability and survivability, as well as locate in their battlefield positions. Dispersed weapons in crisis are less safe than in storage, but battle effectiveness and survival of the deployed arsenals trump exposure to lesser safety and security conditions. Scott Sagan describes this situation as the “vulnerability-invulnerability” paradox: nuclear weapons are safe and secure in storage but vulnerable to strikes; dispersed weapons are less vulnerable to external strike thus survivable but less safe and vulnerable to accidents, accidental launches, and threats from other predators. Like other nuclear powers during the Cold War, NC3 challenges are an additional layer over several other instability factors in South Asia.³

This paper examines the evolution of Pakistan’s NC3 systems as a function of its nuclear deterrence posture. The first section traces the historical origins of NC3, explaining shifts in national governance and the informal institutional arrangement that existed prior to the 1998 nuclear tests. The second section explains Pakistan’s national command authority and managing structures and processes that evolved after the nuclear tests. The third section analyzes the legal frameworks and cultural imperatives that govern the decision-making systems in Pakistan, enacted in the National Command Authority Act in 2010. The fourth section explains the technical merger processes of NC3 and CC3 systems and organizational arrangement for positive and negative controls. The final section analyzes the always/never pressures and various tensions Pakistan might face in deploying the assortment of delivery vectors transitioning from peace to war. Finally, the paper concludes by highlighting the strengths and shortfalls of the system.

Historical Origins of NC3 System: Changes/Evolution of Ownership

The Pakistani nuclear command systems evolved in four major periods that correspond to various stages of its nuclear development and shifts in political systems in the country. The first phase (1954 - 1971) was the pre-nuclear weapons era, a period of predominant military rule that ended with defeat and dismemberment of the country in the 1971 war with India. The nuclear program in this period was for peaceful purposes under the domain of the Pakistan Atomic Energy Commission (PAEC) that functioned directly under the President/Prime Minister. The second phase lasted from 1972 to 1988. It included a brief period of civilian rule (1972- 1977) led by Prime Minister Zulfikar Ali Bhutto who is considered the political father of Pakistani’s nuclear weapon program. After the military overthrew Bhutto’s civilian government in 1977, a decade of military rule under President General Zia-ul-Haq followed, during which the Presidential system of governance was reinstated. In this period, the nuclear weapons program developed directly under the supervision of the President, who was also the Chief of Army Staff. President Zia established an inter-ministerial coordination committee comprised of the most senior government ministers, which oversaw the two scientific commissions—PAEC and A.Q. Khan Research Laboratories (KRL)—which took the lead in weapon development. This committee synergized resources on behalf of the President to ensure continuity of the weapons development program.⁴ In 1988, President Zia and several senior military leaders perished in a plane crash, after which Mr. Ghulam Ishaq, Chairman of the Senate, took over the presidency. Mr Ishaq-Khan, a civilian President, remained in office until 1993 and the nuclear program remained under his supervision, while the Army Chief General Mirza Aslam Beg ensured the nuclear program continued apace. The third phase from 1988 to 1998 saw a decade of democracy and the formation of a hybrid form of governance in the country euphemistically dubbed the “power troika,” in reference to the diffusion of power between the President, the Prime Minister and the Army Chief. These top three political-military leaders, along with the head of the two scientific commissions—PAEC and KRL—formed an informal nuclear decision-making system.⁵ While Prime Ministers Benazir Bhutto and Nawaz Sharif exchanged power twice in this period, both civilian Prime Ministers exercised nominal control over decisions on nuclear policy. The direction of the program rested with the President

³ For an analysis of paradoxes and dilemmas, see Feroz Hassan Khan, “Challenges to Nuclear Stability.” *The Non-Proliferation Review*, Spring 2003.

⁴ Adil Sultan. “Pakistan’s Nuclear Command and Control” in Naeem Salik, ed. *Nuclear Pakistan: Seeking Security and Stability*, CISS Security Series (Lahore, Pakistan: University of Lahore Printing Press, 2018) 96-97.

⁵ IBID. Though some referred to this decision-making arrangement as national command authority, it was not an institutional command and control system.

and successive Army Chiefs. In this phase Pakistan produced fissile material and nuclear warheads and developed and acquired delivery means, both air and ballistic missiles.⁶

In 1993, both the President and Prime Minister resigned after a power struggle over constitutional authority. Before leaving office, in July 1993, President Ghulam Ishaq Khan handed over all nuclear matters and decision-making authority to General Abdul Waheed, Chief of the Army Staff, as custodian of the highest and most sensitive national security priority. The Army Chief tasked the “Combat Development Directorate” in General Headquarters (GHQ) to coordinate and synergize efforts between various organizations, direct and facilitate resources for strategic weapons development, and assist the foreign ministry in nuclear diplomacy and negotiations. After elections in November 1993, though the newly elected Prime Minister and constitutional President took office, the nuclear weapons policy, development, and direction remained with the Army Chief. At the government level, the Prime Minister presided over the Defense Cabinet Committee (DCC), comprised of key civil ministers and senior military leadership, as the highest constitutional body on national security matters. The decision to conduct nuclear tests was taken after deliberations of several DCC meetings in May 1998.⁷

