

COMMAND AND CONTROL CHALLENGES IN SOUTH ASIA

by Clayton P. Bowen and Daniel Wolvén¹

Dr. Clayton P. Bowen is a Senior Research Associate with the Monitoring Proliferation Threats Project at the Center for Nonproliferation Studies, Monterey Institute of International Studies. A former US Air Force officer, he has directed Strategic Air Command divisions involved in nuclear planning and nuclear command and control. Daniel Wolvén is a student in the Political Science Department at Columbia University. His studies focus on international security and weapons of mass destruction.

The 1998 nuclear tests in South Asia were literally earth-shaking events, revealing that latent capabilities appeared to be progressing toward emerging nuclear arsenals. Moreover, the fact that India and Pakistan, two countries that had fought three bitter wars in the previous 50 years, had finally decided to abandon their ambiguous nuclear status and declare themselves nuclear weapon states came as an unwelcome surprise to countries committed to nonproliferation. Needless to say, the presence of nuclear weapons on the subcontinent and their impact on regional stability is a question of utmost importance. A critical element in this will be the two countries' ability to maintain control of these weapons and prevent their unintended use.

Emerging nuclear states sometimes assume that their small and simple nuclear arsenals present fewer challenges than the Cold War superpowers faced, and that a simple command and control arrangement is adequate to control these forces.² But is it? Despite the apparent belief that command and control will be simple for these states' arsenals, an established command and control structure is in place in neither India nor Pakistan.³ Stable deterrence requires, among other things, a safe and reliable command and control system that can assure neighboring countries both that an accidental or unauthorized launch in a time of crisis is next to impossible, and that retaliation in the event of nuclear attack is possible. Are India and Pakistan likely to develop such safe and

reliable systems? In this article, we address this question by analyzing the command and control requirements for India and Pakistan, and by comparing those requirements with the systems each appears to be developing.

We examine command and control challenges in South Asia from two different perspectives. First, we begin by looking at the requirements for a stable nuclear deterrent that have been articulated by scholars and officers in the region itself. With these requirements as background, we attempt to deduce what kind of force structure we are likely to see in each country. We then turn to the long-standing academic debate between "proliferation optimists" and "proliferation pessimists" on

whether or not the command and control challenges facing minor nuclear states will be manageable. We compare the predictions of this debate with the force structures and doctrines that appear to be emerging on the subcontinent since the 1998 tests. This analysis leads us to conclude that the command and control challenges facing India and Pakistan are far from simple, and that the current nuclear policies in the region involve contradictory and dangerous elements. In short, the evidence from South Asia since the tests leads to pessimistic conclusions about the prospects for stability after proliferation.

GENERAL DILEMMAS OF COMMAND AND CONTROL

The motivation for this analysis begins with Indian and Pakistani claims that the command and control structure required to support their deterrents can be simple because the arsenals themselves are small and simple.⁴ Without the complex problems of command and control inherent in arsenals the size the superpowers maintained during the Cold War, the argument goes, the challenge facing these emerging nuclear powers is a relatively minor one. However, certain dilemmas are likely to arise regardless of the size or sophistication of a country's nuclear arsenal. In this article, we follow a framework and terminology for discussing command and control developed by Peter Feaver.⁵ According to Feaver, all possessors of nuclear weapons, including new nuclear nations, confront a dilemma. If authorities' control of the weapons is too loose, deterrence can "fail deadly" in the form of an unauthorized or accidental launch. But if

control is too tight, deterrence can "fail impotent" if a first strike against leadership short-circuits any chance of retaliation. Prevention of unwanted use is termed negative control, while assurance of wanted use is termed positive control. The tension between these goals forces leaders to choose between a more "assertive" or more "delegative" control system. "Assertive" control, in Feaver's taxonomy, is a command and control arrangement in which the decision to launch nuclear weapons is retained exclusively by top political leaders. The opposite end of this spectrum is "delegative" control, in which subordinate commanders are authorized to make nuclear launch decisions under defined circumstances.

Applying this framework to the subcontinent suggests that, for example, while a small arsenal may be easier for leaders to control directly, it may also, if it is not properly protected, be an inviting target for decapitation. These possibilities represent two determining factors predicting opposite results: the first (the small size of the arsenal) supports opting for an assertive command and control system, while the second (the postulated vulnerability that may be associated with a small arsenal) supports opting for a more delegative system.

As this description begins to reveal, we cannot properly discuss command and control of India's and Pakistan's nuclear forces until we first examine some rudimentary elements of these two countries' anticipated nuclear operations—how those nuclear forces might be employed and how they might be deployed. This study focuses on the balancing act between assertive and

delegative control, the relationship between operational doctrine and command and control, and the ways each of these factors might influence regional stability.

The first step is to examine how Indian and Pakistani officials and analysts describe their countries' emerging nuclear doctrines. Both countries proclaim a deterrence posture, but with different scenarios for nuclear use. Indian views of deterrence are coherent and well elaborated, and many Indian strategists believe that stable deterrence can be achieved through a no-first-use doctrine.⁶ Such a doctrine, they contend, would increase assertive control over the nuclear forces. Says General Sundarji:

...very strong centralized negative controls can be exercised, if you are looking at nuclear weapons purely as a deterrent. If you're thinking of first use, on the other hand, then you have to decentralize. But if you see it purely as deterrence, there is no harm done if it is totally centralized, tightly held, because the response time is no longer central.⁷

While arguments in India about the value of a deterrent nuclear force are well articulated, issues of war fighting and crisis stability are not. As one Indian analyst argued, "ours is a deterring force, not a war-fighting force—we don't need elaborate war-fighting doctrine."⁸ Yet if the Indian nuclear deterrent is based on operational forces rather than a mere bluff,⁹ that is, if there is some set of actions that could make the Indian government consider using nuclear weapons, then we expect the government to consider at some point how these weapons might be used and how to control them in a crisis.

