

Nuclear Command and Control Issues in Pakistan

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Thank you for inviting me to speak. It is a privilege to exchange views with such a distinguished group, and hope that I can make a small contribution to the important subject at hand.

Mr. Shahi has just made important observations on the nuclearization of the Subcontinent, the rising temperature in military relations with India, the dangers of nuclear escalation, and the crucial objectives of stability, thus setting the stage for this conference.

Mr. Tanvir Ahmad Khan also made landmark contribution in his think piece on “A Command and Control System,” in DAWN on February 15. That article not only succinctly defined the ingredients of effective nuclear command and control but bracketted most of Pakistan’s urgent concerns about the subject very neatly. If I might just comment on the points in that piece stood out in my mind, including certain delicate observations that a Pakistani can make better than a foreign visitor, they were the following:

1. At the conceptual level, an effective command and control system is at the heart – indeed, it forms the central nervous system – of a credible nuclear deterrent infrastructure. It is a critical prerequisite for a stable balance of nuclear deterrence between two nuclear-armed rivals – evidently the case now between India and Pakistan.
2. Pakistan’s choices in this arena are difficult because it does not have the luxury of great national wealth and India’s military capabilities are highly asymmetrical, not only in nuclear-related infrastructure but also in conventional military forces. Pakistan’s

relatively greater vulnerability in the relationship with India has implications for Pakistan's nuclear posture, as well as the requirements of the command and control system and the operational readiness of the force structure it would support.

3. Command decentralization and physical dispersal of the deterrent force elements could be crucial, given this asymmetry, to the survivability of Pakistan's deterrent force and therefore to the robustness of deterrence.

4. Whereas Pakistan recently has announced a National Command Authority structure for nuclear forces, much work remains to be done to organize top level crisis decision making to ensure sound national decisions when circumstances dictate rapid response and there is little time to deliberate.

5. The dangers of the new nuclear-armed situation in South Asia are now so urgent as to warrant outside technical help on developing effective command and control mechanisms, although the Treaty on Nonproliferation of Nuclear Weapons (NPT) is a well known international legal obstacle to any assistance with nuclear weapons.

6. Finally, dialogue with India remains indispensable to a nuclear restraint and stability regime, presumably to prevent the onset of military crises in the first place, and to manage them without losing control if they occur.

Key Questions and Issues on Pakistani Command and Control

My presentation will take up the following basic issues that Pakistanis will have to address in elaborating a stable command and control system for nuclear weapons. My remarks, however, will not necessarily follow exactly the order of these issues as I list them here, since there are threads and relationships to which one must return in more than one context:

- A. What does Pakistan's situation call for, in human and technical terms?
- B. What can Pakistan do reasonably well by itself?
- C. What are the gaps that may be the most difficult to fill?
- D. What could go wrong?
- E. What are the self-help measures to narrow the range of what could go wrong?
- F. What external forms of help are available, and how would they matter?

I. Controls over Nuclear Weapons: Positive and Negative Controls

Nuclear command and control is similar in important respects to all professional military command and control. Military command and control takes guidance from national defense goals and strategy. With those goals and strategy in mind, it consists of human, organizational and technical means of applying military force, or the threat thereof, for maximum effect, offensively or defensively.

Nuclear command and control is also distinct in important ways from conventional command and control because the use of the nuclear means for military purposes is so irrevocable, and the consequences so likely to be catastrophic. Hence, designated personnel with specialized training, equipment and procedures usually are dedicated to core nuclear operations, and secrecy, procedural standards, and safeguards are higher than for conventional military operations.

The priority of deterrence over sustained combat places a high premium on not launching or firing nuclear weapons at all, and never prematurely – even though a conventional war may be raging and conventional munitions are being expended at a high rate. For, once nuclear weapons are used, the consequences of retaliation are likely to be uniquely painful and potentially far more indiscriminate than from a conventional attack. The word often used to describe nuclear war consequences is “incalculable.” Hence, the threshold for nuclear strikes usually is vastly higher than for conventional strikes. Nuclear command and control must be rigorous enough to ensure that the nuclear threshold is not crossed until and unless absolutely necessary.