The fourth phase began after the 1998 tests and continues through the present. This period has seen the evolution and expansion of an institutionalized national command and control system under President Pervez Musharraf who ruled for nearly a decade (1999–2008).⁸ Musharraf brought accountability and control to the nuclear program. It took several years to reign in the loose oversight that enabled A. Q. Khan to illicitly transfer nuclear materials, technology, and expertise to Iran, Libya, and North Korea. Under an institutional arrangement, Pakistan’s deterrence strategy was refined during the 10 month military standoff in 2001–2002. President General Musharraf left office in 2008, returning Pakistan to democratic civilian rule. In the following ten years, Pakistan changed government twice through democratic elections. The nuclear management system established during President Musharraf’s military rule continues to exist and was eventually codified in legislation. In summary, since the departure of Prime Minister Zulfikar Bhutto in 1977, Pakistan’s command system has remained effectively under the control and direction of the military leadership, even as fledgling democracy progressed in the country.

Pakistan’s National Command Authority: Management Structures

President General Musharraf formally announced the National Command Authority (NCA) in February 2000, declaring SPD as secretariat of the NCA.⁹ Pakistan’s NCA is structurally grouped into three constituents: NCA, SPD, and the Strategic Force Commands (SFCs). The NCA is comprised of the highest level of decision makers and is the apex body in the country.¹⁰

NCA is the highest decision-making body that formulates policy and controls the development and employment of strategic weapon systems and exercises ultimate control over the use of nuclear and conventional assets of the country.¹¹ The Chairman of the NCA is the Prime Minister, who presides over two committees: the Employment Control Committee (ECC) and the Development Control Committee (DCC). Each committee has a deputy chairman: the Minister of Foreign Affairs is the deputy chairman of the ECC and the Chairman Joint Chief of Staff Committee (CJCS) is the deputy chair of the DCC. The ECC periodically reviews threat assessments, updates development on strategic developments, and approves response options. It provides policy directions and guidance

⁶ Retired General Mirza Aslam Beg, Chief of Army Staff from 1988–1991 in an interview with the author in 2005 described the composition of the so-called national command authority.

⁷ For greater details, see Feroz Hassan Khan, *Eating Grass: The Making of the Pakistani Bomb* (Stanford University Press, 2012) pp 269–286; 321–337.

⁸ The military under General Musharraf overthrew Prime Minister Nawaz Sharif in October 1999, which was fourth time in the history of Pakistan.

⁹ SPD was a functioning secretariat to NCA in March 1999 that brought coherence to the diverse array of strategic organizations—often working at cross-purposes and in competition with the other services.

¹⁰ The NCA is comprised of the Prime Minister (Chair) and four key ministers (Foreign, Defense, Finance, and Interior) and four service chiefs (Chairman Joint Chiefs of Staff Committee (CJSC): Chief of the Army Staff (COAS), Chief of Naval Staff (CNS), Chief of Air Staff (CAS), and Director General Strategic Plans Division (DGSPD), Joint Services Headquarters (JSHQ), who is secretary of the Authority.

¹¹ “Maritime Doctrine of Pakistan: Preserving Freedom of Seas, 2018.” (Islamabad: Pakistan Naval Headquarters, December 2018).

on nuclear doctrines and directly controls the deployment and employment of all strategic forces during crises and war. ECC provides guidance on an effective NC3 system to ensure safeguards against accidental or unauthorized use of nuclear weapons. The primary role of DCC is to implement the policy decisions of the ECC. It is responsible for preparing development strategy for approval of ECC and for oversight and development of nuclear weapons program. In peacetime, DCC functions under the CJCS (deputy chair of DCC) and is primarily responsible for systematic development of the nuclear weapons delivery means and the NC3 systems.

The second constituent—SPD—is at the center of “all things nuclear” and as the Secretariat of NCA, is entrusted with the task of developing and managing nuclear capability. SPD is a unique organization that is incomparable to any other nuclear-armed state. From operational planning, weapon development, storage, budgets, arms control, diplomacy, and policies related to civilian applications for energy, agriculture, and medicine, etc., all are directed and controlled by SPD. Headed by three-star General from the Army, it is staffed by over 100 military officers from all three services. SPD functions under the CJCS and is responsible for nuclear policy, strategy and doctrines. It formulates force development strategy for the tri-services strategic forces, operational planning at the joint services level, and controls movements and deployments of all nuclear forces. SPD implements NCA’s employment decisions for nuclear use through its NC3 systems. As explained in the next section, SPD assists national political and military decision-makers in command and control of strategic forces.¹²

The third constituent is comprised of SFCs from the three services. Each service—Army, Navy, and Air Force—have dedicated SFCs and each service does training, technical management, and administrative control in peacetime. The strategic planning and operational control of these forces, however, lies with the CJCS. SPD coordinates with all three services and integrates the planning at the JSHQ as explained below.¹³

Legal Framework and Cultural Imperatives

Though Pakistan’s NCA was announced in February 2000, SPD has been functioning since early 1999. It took nearly 8 years to establish SPD in a legal framework. In 2007, President Musharraf (also the Army Chief at the time) decided to retire from the military but retain the office as civilian President. Presidential elections were scheduled for October 2007; however, Pakistan went through a series of complex internal crises that year, including political unrest, terrorist attacks, and a constitutional crisis. On November 3, 2007, the President declared a national emergency, dissolved the parliament, and ordered fresh elections.