Pakistan's war-fighting doctrine, on the other hand, is clearer. While India has often proposed a "no-first-use" agreement, Pakistan has repeatedly refused such an offer. Because of Pakistan's conventional inferiority, retention of the first-use option appears to be a deterrent against an Indian conventional attack.¹⁰ Moreover, as Eric Arnett has suggested, Pakistan's conventional inferiority implies that the Indian Air Force could potentially erode most of Pakistani nuclear delivery capability in a conventional attack.¹¹

Given Pakistan's conventional inferiority and perceived vulnerability, the country's first-use doctrine is not surprising. Nor would it be surprising if Pakistan opted for a mobile and delegative command and control system. As Peter Lavoy notes, "Although all Pakistani leaders publicly assert that the prime minister directs the nuclear program with the president and army chief playing only advisory roles, it is generally believed that the military is responsible for physical control of Pakistan's nuclear weapons program."¹²

A proper command and control system must be based not only on the size of the force it controls, but also on the operational plan for that force. What, then, are the key operational requirements for a deterrent force in South Asia?

OPERATIONAL REQUIREMENTS

In the following sections we consider two sets of criteria for judging command and control arrangements in India and Pakistan. The first set is derived from statements by Indian scholars and government leaders, and describes their view of the re-

quirements for a stable deterrent (official Pakistani statements are both rare and very vague, so it is unfortunately not possible to identify an explicit set of Pakistani criteria for stable deterrence). The second set of criteria comes from the unresolved academic debate on command and control in emerging nuclear nations.¹³ Following presentation of these criteria, we proceed with an empirical examination of events in South Asia, particularly since the May 1998 nuclear tests, to illuminate the extent to which developments have fulfilled the South Asian and Western academic expectations.

Indian descriptions of an ideal deterrent for South Asia have said that it should be credible, survivable, and non-provocative. These descriptions presume that such a deterrent will contribute to regional stability.¹⁴ Let us discuss what India's and Pakistan's nuclear forces should look like if we treat these criteria as the requirements for a deterrent.

Credibility

South Asia's recent nuclear past of "recessed deterrence" or "non-weaponized deterrence" was (apparently) sufficient to give both countries reason to pause before considering military action. However, as the governments in India and Pakistan appear to be moving away from the "virtual" deterrence of the past toward an actual rather than a theoretical capability, we need to give some thought to what the term "credibility" really means now. In other words, what is it about these weapons that could make each state limit its military actions?

Credibility in nuclear deterrence consists of two elements: a capabil-

ity to deliver and explode nuclear weapons, and the belief by the other party that one has the will to do so. The underground tests last year confirmed the existing belief that both countries had a nuclear capability, but they only scratched the surface of what the will or intent of each country was. Demonstrating intent, through some operational doctrine or description of how weapons would be used in war, is part of establishing a credible deterrent.

An operational doctrine would logically begin by identifying a number of targets that would be attacked with the weapons available at the time a country decides to strike. Because the South Asian arsenals are much smaller than the superpower arsenals of the Cold War, the target lists and range of options cannot be as extensive as they were for the United States and the Soviet Union. However, there are large cities, industrial centers, and military bases within easy range of both sides' proposed and existing nuclear-capable delivery systems, and while the range of options may not be of "superpower" extent, there are still important choices that each side can make about targeting priorities. Thus, while an employment strategy for South Asia need not be as complex as it was for the superpowers, neither does it need to be so limited that political authority is left only the option of total commitment or total capitulation.¹⁵

To this end, we expect both countries to develop plans about how to execute preplanned strikes,¹⁶ and about how to ensure operational flexibility in target selection so that rigid preplanned target selection is not the only option. Such creation of target lists and employment doc-

trines will follow from efforts to ensure credibility.

Survivability

Survivability of nuclear weapons refers to the assurance that a country will have weapons left to retaliate if it is attacked first. While demonstrating credibility of intent demands an *employment* doctrine, establishing survivability demands a *deployment* doctrine, a plan about the way weapons are stored and readied for use in time of war. Obviously, if an enemy could figure out how to prevent those weapons from being used in time of war, the effect of the deterrent would be nullified. In order to keep the deterrent intact, therefore, weapons must be protected against the risk of preemption. Moreover, the adversary must be convinced that preemption is not possible.

There are two basic ways to protect any asset: active and passive defense. “Active” defense means destroying any attacking force before it can destroy its target, while passive defense involves limiting the *effects* of an attack without actually stopping it. Given the current rudimentary air defense capability on both sides in South Asia, active defense is currently unlikely; a protection scheme based on passive measures is more likely to provide for robust defense. Because the Indian and Pakistani arsenals are still fairly limited in size, we will focus on those passive defense measures most likely to complement the advantages of a small arsenal: hardening, dispersal, and mobility.

Hardening is technically straightforward as a passive defense measure. But a hardened facility is fixed and immovable, and is likely to at-

tract attention to whatever is being held there.¹⁷ Hardening may minimize the destructive effects of an attack, but it does little to actually prevent an attacker from locating a target; it may even have the perverse effect of encouraging a more ferocious attack, if the value of the target is high enough.