Another distinguishing benchmark of nuclear command and control is a much higher premium on weapons safety. The safe and secure handling of nuclear weapons is critical for national security. All military ordnance requires attention to safety in handling to protect civilians as well as military operators, but the safety of nuclear weapons takes extraordinary precedence. Nuclear weapons should be designed so that they cannot explode as a result of handling accidents, such as from shock in a truck or train accident, when dropped from some height, or when exposed to a fire, to electric shock, or to an explosive blast. This safety requirement has two sides to it. One is the protection of the home society against massively destructive accidents from nuclear weapons in storage or transit. The other is that in tense military situations, an accidental nuclear detonation, especially near the front lines, may be mistaken by the opponent as the beginning of a nuclear attack, triggering steps by the opponent to attempt to thwart nuclear attack or begin nuclear retaliation.

Related closely to safety but better described as a physical security concern about nuclear weapons is the requirement that they not be operable or capable of sustaining a nuclear detonation until deliberately “armed” or “enabled”. This also has two sides to it. One is ensure that nuclear weapons cannot be launched or fired unless this has been authorized by central decision makers and the top command. It is vital to prevent situations with nuclear weapons in which a local operator can start nuclear war as easily as a soldier might discharge a rifle or an artillery gunner might fire a shell. The other aspect is to protect against the operability of nuclear weapons that might be stolen by terrorists or by insurgents.

These features help to illustrate what is meant by positive and negative controls in an effective command and control system. Negative controls are to ensure safety (preclude accidental detonation), to block unauthorized use of nuclear weapons by military operators, and to prevent thieves from being able to use stolen weapons.

Positive controls go hand in hand with the negative ones. They are designed to assure that nuclear weapons will work according to specifications when authorization of launch has been ordered, when separated components are assembled, and/or when enabling codes or keys have been issued, but also that the weapons would not work when these steps are missing. Positive controls also include other technical capabilities and functions, such as secure and redundant communications, designed to survive under attack, and plans and procedures designed to target and employ nuclear weapons for maximum accuracy and military effect.

The now well-known term “permissive action links” (PALs) refers to technical means of control – usually electro-mechanical locking devices -- that have both negative and positive features. They would preclude a weapon from being operable until it is armed or enabled by appropriate codes. Some PALs may also be designed to disable weapons, by having sensors to react if the weapon is being tampered with, or if efforts are made to use invalid codes or procedures. Disabling mechanisms may simply make a weapon inoperable, a useful (albeit temporary) defense against theft or terrorism.

Features of a nuclear command and control system that could offer additional protection against unauthorized actions might consist of: (1) separation of nuclear weapons from delivery systems until a very late stage in a crisis, e.g., until escalation has reached the nuclear threshold during a conventional war; and (2) mechanisms that block the firing of dedicated nuclear delivery systems by the local military operators, until authorizing commands and enabling codes have been received.

An inherent problem with negative controls for military responsiveness is that they may be inefficient or unreliable and prone to be released too late. An attack, even a conventional one, might destroy nuclear delivery systems before they are enabled, or before nuclear weapons have been mated to them. Thus the imposition of controls against unauthorized use or theft presents tradeoffs and risks of a different kind – risks that the deterrent system will be crippled by internal restrictions.

II. What can Pakistan readily accomplish by itself in developing nuclear command and control?

Two observations can be made here:

(1) At least as important, if not more important, than the level of sophistication of the technical controls is the quality of the personnel who are assigned to man the command and control system, handle nuclear weapons, and operate nuclear-capable delivery systems. Rigorous screening for loyalty and reliability coupled with careful training and exercising of these personnel, and their insulation from divisive group or partisan politics, would be a high priority. This requires practice and discipline. Rigorous results cannot be taken for granted. They have to be developed through training and hard work. But recruiting and training effective personnel is an internal human and organizational matter, not a subject of technology transfer.

(2) The generic workings of electro-mechanical locks and disabling mechanisms for the safety and security of nuclear weapons, and engineered devices ensuring centralized fire control over delivery systems, do not require knowledge or skills that Pakistan does not already have or could not easily obtain from unclassified sources. The only safety refinement that has been adopted widely in the West that I would guess Pakistan today may not have a ready solution to is the use of “insensitive high explosives” in the chemical explosive triggering assembly. But this is not an insuperable problem either.