On December 13, 2007, President Musharraf promulgated Ordinance Number LXX of 2007 to provide for the constitution and establishment of National Command Authority. The National Command Authority Ordinance of 2007 established the President of Pakistan as Chairman of NCA and Prime Minister as Vice Chairman, with four key cabinet ministers (Foreign, Defense, Finance, and Interior) and four military commanders (Chairman Joint Chiefs of Staff Committee (CJCS): Chief of The Army Staff (COAS), Chief of the Navy Staff (CNS), Chief of Air Force Staff (CAS), and DG SPD (three star Army General) as ex-officio members of the NCA.

Key elements of the NCA 2007 were (1) All powers and functions of the authority were vested in the Chairman NCA (President of Pakistan at the time) who may “delegate all or any of these powers and functions to Director General Strategic Plans Division or such person as he may deem appropriate”; (2) NCA shall have powers “exercise complete command and control over all nuclear and space related technologies, systems and matters”; and (3) NCA shall supervise, manage and coordinate the administration, management, control and audit of budget, programs, and project of strategic organizations (PAEC, KRL, SUPARCO, and NESCOM).

Two days after the NCA ordinance was issued, on December 15, 2007, the national emergency was lifted. A new parliament was elected in February 2008. In August 2008, President Musharraf was forced to resign, bringing to an end a decade of the military rule wherein the NCA functioned under a system where the President and Army Chief held the same office. Under Article 89 of the Pakistani constitution, during a period when the Pakistani Parliament is

¹² Amongst other specific functions, SPD assists the NCA in financial, technical and administrative aspects. It undertakes measures for the safety and security of strategic assets. SPD provides inputs to the Foreign Office on nuclear diplomacy in international arms control regimes and assists in international negotiations.

¹³ Retired SPD officials’ formal presentation at conferences on “Strategic Stability in South Asia” held in 2004 and 2005 in Monterey, California, and U.S.- Pakistan Strategic Dialogue Track II organized by Naval Postgraduate School at Singapore, March 2010.

dissolved, all interim laws passed through Presidential Ordinances are subsequently adopted as law once the Parliament reassembles or a new Parliament takes office after elections.

National Command Authority Act 2010

Following the resignation of President Musharraf, Parliament elected Mr. Asif Zardari (widower of assassinated leader Benazir Bhutto) as the new President of Pakistan. The new Parliament then legislated the 18th amendment to the constitution, codifying the President as the nominal head of the state and the Prime Minister as the head of the government with powers, as is the norm in all parliamentary governance systems. The constitutional amendment also devolved political powers to the four provinces of Pakistan. President Zardari decided to step down as Chairman of the NCA and appointed the Prime Minister as Chairman of the NCA. In 2010, sequential to constitutional process, the “NCA Ordinance 2007” with amendments were legislated as “National Command Authority Act, 2010.”¹⁴ By virtue of the legislation, JSHQ /SPD became the de jure and de facto authority on “all things nuclear”—including both the military and civil aspects of nuclear programs. JSHQ/SPD is an exclusive organization; no other national security body has a dedicated secretariat comparable to SPD in functioning with authority, budgeting, and legal powers.

There are several implications arising from changes in the system of governance in Pakistan and the legal powers and functions of JSHQ/SPD. First, while President Zardari recused himself as Chairman of NCA, he remained at the apex of political power in the country. For 5 years—from 2008–2013—the Prime Minister as the constitutional Head of Government and Chairman of the NCA did not hold any real political power. The President made national decisions as if he were in a Presidential system.¹⁵ Second, the change implied one less civilian member of the NCA. Previously the NCA was comprised of six civilians and four military chiefs before the President removed himself on nuclear decisions.¹⁶ Third, the new law implied that the CJCS, under whom SPD functions, holds authority over the nuclear domain on behalf of the Pakistani government, with the Chairman of the NCA (Prime Minister) delegating “all or some of its powers to CJSC or DGSPD.” In 2013, Prime Minister Nawaz Sharif returned to power for the third time as Prime Minister. For the next five years, the NCA functioned with its Chairman (Prime Minister) also holding political power. Quite like his previous three terms, Prime Minister Sharif’s tenure was mired in domestic political confrontation and tense civil-military relations. It is hard to conceive that on sensitive nuclear issues, the Chairman of the NCA would have complete command. In its 2013 election manifesto, Mr. Sharif’s political party vowed to reform the NCA system that evolved under the Musharraf regime. However, upon coming to power, no such move was made. The only change Prime Minister Sharif made was to change Defense Cabinet Committee (DCC) to Cabinet Committee of National Security (CCNS), with “the aim to formulate a national security policy that will become the guiding framework for its subsidiary policies – defence policy, foreign policy, internal security policy, and other policies affecting national security.”¹⁷ CCNS appears to be the top body on national security and is comprised of the same members as in NCA, but does not have an elaborate and organized secretariat and, as such, is less powerful than SPD. Prime Minister Imran Khan leads Pakistan current government. To date, there has not been any public information regarding any formal NCA meeting at JSHQ/SPD to assess changes in national policy on nuclear matters.