Thus the more likely passive methods to ensure the survival of a relatively small arsenal might be those that make it most difficult for an attacker to pinpoint the heart of the other side’s arsenal. Two such methods are dispersal and concealment. Dispersal places weapons in a variety of locations rather than in one central location. Dispersal also capitalizes on the ease of moving mobile weapons from place to place, making it more difficult for an attacker to know where these weapons are, and thus reducing the possibility that all weapons could be destroyed in a preemptive attack.

Another way to protect weapons is to conceal them. If an attacker can’t find his enemy’s weapons, he can’t attack and destroy them. To ensure that weapons remain hidden, states can employ multiple hiding places, or make the weapons mobile and continually move them around. In such a mobile configuration, weapons are both dispersed and concealed.

The way in which forces are deployed in turn affects a critical aspect of command and control: connectivity.¹⁸ As we use the term here, connectivity simply means the ability of a country’s political leadership to maintain constant communications with their nuclear forces. This area of command and control includes the measures that may be taken to ensure that nuclear forces

are always in a position to receive timely instructions from the institutions designated to authorize alerting, launch, or recall of nuclear forces. The potential for connectivity failure raises issues of execution authority and predelegation—if leadership can’t talk to the forces, how should those forces respond?

How, then, do the measures taken to make the arsenal survivable affect the issue of connectivity? The first survivability choice described above was hardening. This option permits features like buried phone lines that provide the greatest chance of continued connectivity; for reasons stated above, however, it is an unlikely choice for both India and Pakistan. Mobility, which combines the benefits of dispersal with the benefits of concealment, is a more likely option. But by increasing their survivability in this manner, India and Pakistan will also increase the susceptibility of these forces to broken connectivity, since forces on the move are more difficult to talk to than forces at a fixed and known location.

Thus, in trying to ensure survivability through mobility, a country trades one strategic problem for another. What, then, are the problems associated with degraded connectivity, and what are possible solutions? The kinds of connectivity challenges a country faces depend on the delivery vehicles it deploys. Of three fundamental types of delivery vehicles—manned aircraft, land-based ballistic missiles, and submarine-launched missiles¹⁹—land-based ballistic missiles are the most likely to be used in South Asia.

Aircraft, first, have several disadvantages as a delivery vehicle. An aircraft may be destroyed on the

ground in a conventional or a nuclear attack, or an airbase runway may be destroyed, preventing take-off. Protection from a conventional attack may be possible by hardening shelters for airplanes, putting them under cover to hide them, or dispersing them to a number of bases to complicate the targeting problem for a potential attacker. Even so, aircraft have several weaknesses as a secure second-strike delivery vehicle. They may be vulnerable to both nuclear and conventional attacks, and because of their reliance on runways, may not be able to respond if the runway is destroyed. Moreover, connectivity with flying aircraft, through two-way radio communications, is not as assured as is landline communication with a fixed and hardened facility. However, assuming surviving command posts and the absence of communications degradation from prior atmospheric nuclear blasts, connectivity with aircraft can be maintained with moderate effectiveness.

A mobile ballistic missile escapes some of the disadvantages of aircraft. Not tied to a runway, it may simply be moved and readied for launch miles away from its home base. Field deployment, however, presents a challenge to continued connectivity. At an established base, hardened landlines provide the assurance that national leaders can talk to their forces. But once these forces start deploying to other locations, where they can take advantage of concealment, established landlines become fewer, and continued connectivity becomes problematic.

Submarines, finally, have the built-in advantage of dispersal and concealment. But communication with submerged submarines is ex-

tremely difficult and this option virtually guarantees poor connectivity. Moreover, at least for the time being, completed development of a submarine and associated missiles is years away for both India and Pakistan.

Thus, one of the vehicles likely to be used to launch a retaliatory strike is a ballistic missile,²⁰ something that is also indicated by the recent emphasis both India and Pakistan have placed on developing functioning ballistic missile systems. Such a weapon system, if made mobile (unlike the first generation of missiles in the superpower rivalry), may be deployed to the field to take advantage of dispersal and concealment to ensure the survival of a retaliatory force.

We have looked at and evaluated the first two South Asian criteria—credibility and survivability—for a minimum nuclear deterrent. Before dealing with the third criterion (that the nuclear arsenal be non-provocative), we consider what some would term a “western” argument about the challenges of command and control in emerging nuclear states, and about the spread of nuclear weapons more generally. The optimism–pessimism debate raises the question of whether new proliferators will be able to develop adequate command and control systems. Addressing the predictions of this debate will provide helpful information for assessing whether India and Pakistan will develop non-provocative postures.

COMMAND AND CONTROL: THE ACADEMIC DEBATE

The debate between proliferation optimists and pessimists relates command and control issues to the “big picture” question of prolifera-

tion, that is, whether the spread of nuclear weapons is good or bad for stability. Proliferation pessimists argue that because emerging nuclear states have limited resources and experience with nuclear weapons, an adequate command and control system for dealing with them safely is unlikely to emerge. The dangers of inadequate command and control translate into an increased danger of an unauthorized or accidental launch or detonation, leading to a potentially catastrophic nuclear exchange. The optimist response, as originally formulated by Kenneth Waltz, is that it is nonsense to predict that new nuclear powers will fail to develop adequate command and control—since they have every incentive to avoid an unwanted nuclear exchange, they will develop systems to provide adequate control.²¹