Well-meaning Western social scientists and policy pundits who want to help India and Pakistan to acquire the technical means of controlling nuclear weapons quickly, ostensibly in the interests of nuclear stability, are presuming that Pakistan and India are technically backward or incapable on these nuclear safety matters. I believe this view is mistaken or at least exaggerated. To be sure, there would be a gap in cumulative experience with the handling of nuclear weapons and related technology, but that is different from technical incompetence.

III. Where are the most serious technical deficiencies in Pakistani C4I like to be?

My guess is that the most serious technical deficiencies in Pakistani nuclear command and control today would be in three areas:

- (1) deficiencies in the robustness, survivability, and reliability of key links in the nuclear weapons storage, assembly, and transport infrastructure;
- (2) deficiencies in the reliability and secrecy of communications through the command hierarchy during wartime; and
- (3) deficiencies in the national technical means of warning of attack, characterization of attack, and post-attack assessment of the results of both defensive and offensive military operations.

Compared to nuclear weapons safety issues, the technical challenges of redundant infrastructure and communications hardening, and of overhead surveillance, pre-attack warning, and nuclear attack assessment are formidable and expensive. These would be hard for Pakistan to do by itself, in a hurry, and the sequencing of various new capabilities or improvements could involve its own challenges.

The underlying problems for nuclear command and control system reliability and survivability here are of two kinds, one generic, and the other situational. The generic problem is that if a conventional conflict escalates to the nuclear level, or a crisis gives way to expectations of deterrence failure and nuclear exchange, the military commands almost certainly would prefer to attack the opponent’s nuclear command and control system and its nuclear storage and transport infrastructure as high priority interdiction targets. This would be a viable option, however, only for a military strike force that has both the geographical reach and the large number of strike assets needed to target that infrastructure in a sustained campaign.

The situational problem for Pakistan stems from the asymmetries of defense space, capabilities and resources in the relationship with India. It is easier to imagine how India could attempt to cripple Pakistan's nuclear infrastructure and command and control than the reverse. No doubt Tanvir Ahmad Khan had these problems in mind when he graphically touched on the risk that India might aim to decapitate Pakistan's command and control, and elaborated on the possible need to rely on decentralized nuclear weapon deployment and delegation of nuclear release authority to units in the field.

Geographical asymmetries as well as unequal technical capabilities exist today in the functional areas of surveillance, strategic early warning, tactical warning, and prospective battle assessment. Pakistan has standard ground-based radar and signals monitoring capability, but India has long had high-altitude photoreconnaissance capability, is moving fairly rapidly towards real-time satellite imaging capability, and has an ambitious RPV/UAV surveillance program. The onset of commercially available satellite imagery presumably will improve Pakistan's peacetime surveillance of fixed military installations throughout India, but this probably will not provide real-time intelligence or warning. Pakistan may be able to redress this gap to a very limited degree by its own program of RPVs and UAVs – at least over areas near the border and along the western coastline – but India's missile defense development programs clearly have as one of their objectives the denial of deeper and routine use of such Pakistani assets in its territorial air space.

Presumably Pakistan's space launch program eventually could launch surveillance satellites transmitting real-time data, but the high cost and lead times suggest that this type of independent reconnaissance, early warning and post-attack assessment capability is many years away. Obtaining cooperation of friendly space-faring powers, such as China, in relaying real-time surveillance data is technically conceivable. One would assume Pakistan would attempt to cultivate such options, but winning such cooperation probably would not be easy. A regional consortium approach of oil-producing states to funding a space and satellite effort with down-links in Pakistan, given Pakistan's technical capabilities, is also theoretically conceivable but would be difficult, politically, to fund, organize, and manage coherently.