Given the background of the country’s governance, evolution of nuclear management, and legal systems, it is clear that the military maintains authority over the national security domain, whereas JSHQ and SPD maintain authority over the nuclear domain. In most cases, the President/Prime Minister approves major policy issues on classified development projects prepared by SPD as secretariat and with the recommendations of the CJSC. The NCA meets periodically and formally approves developments plans and policy directives, but these processes are obviously classified. Following NCA meetings, public statements are typically issued through Inter- Services Public Relations (ISPR).

¹⁴ http://www.senate.gov.pk/uploads/documents/1363266864_393.pdf

¹⁵ Two Prime Ministers held office during President Zardari’s tenure, but the elected government completed its five years in power. Prior to attaining nuclear capability, the Pakistani war cabinet included the President. It is unclear what the President’s role as part of the war cabinet would be with the enforcement of the NCA 2010.

¹⁶ Previously NCA comprised six civilians (President, PM, Foreign, Defense, Interior, and Finance Ministers) and four military chiefs and DGSPD as the secretary.

¹⁷ Dawn News, August 22, 2013, <https://www.dawn.com/news/1037613>.

Technical Merging NC3 and CC3

SPD frequently undergoes organizational expansion and changes within. Its core functions are executed with five major directorates: the Operations Directorate; the Strategic Weapons Development Directorate; the Arms Control and Disarmament Directorate; the Command, Control and Communication and Intelligence (C3I) Directorate; and the Security Division that has several directorates within it. A Technical Directorate also supports the C3I Directorate, with the system evolving over the past two decades. SPD began studying the NC3 systems of all major powers, integrated the experiences of Army, Navy, and Air Force conventional C3 systems and subsequently created an integrated Pakistani NC3 system. SPD concluded that the effective employment of strategic forces required a dedicated strategic NC3 system separate from the conventional command, control, and communication (CC3) system. In addition, surveillance and reconnaissance means the integrated strategic intelligence networks are now capable of reporting real-time information for accurate decision-making.

SPD progressively developed an elaborate NC3 system that includes Command, Control, Communication, Computer (C4); Information and Intelligence (I2); and Surveillance and Reconnaissance (SR). This erstwhile C3I Directorate is designated C4I2SR Directorate. Under its fold, Pakistan synergized all service resources on cyber, intelligence, surveillance and reconnaissance (ISR) and electronic warfare and space assets. Organizations such as Space and Upper Atmosphere Research (SUPARCO) and Defense Science and Technology Organization (DESTO) were previously functioning under different ministries and reporting channels have now been placed under the centralized control of the SPD.¹⁸

At JSHQ, the communication systems of the three services, along with civilian and military intelligence agencies inputs, are integrated to produce a net assessment of threats that is available to the highest civilian and military leadership. JSHQ is responsible for the organization and functioning of the National Command Center (NCC), which links the conventional force military operations, naval operations, and air force operations into an integrated system (CC3). After SPD was formed, its C2I2 SR Directorate evolved a dedicated nuclear (strategic) communication system (NC3). At NCC, a common operational picture (COP) is available that merges all national surveillance and reconnaissance capabilities, integrating satellite, drones, and other information means from all three services.¹⁹ The communication system is backed with several redundancies and is a secure, dedicated communication system with procedures that are updated as the information age evolves and new innovations in cyber, space, and information technology domains are introduced.

The NCC system facilitates NCA's decisions both on conventional war-fighting options as well as decisions to deploy and redeploy nuclear forces and assess thresholds for employment of nuclear weapons. Further, as Pakistani arsenals grow to meet full spectrum deterrence and requirements of fielding a nuclear triad, the Pakistan command systems are evolving into "fully automated" systems. In 2012, following a flight test of air launched cruise missile (ACLM) *Raad*, Pakistan Inter-Service Public Relations (ISPR) announced:

*"A major additional factor of today's test was the effective employment of National Command Authority fully automated Strategic Command and Control Support System (SCCSS). It has enabled robust Command and Control capabilities of all strategic assets with round-the-clock situation awareness in digitized network centric environment decision makers at National Command Center (NCC). This system has the added capability of real-time monitoring of missile flight path."*²⁰

Nuclear Planning: From Relaxed to Readied Posture

Pakistan's nuclear planning began in the shadow of India's changing military doctrines, specifically India's public declaration of "limited war doctrine under the nuclear overhang" in early 2000. Within 3 years of demonstrating

¹⁸ Former DG SPD, Lt.Gen (Retd.) Khalid Kidwai in visit to Stanford University in March 2015 explained the roles, functions and structure of managing nuclear systems. Earlier in 2006, Gen Kidwai addressed at the Naval Postgraduate School, Monterey California. SPD has now seemingly closed discussing nuclear matters and management system publicly.