At first glance, the publicly available record of what India and Pakistan have done since their nuclear tests seems to support the view of the proliferation optimists, and clearly leaders in both countries recognize that the control of these weapons is vitally important. In India, A.J.P. Abdul Kalam, head of the country’s nuclear program, has given assurances that India has all the resources necessary to build an adequate command and control structure,²² although his statement did not make it clear exactly what such a system would look like. Answering the charge that limited resources would lead to inadequate command and control, another Indian official responded that “elaborate” systems were unnecessary, since the bomb would always be under civilian control.²³

Assurances from Pakistani officials sounded the same note of con-

fidence. Foreign Minister Sartaj Aziz said that Pakistan had developed an effective command and control system, and there was “no chance” of an accidental nuclear war with India.²⁴ Similarly, the head of Pakistan’s nuclear weapons development program, A.Q. Khan, called his country’s command and control system “flawless,” and said that an accidental launch was not possible.²⁵ Army Chief of Staff Jehangir Karamat said that Pakistan had a “proper” command and control that addressed “technical” concerns.²⁶

These statements support the optimist prediction that leaders have every incentive to develop a safe and reliable system to deal with their nuclear weapons. However, even if leaders of both countries truly want their nuclear arsenals to be safe ones, and want effective means for ensuring that safety, these statements do not constitute evidence that such safe systems are either already in place or being constructed. Since development of a new system is the product, not just of decisions, but of implementation as well, statements by Indian and Pakistani leaders are insufficient to establish the proposition that reliable command and control exists in South Asia. Moreover, while political leaders may have powerful incentives to develop a safe command and control system, these may not be the only incentives influencing the allocation of resources and whether or not the countries actually develop adequate systems.

To see if these statements are supported by actions, let us look at further predictions made by optimists and pessimists about how command and control would actually be configured, and how this configuration

would affect the possibility of an accidental nuclear war.

The pessimist school, represented by Feaver, Lewis Dunn, and Scott Sagan, assumes that militaries are likely to have a major role in the nuclear weapons programs of new proliferators, and that these military organizations will give primary emphasis to developing offensive options and capabilities, not to developing safety systems or survivable deployment modes.²⁷ This leads to a variety of predictions about the nuclear command and control arrangements that are likely in emerging nuclear states. First, to maximize the chances of successfully executing attack plans, a new nuclear state is likely to neglect “negative control” (preventing unwanted launch) of its nuclear weapons in favor of ensuring “positive control” (reliable launch on command). Such an emphasis courts the danger that in a crisis, some unforeseen circumstance or accident could contribute to the unintended launch or detonation of a nuclear weapon.

Second, pessimists predict that the close geographic proximity of these emerging nuclear states to their greatest rivals could, combined with inadequate early warning systems, lead to a hair-trigger response to an attack warning.²⁸ Finally, pessimists predict that states will concentrate their resources not on developing a safe and reliable command and control architecture, but on developing and refining the weapons themselves. The sum of these predictions is the big picture prediction made earlier, that command and control in emerging nuclear states will be inadequate, and the danger of accidental or unauthorized launch will be high.

The optimists counter with a different set of predictions, contending that the limitations of a small nuclear arsenal are actually its operational strengths.²⁹ First, a small nuclear arsenal allows for greater operational simplicity, avoiding the complex maze of procedures and options confronting the nuclear superpowers and thereby reducing the chances of an accident or mistake. Second, since arsenals would be small, the emphasis would be necessarily on a countervalue rather than a counterforce strategy—with few weapons, neither side could afford to waste any on the extremely uncertain prospect of destroying the other side’s retaliatory capability. With an emphasis on countervalue targeting (and a clear communication of this strategy to the other side), neither has a “use them or lose them” incentive to strike early in a crisis. Finally, optimists predict that each side will be able to protect its nuclear force through the simple means of dispersal and concealment. A hidden retaliatory force is a secure one, optimists argue, and a secure second strike enhances stability.

These arguments had, until recently, little history against which to validate them, and relied heavily on theoretical assumptions. However, the May 1998 nuclear tests by India and Pakistan have given us some empirical evidence against which to compare these theoretical accounts. Let us now look at events in South Asia over the past year and see how the actions of each country match the predictions of the two sides of this debate.

Several developments since the 1998 tests constitute important clues to the command and control structure in both countries. One of

the most prominent events has been the development and testing of the Agni, Ghauri, and Shaheen ballistic missile systems.³⁰ These specific missile systems have several characteristics that seem to support the contention that nuclear systems in India and Pakistan could be deployed and concealed to prevent their preemption. Pakistan's liquid-fueled Ghauri and solid-fueled Shaheen both feature mobile launchers, and it is reasonable to infer that Pakistan envisions deploying these systems in a mobile configuration. India's most recent development program for its Agni ballistic missile has focused on upgrading the awkward combination of a solid first stage and liquid second stage to an all-solid fuel configuration, thus enhancing the prospects for making this missile mobile. This aspect of the missile development programs in both countries seems to point in the direction of dispersal and concealment.

Other developments in South Asia, however, make it less certain that the optimist position is correct, and some disturbing features of these programs are cause for concern. The Indian navy has made a concerted attempt to get into the nuclear game: India has attempted to develop a submarine platform for launching nuclear missiles, and is working on development of the Sagarika, a cruise missile designed to be launched from a naval platform and capable of carrying a nuclear warhead.

The program to develop a submarine as a platform for launching nuclear missiles has a number of possible implications. To begin with, an emphasis on developing new weapons, so soon after India de-

clared itself a nuclear weapon state, suggests that emphasis in India remains on developing the weapons themselves rather than on developing the systems to make them safe and controllable. Secondly, the development of Prithvi, Agni, Sagarika, and a submarine launch platform may indicate that the arsenal in India will not be especially limited in size. Since one of the major assumptions of the optimist school is the belief that arsenals would remain small, this development, if continued, seriously weakens their case.