Hardening and expanding the Pakistani internal military communications network for a reliable nuclear command and control system under conditions of conventional military attack certainly is a viable objective, given time, and this task surely is within Pakistan's means. Here, Pakistan's technical knowledge and skills together with commercially available information should be entirely sufficient. Ensuring connectivity and survivability of communications links under nuclear attack conditions could not be perfected, but probably could meet standards of degrading gradually (to support deterrent credibility) without distorting the economy. It should be noted that no existing nuclear command and control system, even the most sophisticated, has actually been tested under nuclear attack conditions, leaving great uncertainties about performance.

The key objective is redundancy of communications channels and reroutability of encrypted communications. Buried optic fiber now widely available, for instance, may soon be more cost-effective than copper wire cables and not as susceptible to

electromagnetic disruption or traditional jamming methods, except at relay stations. Burst wireless and microwave communications are becoming more proficient and resilient. Strides have been made in the methods for hardening otherwise vulnerable solid-state electronics. Redressing ECM degradation of communication ground links with aircraft and communications between aircraft will nevertheless pose greater challenges, probably, than ensuring connectivity of dispersed land-based assets.

IV. What human and organizational deficiencies in Pakistani nuclear C4i should be anticipated?

To my mind, the most serious potential short comings in the command and control system are less likely to be technical than human and organizational. In any case, given time and resources, solving many technical shortcomings is possible. But technical solutions are no substitute for and do not guarantee good judgment, clear analysis, or self-discipline under stress. Most important of all is the stability and clarity of top level decision-making in a military crisis where rapidly changing circumstances dictate consideration of possible nuclear use, and that may require precautionary measures of generating and dispersing nuclear forces on high alert – the so-called “hair trigger” conditions.

Consider how a nuclear crisis could unfold if the recent Kargil events had been accompanied by deployed nuclear forces, and actions to generate and ready them for prompt action on both sides had also been undertaken. Suppose India had not just mobilized conventional forces along the border with Pakistan and not just “threatened” to blockade Karachi by surging its naval forces in the West, but had actually imposed a blockade of Karachi directly. Would Pakistan have contested the blockade? How would it have done so? Would it have made nuclear threats? Would they have been veiled or explicit? Whether explicit or not, what targets would have been considered? Would Pakistani submarines or aircraft have been ordered on missions to sink Indian ships forming the blockade? Would Pakistan have opened a diversionary movement against the border in the hope of relieving pressure on Karachi? Or might India have threatened to drive ground forces towards the Indus south of Bahawalpur? Suppose India actually invaded on that axis, slowly?

One would want the top civilian and military decision-making system at the top to be very clear-headed under these awesome conditions. Personally, I have no doubt of the general intelligence and sense of responsibility of the leadership that could be assembled under those circumstances. But it is no secret when I mention to you that South Asia watchers in Washington have been gravitating towards the conclusion that several major Pakistani military decisions that have been made over time betray a failure to think through the chain of military and political consequences. Whether this image is fair or not, the important point is that it should be unacceptable to Pakistan’s leadership to permit a system to endure in which decisions of war and peace are, or appear to be, less than thoroughly thought through.

The creation of a National Command Authority must be regarded as a useful structural step. While there is no magic solution, institutional or otherwise, that ensures that decisions are thought through, it is time to adopt a system of structured simulations – sometimes called war games -- in which top Pakistani leaders, civilian as well as military, are obliged to exercise the roles they actually would be, or might be, obliged to play in a nuclear crisis. These could be rehearsed with different scenarios at regular intervals. While these activities would be designed and conducted secretly, and the results classified, self-critically digesting the lessons applicable to internal decision-making and the procedures conducive to reliable operation of the apex command and control system would pay big dividends.

Below the top level, and all the way down the chain of command, human and organizational weaknesses are also likely to subsist, with endemic risks to the reliability of the system, unless regular efforts are made to institutionalize good judgment and impeccable habits, and to prune out misfits or troublemakers. Rigorous screening and training of personnel in the nuclear chain of command was mentioned earlier. This is not a one-time task, but a continuous one.