¹⁹ Each of three services have respective surveillance picture known as "Recognized Land Picture," "Recognized Maritime Picture," and "Recognized Air Picture" that is merged into common operation picture for decision making at the highest level at NCA. See Pakistan's Maritime Doctrine (Lahore: Pakistan's Naval War College, December 2018)

²⁰ Press release cited in Feroz Hassan Khan and Mansoor Ahmed, "Pakistan, MIRVs, and Counterforce Targeting, in Michael Krepon et al eds. *The Lure and Pitfalls of MIRVs: From First to the Second Nuclear Age*. (Washington D.C.: Henry L Stimson Center, May 2016), 149–176.

nuclear capability, India readjusted its military doctrine and conceived waging a new form of conventional war against Pakistan. The “limited war” concept sought to exploit the strategic space between existential low intensity conflict and perceived Pakistani nuclear thresholds for a swift conventional war. India’s military operations would be limited in scope, geography, and time to end the operations before Pakistani nuclear thresholds were crossed.²¹ Around that time, Pakistan’s newly established NCA was still in its infancy and still in the process of developing force structure that evolved into Pakistan’s 5 point deterrence policy, which included command and control system as an essential element.²² Planning for a nuclear strategy initially focused on deterring India in general from political-military coercion, threats to its political sovereignty, and preventing war. Such an objective did not require readied arsenals; a recessed deterrent posture based on counter-value targeting was sufficient to ensure stability. Accordingly, Pakistan’s initial NC3 configuration catered for a relaxed posture to meet deterrence objectives that would shift to low alert status for just-in-case contingency in periods of tension. India’s conventional force mobilization allowed enough time, space, and indicators to employ counter mobilizations, initiate bilateral CBMs, backdoor communications, and/or multilateral diplomacy to diffuse tensions before crises could deepen. India and Pakistan, however, live in a tinderbox environment with crisis on the brink as low-level insurgency has simmered for over three decades since the Kashmir separatist movement erupted in 1989.

Islamabad reevaluated its deterrence posture in the wake of three developments: the Kargil crisis (1999), military standoff (2001–2002), and Indian nuclear doctrine (2003). In a few years, India’s limited war doctrine was refined as “proactive operations” – colloquially called Cold Start. Pakistan now faced prospects of a cross-border attack with little to no notice – triggered by a terrorist attack – while offensive land/ air forces are simultaneously mobilizing.²³ To deter India’s conventionally larger forces operating against Pakistan’s elongated rectangular geography, especially after enunciation of India’s new limited war doctrine, a relaxed deterrent posture was no longer feasible. India tested the Pakistani deterrent during the 10 month military standoff in 2001–2002, after which, integrating conventional and nuclear forces into a comprehensive deterrence posture became a greater priority.²⁴ In February 2002, at the peak of the military standoff, the then Director-General of SPD, Lieutenant General Khalid Kidwai, asserted four determinants for a nuclear-use in an interview with two Italian scientists: territorial space (invasion); destruction of forces (firepower); economic strangulation (naval blockade); and domestic instability (inducing insurgency/domestic instability for military invasion - as done in erstwhile East Pakistan in 1971).²⁵ These criterions for nuclear-use decision are deliberately imprecise, but the signaling intent is clear to India’s political leadership, armed forces, intelligence agencies, and the international community.

Stemming from the above dynamic conditions, the NC3 system evolved to enable readied arsenals to transition from peacetime safety to effectively deployed arsenals under the centralized control of the NCA. Pakistan’s command system should be responsive if any of the four thresholds conditions General Kidwai identified should occur. Absent those conditions, the command system must also ensure no nuclear use, which pits Pakistan into Peter Feaver’s

²¹ In January 2000, Indian Defense Minister and Army Chief propounded a concept of “limited war under the nuclear umbrella,” which proffered use of India’s conventional force superiority without crossing nuclear threshold and defined as “limited conventional operations in scope, geography and time” to start and terminate military operations on India’s terms and conditions without crossing the Pakistani nuclear thresholds. This concept was later refined and dubbed the “Cold Start Doctrine.”

²² Peter Lavoy describes five major elements of Pakistani nuclear deterrence policy: conventional–military component; minimum nuclear deterrence; adequate stockpile and delivery means; and a responsive strategic command and control system. See Peter R Lavoy, “Pakistan’s Nuclear Posture: Security and Survivability” in Non-Proliferation Education Center, January 21, 2007, available at <http://npolicy.org/article.php?aid=291&tid=30>

²³ Most likely triggers for an India- Pakistan crisis stem from a spectacular terrorist attack resembling the Indian parliament attack in 2001 or the Mumbai attack in 2008. Other triggers could be shooting down a military aircraft on routine patrol like the one in August 1999, when India shot down Pakistan Navy maritime patrol plane.

²⁴ See Brig (Retd.) Feroz Hassan Khan, “Pakistan’s Nuclear Force Posture and the 2001–2002 Military Standoff” in Zachary Davis, ed, *The India-Pakistan Military Standoff: Crisis and Escalation in South Asia*, (New York: Palgrave Macmillan, 2011) 127–142.