As we have argued throughout, clarification of employment doctrine is crucial to the command and control of nuclear forces, and doctrinal declarations since the nuclear tests are yet another cause for concern. India has openly stated a no-first-use policy,³¹ meaning that it would not be the first to use nuclear weapons in a crisis, or in an actual war with Pakistan. However, Pakistan has failed to give a similar pledge,³² raising the possibility that it would cross the nuclear threshold in a war against India. The most likely reason for Pakistan to retain a first-use option, as discussed earlier, is to deter India during a conventional conflict and to prevent India's numerically superior army from invading. Pakistani doctrine thus permits the use of nuclear weapons against a massed Indian adversary, whose conventional might Pakistan cannot match.

While such a Pakistani doctrine is easy to understand, it is also easy to misunderstand. The predictions of the proliferation optimists are based on an assumption that new nuclear nations would develop a countervalue rather than a

counterforce doctrine, and would clearly articulate that strategy to the other side. Part of that articulation is a clear no-first-use policy, and the lack of that declaration weakens the stable relationship that optimists predict.

The next prediction comes from the pessimist school and deals with the dangers of predelegation of launch authority.³³ The idea behind predelegation is the recognition that if, in a national emergency, a potential adversary is able to isolate the country's political leadership, it can prevent damage to itself by striking the opponent's leadership, regardless of the status of the country's nuclear forces. To prevent its forces from becoming impotent in a decapitating strike, a country might therefore opt for predelegation. This authorization simply means that under a carefully defined set of circumstances, a lower echelon commander could respond with nuclear weapons on his own authority, even if there had been no specific orders from the legally constituted, higher authority.

But predelegation also introduces a risky element to control of nuclear forces. Authorizing lower echelon commanders to strike in certain circumstances without a positive order from the top dramatically increases the potential for mischief. Potential disasters include a "Dr. Strangelove" commander who can't wait to use the nukes under his control, or a circumstance in which a commander assesses the situation inaccurately and, in the absence of contrary instructions from the top, starts an unwanted nuclear strike.

To what extent is such a strategy likely to be implemented in South Asia? The answers differ, depend-

ing on whether the strategy is India's or Pakistan's. We begin with India. Because of the history of military exclusion from decisions on military national strategy in India,³⁴ it is unlikely that predelegation would be readily given to even the highest military commanders.³⁵ Thus, in a situation in which civilian leadership was isolated from communicating its decision to the military, the nuclear forces would be likely to "fail impotent," to use Feaver's "always/never" terminology. In other words, they would fail the "always" portion (always respond when you want them to) of the "always/never" standard.

One may argue, as some scholars have done,³⁶ that civil-military relations in India support a rather tight civilian, assertive control of the nuclear forces. One could also argue that for India to achieve a credible nuclear deterrent, the military must assert its expertise and come to the forefront of national security affairs.³⁷ If leaders are not willing to predelegate, are they willing to accept the consequences of a system that is likely to fail impotent in a time of crisis?

It is essential to point out that one of the least desirable strategic by-products of a nuclear strike, the isolation of nuclear forces from their leadership, could result not just from actual preemption but from the degraded communication capability that may result from the choice of a deployment strategy. Forces may be isolated not because leaders are killed, but simply because their removal from established and hardened command and control facilities degrades connectivity. In this case, the problem arises not from a preemptive decapitating strike that ren-

ders the nuclear forces incapable of responding—under such a circumstance, the legally constituted authority is a surviving one, and may even have a cogent decision to communicate. But, if the act of dispersal has removed the nuclear forces too far from the government authority that controls them, the result is as effective (or disastrous) as if the enemy had destroyed the executive mansion.

If forces are dispersed, therefore, they are less attractive as targets but run the risk of being ineffective because political leaders cannot communicate with them. To prevent their forces from being ineffective, leaders may choose to accept the risks associated with predelegation. Thus, dispersed forces may be associated with delegative control³⁸ and may thus be more likely to "fail deadly." Therefore, while such an arrangement may increase day-to-day deterrence, it may be detrimental to crisis stability and certainly more susceptible to accident.³⁹

This means that there are some choices for political leaders in South Asia to make about the structure of an effective deterrent and the command and control system necessary to support it. Schematically speaking, these issues boil down to a "three-choice matrix" of decision points about nuclear deployment (fixed or mobile), launch authority (delegative or assertive), and employment doctrine (first use permitted or no first use). As we have argued above, both countries appear to have opted for mobile forces. Pakistan, however, appears more inclined toward delegative control while India seems more likely to opt for assertive control. Finally, Paki-

stan retains a first-use option while India has ruled out first use.