A key choice that will have to be faced is whether to rely on cadres of specially trained nuclear specialists for nuclear operations, or instead to train all conventional force units in nuclear-related functions. Whatever that choice, it will be imperative that procedures dedicated to safe handling of nuclear weapons and reliable controls on their use be articulated and exercised thoroughly, albeit discreetly, on a regular basis. This would be easier and more economical to do with special cadres, but the organizational morale and connectivity tradeoffs should be analyzed carefully. The use of special cadres would also have a different signature and signaling implications in a crisis.

Another area of critical choices affecting the elaboration of the nuclear command and control system will be how nuclear offensive and defensive capabilities are allocated among Pakistan's three traditional military services. Presumably the services would resist reorganization that would merge or eliminate one or another of them, but that is also conceptually a matter to examine. In any case, under nuclear conditions, the past patterns of interservice rivalry may be unaffordable. Coordination of nuclear matters among the services is crucial for national accountability and clarity of top level decision-making.

Closing:

Among those matters that have most troubled me in watching nuclear and missile proliferation in South Asia for the last quarter century, and particularly since the nuclear testing of May 1998, is the impression that the hawkish segments of the Indian foreign policy elite, including many defense-related scientists, are extraordinarily cavalier about nuclear weapons. They appear to have reached the conclusion that nuclear weapons cannot be used for war, only for political intimidation.

There is a theatrical quality to how the debate has evolved in India in recent years, and in how matters of nuclear posture and strategy have been bandied about. Indian nuclear

policy consciousness appears to have only a remote connection with demonstrable Indian national security requirements. Rather it is driven for the most part by grandiose concerns about international political status and the need to inflate domestic self-confidence. There seems an obliviousness to the danger that these weapons might actually be used in anger, with catastrophic consequences to India as well as Pakistan.

At the same time there is an ever greater ambitiousness to the profile of military technology development that the Indian leadership now in place exhibits to strengthen its image domestically and abroad. The August paper on strategy and doctrine calls for acquisitions that bear no relationship to any active or direct threat to India and that are not easily affordable in India's projected economic capacity. While no one is so gullible as to see this paper as a blueprint, its implicit messages cannot be other than truly alarming to Pakistan and discomfiting to a large number of India's other neighbors.

As Pakistan does what it feels it has to do to bolster its own security against India's nuclear and conventional military forces, and as it articulates a nuclear command and control system suitable for safety and stability as well as deterrence, it is vital to focus on the issues of economy, in two ways. First, Pakistan will lose its way as a nation of considerable importance and even more potential, regardless of elegance in nuclear command and control arrangements and size of nuclear forces, if its economy fails to grow proportionately, fails to take advantage of the stimulus of the liberalized trading regime, or fails to apportion the security burdens of state equitably on the most wealthy layers of society. Pakistan's capacity to grow and modernize economically appears to depend increasingly on fundamental political reform. Nuclear security compulsions must be controlled so that they do not swamp or stifle the opportunities to promote the interrelated objectives of economic growth and political reform.

Second, without complacency, it would be wise for Pakistan's leadership at all levels to practice patience in bolstering nuclear security and to focus on Pakistan's long term future, including what it means to be a nation. In this regard, and particularly on nuclear matters, it is important not to allow the public mood to be overly inflamed by the public commentary on events in the Indian defense sector – which are often exaggerated for effect. As Retired Air Marshall Zulfiqar Ali Khan, Abdul Sattar and Agha Shahi explained in a penetrating piece on Pakistan's nuclear posture last October, Pakistan has the resources to manage the nuclear threat but needs to do so in an economical way, with self-discipline and proportional to the limits of its endowment. It advised against complacency, and also against unproductive emotional swings.

Finding the same middle ground is likely to be the most productive approach to dealing with the undoubted challenges of establishing a reliable nuclear command and control system. Rely on your resources. Spend cautiously, not extravagantly. Focus on the needs of greatest urgency. These needs are conceptual, organizational and procedural as much as, if not more than, they are technical and equipment-related.

Having said that, I would like to recall that I have been among those who long and fervently wished that India and Pakistan would never come to this point. While I have no

illusions that we can readily return to the non-nuclear past, it does seem clear to me that the command and control challenges would be solved with lower risk and less cost if the classic nuclear and missile deployment urges in India, and therefore in Pakistan, could be forestalled.

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