²⁵ Former Director General SPD Lt. General Khalid Kidwai publicly announced four conditions that would determine decisions on nuclear use in an interview with Italian scholars in February 2002 at the peak of India-Pakistan military standoff. Paolo Cotta-Ramusino and Maurizio Martellini, “Nuclear Safety, Nuclear Stability and Nuclear Strategy in Pakistan,” Concise Report of a Visit by Landau Network—Centro Volta, 21 January 2002.

never/ always dilemma.²⁶ Transiting from peace to war, this paper will examine the various alerting options Pakistani (and possibly Indian) planners are likely to confront.

Alerting and Targeting Options

In peacetime, India and Pakistan maintain non-deployed and non-alert status, but this status would certainly change during pre-war conventional force mobilization. Further, with the introduction of sea-based deterrents and reports that some of India's ballistic missiles in canisters imply that India and Pakistan arsenals would soon be no longer non-deployed.²⁷ Strategic planners have at least four targeting possibilities to choose from: preempt at force assembly or consider early use at the start of hostilities (counter force); interdict follow on forces (counter force); decapitate political-military leadership (counter control); and target industrial mainland (counter value). Each of these targeting possibilities requires different choices in weapon system and alerting options that NC3 systems will have to cope with.

With the region prone to sudden outbreak of crisis and wars, there is little transition time to disperse fully mated weapons from peacetime safety mode to "ready to launch" state. The NCA will have to contend with three launch conditions: launch on warning, launch under attacks, and launch on orders. If the NCA places all systems on launch on warning, it would require the NC3 system to have enough capability to receive adequate, timely warning. Given the short distance and the fact that the command systems are not yet technically configured to assure timely and accurate information, it is unlikely that Pakistan (or India) would have such posture. Launch under attack implies that, should nuclear forces come under attack from the enemy missiles, some or the bulk of active missiles are launched as soon as incoming nuclear missiles begin targeting on territory. Again, this posture assumes availability of accurate tactical warning and implies pre-delegation authority to employ under attack. Besides being too dangerous, such a warning is highly unlikely to be available to Pakistan or India. The most likely condition in South Asia is launch on orders.

Launch on orders presupposes centralized positive control, assured invulnerability of the NCA from preemptive decapitation, and foolproof communication with several redundancies. Again, the NCA must have reliable intelligence, accurate information, and a process of speedy transmission of decision orders. Pakistani officials have assured that, under all circumstances, the NCA will have redundancies and contingency plans for centralized control and organized pre-delegation systemically. As explained above, the surest system would be peacetime storage where weapons are non-mated and essential components are separated. As a crisis unfolds, weapons and critical components are dispersed to secret locations and nuclear weapons readied for launch in a highly classified manner. In a war situation, nuclear weapons mated with delivery means will be poised to provide "full spectrum deterrence" – a menu of tactical, operational and strategic options for Pakistan's NCA. SPD would have prepared all hypotheses and, accordingly, prepared NC3 systems for all contingencies.²⁸

Strategic Stability: The Never/ Always Dilemma

In 2011, Pakistan introduced *Nasr* – a short-range ballistic missile system (60-70 kms maximum range) – believed to be Pakistan's answer to India's Cold Start.²⁹ These tactical nuclear weapons (TNWs) would be flushed out of peacetime storage to the operational site in a timely manner to affect battlefield deterrence.³⁰ Battlefield nuclear weapons generate new complications for the articulation of NC3 as NATO forces experienced during the Cold War

²⁶ Christopher Clary. "Command and Control Challenges of New Nuclear Powers: The Case of Pakistan", Master Thesis, Naval Postgraduate School, 2005. Peter D. Feaver. "Command and Control in Emerging Nuclear Nations," *International Security* 17, no. 3 (Winter 1992–1993).

²⁷ India's space assets are growing, as U.S.- India partnership solidifies; India is making significant improvement in ISR and EW capabilities. With the introduction of sea-based deterrents and canister warheads in Indian missiles, Pakistani NCA might sense greater vulnerability of their dispersed strategic assets. The direction of South Asian modes is increasingly more towards readied arsenals with launch on warning.

²⁸ Christopher Clary, "Command and Control Challenges of New Nuclear Powers: The Case of Pakistan," Master Thesis, Naval Postgraduate School, 2005.

²⁹ Rodney W Jones "Pakistan's Nuclear Poker Bet." *Foreign Policy*, May 27, 2011. <https://foreignpolicy.com/2011/05/27/pakistans-nuclear-poker-bet/>.

³⁰ Pakistani nuclear establishment does not use the term "Tactical nuclear weapons" and insists calling it short - range strategic systems.

in Europe. Their location is certain to be within the vicinity of the conventional defenses given its short range. In the Pakistani case, while nuclear forces are controlled under a dedicated NC3 system linked to SPD for NCA's employment decision, the conventional forces C3 system operates separately for all three services. Conventional force field commanders are not involved in nuclear force employment decisions that must only come from NCA, where all services chiefs are present.

In 2017, Pakistan demonstrated sea-based capabilities with the flight test of a naval version of a cruise missile from a submerged platform (simulated for diesel submarine). Nuclear weapons at sea, however, pose a different set of NC3 and CC3 problems for the Navy. The Pakistani concept of naval operations is still evolving and has not yet determined whether its submarines would patrol continuously at sea or would remain on shore or in harbor (analogous to a bastion strategy). The introduction of sea-based strategic deterrence (SBSD) brings in its wake altogether different NC3 complications, especially relating to pre-delegation.