CAPABILITY OF WARNING SYSTEMS

There is a final event we mention because of the potential implications it has for South Asian command and control, even though sage interpretation remains difficult. This event took place when the United States launched a cruise missile attack on Afghanistan in August 1998, in an attempt to root out the believed terrorist Osama bin Laden. According to several news reports, the United States had been concerned that Pakistan, upon detecting the US cruise missiles in flight over Pakistan, might interpret this as evidence that India was conducting a preemptive attack, leading Pakistan to launch a "counterattack" against India. To prevent such a response, the United States had Air Force General Joseph Ralston in place in Pakistan at the time of the attacks to tell the Pakistani government what was really going on if it began preparations for a counterattack. However, Pakistan never detected the cruise missiles, and thus never had a signal to misinterpret.⁴⁰

There are several things to conclude from this incident. The first is that the United States government had enough concern about the possible Pakistani reaction that it put one of its generals there to give the correct signal. But more importantly, Pakistan never detected the missiles in flight, despite the fact that apparently scores of them flew over Pakistan. One could give a wry interpretation and conclude that the optimists are right—there isn't much chance that an emerging nuclear state could falsely interpret a bogus

warning as an attack, because they can't detect anything. A more worrisome interpretation is that the early warning system in Pakistan has serious flaws, and such shortcomings are more likely to foster nervousness than calm. To the extent they lack reliable warning systems, India or Pakistan could base launch decisions on unreliable sources, increasing the chance of mistakes. This incident should give no comfort to optimists.

THE PROBLEM OF NON-PROVOCATIVE DETERRENCE

The information about likely deployment and employment choices derived from discussing the optimist–pessimist debate makes it possible to assess the third Indian requirement for a stable nuclear deterrent, that it be non-provocative. A non-provocative force is one that minimizes the perception on both sides that nuclear weapons would be used first in a crisis, either through misperception of the military situation or through a rational calculation that a preemptive strike could be successful. Like the attributes of credibility and survivability, “non-provocative” is in the eye of the beholder, and that beholder can be either the country evaluating its own force, or the neighbor who must confront it.

So far, we have focused on the requirements of credibility and survivability to try to derive a picture of India's and Pakistan's likely deployment doctrines and the command and control systems needed to support their doctrines. Making their nuclear forces survivable, we contend, will lead both to choices in favor of dispersal, mobility, and

concealment, but at the cost of reduced connectivity.

These choices are intimately connected to the possibility of a non-provocative nuclear arsenal and raise concerns about the prospects for stable deterrence to develop in South Asia. While dispersal and increased mobility contribute to making the nuclear arsenal more survivable, these measures may also make for a more delegative and accident-prone system of command and control. In other words, both India and Pakistan face a problematic trade-off. As they attempt to protect their arsenals from the threat of decapitation, they may inadvertently create a “fail-deadly” system that would severely threaten the prospects for crisis stability. Unfortunately, because of the limited size of both arsenals and because of various technological and financial constraints, the surest way to ensure the survivability of the nuclear forces may indeed be to opt for dispersal, mobility, and some kind of predelegation. In so doing, both countries would be almost certain to retain a second strike capability, something that could, at least in theory, strengthen their deterrent.

What, then, about the indications of the three-choice matrix presented at the end of the last section? India's choices seem to be an assertive control over mobile forces, governed by a no-first-use doctrine. Pakistan, on the other hand, appears to opt for delegative control of dispersed forces, retaining the right to use its weapons first. Let us look at what these particular choices might mean.

For India, the choice of assertive control over mobile forces without

a first-use option seems almost contradictory. If the reason for making weapons survivable (implied by their presumed mobile configuration) is to assure the ability to strike back, we expect to see a logical way of ordering that second strike. If weapons are dispersed, thus presenting challenges to maintaining connectivity, we would expect to see an option for delegative control. If, on the other hand, assertive control is to be maintained, we should see emphasis on hardening fixed positions for greater assurance of continued connectivity, rather than on developing systems that can move and hide. We do not see evidence of such a plan.⁴¹ The danger of this set of choices is precisely that it is provocative, but in the perverse sense that it seems to invite a decapitating strike by India's adversaries in the event of a crisis. If the conclusion to be drawn is that such a force will not respond even if it survives, the deterrent against a nuclear first strike is made meaningless.

While Pakistan's choices appear to be more internally consistent, they also appear to be more prone to fail deadly. In a crisis, a commander of a dispersed nuclear force with the authority to make a launch decision may be tempted by any number of events. While the presence of General Ralston in Pakistan in August 1998 was a prudent safety measure, we do not view a future similar scenario with optimism.

Our analysis shows that the process of making a deterrent survivable presents problems for making it controllable. *The conclusion we draw, therefore, is that as things now stand on the subcontinent, a decision to make a nuclear capability “sur-*

vivable" is apt to make that capability provocative. Therefore, even if India and Pakistan meet the requirements of credibility and survivability of their newly acquired nuclear forces, it is very unlikely that these forces will not be provocative in one way or another. If this Catch-22 produces a seemingly reasonable deployment plan to assure survivability, the very unreasonable outcome of regional instability may occur as a result.

SUMMARY

We have argued that a suitable command and control arrangement for South Asia can only develop once leaders define the deployment and employment strategies their nuclear forces would follow in day-to-day situations, in a crisis, and in actual war. More specifically, we have argued that command and control does not exist in isolation, but rather is designed to fit the forces it serves, and is based on a variety of factors such as force size, deployment strategy, launch authority, and employment doctrine. Given the trend in South Asia since the May 1998 tests towards further developing missile delivery systems, and the lack of progress in doctrinal declarations, we view the command and control challenges for the region as far from simple.

We recognize that this is a pessimistic view, and hope that other indicators point more accurately in the opposite direction. If the framework represented in the February 1999 Lahore declaration ends up providing guidance for future relations between the two countries, our forecasts will have been (happily) wrong. However, if the trends we have described above continue, we

do not view the emerging nuclear relationship between India and Pakistan with optimism.