Positive and Negative Controls: Permissive Action Links (PALs) Equivalent

Pakistan insists that NCA will maintain centralized control of all weapons—including TNWs - under all conditions of war. Pakistani warheads likely have some codes built into the warheads at assembly. The weapon would become operable only when NCA authorizes and SPD releases the codes that are inserted into the weapon systems, which is done in utmost secrecy. Unlike Cold War deployments in Europe where there were complex procedures and stages of moving TNWs to battlefield, Pakistani nuclear weapons are deployed on its own national territory. Given short distances and the necessity of speed and consciousness of vulnerability, Pakistani NC3 systems have layers of redundancies to ensure successful and safe communications to the field, which are classified. Pakistani authorities do not publicly articulate the technical nature of NC3 functions in peace and transition to war.

The Pakistan command system is unlikely to have assertive control technological tools comparable to those the United States and Soviet Union used during the Cold War. Further, as explained, the nature of threat Pakistan confronts is characteristically different than those faced during the Cold War.³¹ In the Pakistan case, the suddenness with which the environment switches from peace to crisis and war posits a significant strain on command and control systems. SPD has developed operational procedures to maintain assertive centralized control at all times.³² Arguably, transitioning from centrally assertive systems during periods of relative calm to a delegate control system in critical time in the midst of military crisis or war risks inadvertence and possible mistakes.

As Peter Feaver described, “leaders want a high assurance that weapons will *always* work when directed and similar assurance weapons the weapons will *never* be used in the absence of authorized directions.”³³ Confronting the “always/never” dilemma is inescapable, especially when nuclear weapons are deployed under crises and escalating conventional war. The foremost dilemma the NCA faces will be to meet the conflicting demands of keeping weapons safe, yet ready when required. Next, fully deployed nuclear weapons risk adversary preemptive strikes on the excuse of posing imminent threat. An even more difficult challenge would be overcoming tension between ensuring effective launch when commanded yet remaining invulnerable to hostile preemptive strike. The compulsion for survival and invulnerability necessitates dispersal, camouflage, and concealment. In terms of safety, the control factor is significant especially since mated weapons are susceptible to risks of inadvertence (accidents, accidental launches, or unauthorized launches).³⁴

Western scholars fear “the risks of communication failure, accidents, and theft” are higher in this case. For Pakistan, the down side risks with the pre-delegation are inescapable with the assurance that weapons system function effectively when directed.³⁵ As explained, in the face of invading Indian military forces, the “*always* would likely

³¹ Feroz Hassan Khan. “Nuclear Command-and- Control in South Asia during Peace, Crisis and War.” *Contemporary South Asia* 14(2), (London: Routledge, Taylor and Francis, June 2005), 169.

³² In his speech at Stanford University March 2015, former DG SPD assured that SPD has developed command and control procedures that enables assertive control of NCA of all weapons at all times in peace, crisis, and wars.

³³ Peter Feaver. “Command and Control in Emerging Nuclear Nations.” *International Security*, Volume 17, Issue 3 (Winter, 1992–1993) 163.

³⁴ Christopher Clary, Pakistan Command and Control, MA thesis, 2005.

³⁵ *Ibid.*

trump the *never* to prevent military defeat.”³⁶ The most likely danger in the midst of conventional war is an adversary’s attempt to decapitate or target the command systems with air, naval, and multiple delivery means with smart munitions and sophisticated cyber-attacks. Balancing effective response and invulnerability requires sophistication of the command systems, especially in the digitized security environment. While the level of sophistication of the Pakistani command systems are unknown, given the complexity due to innovative technologies explained above, for deployed arsenals the system could likely tilt towards partial pre-delegation. A partial pre-delegation refers to conditions where field commanders in physical possession of nuclear weapons are functioning under standing operating procedures (SOPs), linked with redundancy and backup channels wherein instructions are clear in the event of communication breakdown.³⁷ Breakdown in communication systems with the central authorities in war is usual and all command system relies on redundancy. Under these circumstances dispersing nuclear warheads unmated with delivery means are dangerously exposed to enemy attacks where higher safety coefficient may fail-safe (impotent rather than deadly). In that event, the NCA faces greater risk of deterrence failure and thus highly destabilizing.³⁸

Given the above pros and cons, three options could be exercised in event of crisis and war. First, disperse fully mated nuclear weapons to deployment sites, issue partial pre-delegation orders, and maintain assertive control. In this option NCA’s main challenge would be minimizing the danger of unauthorized launch; therefore, assured communication at all command levels would be critical. The second option is to disperse unmated or separated components under central authority for mating at deployed sites on NCA orders. In this choice, weapons will be safe from inadvertence but assertive control risks that the system failure to respond when required, especially under surprise attack. Given the fragile nature of stability and increasing Indian ISR and military modernization, it is highly unlikely that Pakistan would rely on this option. Third, the NCA can make no changes in the posture during crisis and conventional war and keep weapons under peacetime assertive control. This option is optimally stable but assuring stability erodes deterrence, forcing the NCA into the tension between deterrence and stability.³⁹ Pakistan’s command and control challenges would be most critical to stability if India undertakes the misadventure of attacking dispersed Pakistani nuclear weapons. Pakistan relies on mobility, dispersal, and hardened silos to make it invulnerable and invisible, and its force posture is designed for an assured retaliation to cause unacceptable damage. Under South Asian conditions, nuclear stability cannot be assured as long as the dilemma of control vs. vulnerability continues. Tightly controlled nuclear weapons are exposed to loss of control of central authority at the maximum and break down of communication at the minimum. Decentralized controls are prone to theft and unauthorized use at the maximum, and inadvertent use through miscalculation or misperception at the minimum.⁴⁰ Pakistan’s system seems to be modernizing, based on recent Pakistani NCA meeting announcements, but there is no public information about the level of sophistication. As NC3 gains sophistication, control of partial or full pre-delegation regimes would likely be refined to overcome the never/always dilemma of deployed arsenals in the field.

Conclusion

The Pakistani command and control system evolved over decades of development of Pakistan’s nuclear program. From the outset, the nuclear program was considered the highest national security objective. For the majority of its history, Pakistan insisted its program was peaceful and non-military. In 1998, India’s nuclear tests forced Pakistan to demonstrate its capabilities. Nuclear program decisions and details were always kept with the highest civil-military authorities. For a brief period in the 1970s when Prime Minister Zulfikar Ali Bhutto was in office, the program was under full civilian control. Since 1977, the military has predominantly been the guardian of the program, both in

³⁶ Ibid.

³⁷For discussion on “partial pre-delegation” see Feroz Hassan Khan, “Nuclear Command-and- Control in South Asia during peace, crisis and war.” *Contemporary South Asia* 14(2), (London: Routledge, Taylor and Francis, June 2005), 168-169. Also Christopher Clary, MA Thesis, 2005.

³⁸Ibid. Also see Sébastien Miraglia. “Deadly or Impotent? Nuclear Command and Control in Pakistan.” *Journal of Strategic Studies*, 36:6, 841-866, 30 December 2013.

³⁹ Feroz Hassan Khan. “Nuclear Command-and- Control in South Asia during Peace, Crisis and War.” *Contemporary South Asia* 14(2), (London: Routledge, Taylor and Francis, June 2005), 168-169. The author acknowledges Chris Clary’s analysis of the never/ always dilemma applied to the case study of Pakistan for his MA thesis on Pakistan command and control at Naval Postgraduate School, 2005.

⁴⁰ For comprehensive analysis of dilemma and paradoxes, see Feroz H Khan, “Challenges to Nuclear Stability,” *The Nonproliferation Review*, March 2003. Also refer to Chris Clary, Pakistan command and control, MA thesis.

control and direction. Pakistan has undergone several constitutional crises on governance throughout its history but, in particular, during the history of nuclear weapons program. Pakistan vacillates between a strong federation under a presidential system that the military prefers and a parliamentary system under a strong Prime Minister with devolution of power to the provinces. This seesaw in the political governance system has affected the credibility of political control of the national security. The military is the strongest institution and most viable in the country and the keeper of national security. The nuclear domain was always with JSHQ and SPD and is, over past several years through legal processes, the de jure and de facto authority on behalf of the Prime Minister.

Pakistani authorities jealously guard the technical aspects of the evolving NC3 systems. SPD as the secretariat of the NCA retains centralized control (negative) over all nuclear weapons under all circumstances in peace, crisis, and wars. SPD has most likely developed a code-based system to ensure nuclear weapons are safe from unauthorized use and two or three-person rule to execute the employment. With the introduction of tactical or battlefield nuclear weapons (TNW) and sea-based nuclear weapons, centralized control and pre-delegation (partial or complete) may be more complicated in the future. With technological innovation and the information age revolutions, the NC3 will evolve much more differently than it has in the past two decades. Already, Pakistan NCC has announced a fully automated system to provide complete picture to the NCA.

Pakistan's NC3 system is robust and efficient in peacetime with JSHQ/SPD in full control. In the past decade civilian governments have changed twice; the NCA system has remained unchanged. In 2013, the election mandate of the winning party (Pakistan Muslim League—Nawaz) pledged to review the NCA system, but throughout their 5 years agreed to allow the existing system to function. Though there have been few attempts to revise and reform the NCA Act 2010, primarily to seek greater clarity on the responsibility of political leadership, discussion on the subject in the Parliament is avoided due to the sensitive nature of the nuclear subject. At this point in Pakistan's nuclear history, the NCA functioning under the CJSC/SPD seems to have national consensus.

Key Documents

- NCA Act as passed by Parliament in March 2010: http://www.senate.gov.pk/uploads/documents/1363266864_393.pdf
- Amendment in NCA Act: Passed in 2016: http://www.senate.gov.pk/uploads/documents/1483528600_658.pdf
- Report of Senate Defense Committee on Amendment discussion: http://www.senate.gov.pk/uploads/documents/1479894959_743.pdf
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III. ENDNOTES

IV. TECHNOLOGY FOR GLOBAL SECURITY INVITES YOUR RESPONSE

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