¹ The authors would like to thank Peter Lavoy, Anupam Srivastava, Gaurav Kampani, Tariq Rauf, and one anonymous reviewer for their helpful comments on this paper. An earlier draft was presented at the annual meeting of the International Security Studies Section of the International Studies Association, in Monterey, CA, October 1998.

² Pervez Hoodbhoy, "Is Accidental N-War Impossible?" *Dawn*, December 7, 1998. Hoodbhoy quotes a November 29, 1998 statement in which Pakistani Foreign Minister Sartaj Aziz confidently said, "I see no possibility of an accidental nuclear war between Pakistan and India. Pakistan has an effective command and control system."

³ As recently as March 1999, Pakistan's Minister of State for Foreign Affairs Saddique Kanju said that his government was still "coming up with the required procedure including setting up of command and control." "Nuclear Command and Control System Being Set Up: Kanju," *The News International Pakistan*, March 3, 1999, <<http://199.173.88.205/thenews/mar99-daily>>. In addition, the Indian government revealed that it too had yet to complete its command and control setup when national security advisor Brajesh Mishra announced in April 1999 that his government hoped to create a nuclear doctrine by the end of that month. Mahendra Ved, "India's N-Doctrine May be Clear Soon," *Times of India*, April 3, 1999, <<http://www.timesofindia.com>>.

⁴ This argument, ironically, seems to fit well with Jordan Seng's sophisticated analysis of possible command and control advantages of small nuclear states. See Jordan Seng, "Less is More: Command and Control Advantages of Minor Nuclear States," *Security Studies* 6 (Summer 1997), p. 49. For a rebuttal of this view see Peter D. Feaver, "Neooptimists and the Enduring Problem of Nuclear Proliferation," *Security Studies* 6 (Summer 1997), p. 93.

⁵ Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," *International Security* 17 (Winter 1992/93), p. 160.

⁶ Most notably Vijai Nair, K Subrahmanyam, and General Sundarji. See Vijai Nair, *Nuclear India* (New Delhi: Lancer International, 1992); and esp. Gregory F Giles and James E. Doyle, "Indian and Pakistani Views on Nuclear Deterrence," *Comparative Strategy* 15 (April/June 1996), p. 135.

⁷ Sundarji cited in Peter R. Lavoy, "Civil-Military Relations, Strategic Conduct, and the Stability of Nuclear Deterrence in South Asia," in *Civil-Military Relations and Nuclear Weapons*, ed. Scott D. Sagan (Stanford, CA: Center for In-

ternational Security and Arms Control, Stanford University, 1994), p. 87.

⁸ Pravin Sawhney, interview by Clay Bowen, Monterey, CA, July 1998, discussing implications of the May 1998 underground nuclear test.

⁹ India's declaration that it is a nuclear *weapon* state, not merely a nuclear *capable* state, implies that nuclear weapons are or will soon be ready for military use.

¹⁰ "Call for 'No-First-Use' N-Treaty," *The Hindu*, March 5, 1995, p. 5; Tim McGirk, "India Puts Nuclear 'Code' to Pakistan," *Independent*, January 26, 1994, <<http://www.independent.co.uk>>; "Pakistan Willing to Discuss Restraint Regime in Nuke Field With India," *Indian Express*, January 7, 1999, <<http://www.expressindia.com>>.

¹¹ Eric Arnett, "Nuclear Stability and Arms Sales to India: Implications for U.S. Policy," *Arms Control Today* 27 (August 1997), pp. 7-11.

¹² Lavoy, "Civil-Military Relations," p. 86.

¹³ For the major points in this debate, see Feaver, "Command and Control," and Seng, "Less is More."

¹⁴ Sawhney interview, July 1998.

¹⁵ Vijai Nair lists a variety of potential targets in both India and Pakistan. Significantly, he includes not just urban (countervalue) centers, but also industrial complexes, rail centers, airfields, and even nuclear power plants. Nair, *Nuclear India*, p. 141.

¹⁶ A preplanned strike is one in which the desired impact point for a weapon, the weapon itself, and the delivery vehicle and delivery profile for the strike is determined long before hostilities start. Thus, striking a preplanned target requires only the decision to strike. An ad hoc strike involves selecting a target, weapon, and delivery vehicle and strike profile after hostilities have actually commenced, and in reaction to the perceived situation on the battlefield.

¹⁷ Kak reaches a similar conclusion: "As vulnerability and costs rule out having the missiles in silos, a much larger number of missiles and launchers or the widest dispersion may be the only alternatives." Kapil Kak, "Command and Control of Small Nuclear Arsenals," in *Nuclear India*, Jasjit Singh, ed. (New Delhi: Knowledge World, 1998), p. 280.

¹⁸ The optimist-pessimist debate does not specifically address the connectivity issue. While discussions of delegative control hint at the connectivity problem, we believe the issue must be stated explicitly in order to understand the complete range of command and control challenges.

¹⁹ While these are the three "legs" of the US triad, an Indian military spokesman in April 1999 said that an Indian nuclear delivery force was also expected to include these three components. "Creating a Nuclear Triad in India," *RIA-Novosti*, April 12, 1999, p. 26.

²⁰ The prospect of ballistic missile proliferation in South Asia has incurred some debate. One argument, advanced by Ben Sheppard, is that the apparent stability that nuclear weapons have brought to the subcontinent relies on their delivery solely by aircraft and that the development

of ballistic missiles may erode this stability. See Ben Sheppard, "Too close for comfort: ballistic ambitions in South Asia," *Jane's Intelligence Review* 5 (July 1, 1998), p. 11.

²¹ Kenneth Waltz, *The Spread of Nuclear Weapons: More May be Better* (London: International Institute for Strategic Studies, 1981).

²² "India Can Build Nuclear Command System," *Inquisit*, October 29, 1998.

²³ "Unanswered Questions," *Financial Times*, October 26, 1998, p. 16.

²⁴ "No Chance of Accidental N-War: Pakistan Sets Up Effective Command System," *Dawn*, November 30, 1998.

²⁵ "Pakistan Has Flawless Control for Nuclear Arms: Qadeer," *The News* (Islamabad), October 4, 1998, in FBIS-TAC-98-277 (October 4, 1998).

²⁶ "Karamat Denies Opposing Pak. N-Tests," *The Hindu*, October 31, 1998.

²⁷ Feaver, "Command and Control;" Scott D. Sagan, "The Perils of Proliferation," *International Security* 18 (Spring 1994), pp. 66-107; Lewis Dunn, *Controlling the Bomb: Nuclear Proliferation in the 1980s* (New Haven: Yale University Press, 1982).

²⁸ The superpower relationship featured attack warnings of around 30 minutes for a ballistic missile attack. Due to the geographic proximity of India and Pakistan (a shared border), attack warnings would be about four minutes even assuming a sophisticated early warning system.

²⁹ Waltz, "The Spread of Nuclear Weapons;" Seng, "Less is More."

³⁰ The Agni is India's longest-range ballistic missile, and has been in development as a "technology demonstrator" since 1979. A solid-fuel version was tested in March 1999. Pakistan's Ghauri was first test-launched on April 6, 1998, barely a month before India's underground nuclear test. Pakistan's Shaheen had its first test launch within weeks of India's March 1999 Agni test.

³¹ India has tried to convince Pakistan to agree to a no-first-use policy between the two states many times in the 1990s. "South Asia: The Indian Government," *International Security Digest*, September 1994, p. 5; "Call for 'No-First' N-Treaty," *The Hindu*, March 5, 1995, p. 6; "Officers Propose India Declare Itself Nuclear Weapon State," *Times of India*, August 10, 1996, p. 6. In late 1998, India asked for a UN resolution calling for all countries to renounce first-use. "India Calls for Urgent Steps to Reduce Nuclear Risk," *Deccan Herald*, November 4, 1998, <<http://www.deccanherald.com>>.

³² Pakistan has repeatedly refused to join India in a no-first-use pledge. In 1994, Pakistan proposed instead that both countries denounce any nuclear use, which India refused. "Pakistan and India Expel 'Spy' Envoys," *Daily Telegraph*, September 1, 1994, <<http://www.dailytelegraph.co.uk>>; In early 1999, Pakistan first refused an Indian offer to make a joint no-first-use pledge ("Pakistan Willing to Discuss Restraint Regime in Nuke Field with India," *Indian Express*, January 7, 1999, <<http://www.expressindia.com>>), and later responded with a call for a "no war pact."

"Vajpayee to Initiate Dialogue with Sharif on Nuke Strategy," *Indian Express*, February 16, 1999, <<http://www.expressindia.com>>.

³³ Feaver argues that when weapons are at risk, leaders are likely to opt for a "delegative" control over launch decisions rather than an "assertive" one, and that a delegative system is likely to fail deadly. Feaver, "Command and Control," p. 181.

³⁴ The literature on Indian civil-military relations is immense. For some relatively recent treatments, see for example Kotera M. Bhimaya, "Nuclear Deterrence in South Asia: Civil Military Relations and Decision-Making," *Asian Survey* 34 (July 1994), p. 647; Lavoy, "Civil-Military Relations;" and W.P.S. Sidhu, "India's Nuclear Tests—Technical and Military Imperatives," *Jane's Intelligence Review* 8 (April 1, 1996), p. 170.

³⁵ As Kak writes, "Even in the worst case 'bolt from the blue scenario' of Delhi being subjected to an attack and the entire political leadership being decapitated, a decision center outside the central political leadership may not be advisable." Kak, "Command and Control of Small Nuclear Arsenal," p. 279.

³⁶ K. Sundarji and K. Subrahmanyam support this point of view. See Lavoy, "Civil-Military Relations," esp. p. 85.

³⁷ On this point, see Sidhu, "India's Nuclear Tests," p. 170; and Rahul Bedi, "Latest Tests Put India in Nuclear Arms Spotlight," *Jane's Defence Weekly* 29 (May 27, 1998), p. 3.

³⁸ We believe, in line with Feaver, that a delegative command and control system will increase the risk of an accidental nuclear war and may undermine crisis stability. For an alternative view, consider Seng's claim that "[s]trategic need and technological limitations may lead to delegation of launch capability, but concealment, along with small and simple organizations, makes for a highly controlled form of delegation." Seng, "Less is More," p. 81.

³⁹ However, this stability depends greatly on the adversary's *perception* of how tightly controlled these forces are. In the South Asian context, given that India has pledged to a no-first-use doctrine, Pakistan might rest assured that India would not take precipitous action in a potential crisis.

⁴⁰ "Top US General Was In Pakistan During Strikes," *The Nation*, August 25, 1998, <<http://www.nation.com.pk>>.

⁴¹ As we have argued earlier, India's history of civil-military relations seems to make the Indian government's retention of assertive control a near certainty. However, Vijai Nair clearly recognized the potential problems this policy could foster: "In areas that [susceptibility to decapitation] becomes suspect, predelegation of control may be resorted to so that retaliation is guaranteed irrespective of the effects on central leadership." Nair, *Nuclear India*, p. 189.