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Toward a 'Force-in-Being': The Logic, Structure, and Utility of India's Emerging Nuclear Posture

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After a hiatus of almost 24 years, India startled the world by resuming nuclear testing at a time when the international community solemnly expressed a desire through the Comprehensive Test Ban Treaty (CTBT) to refrain from the field-testing of nuclear explosives. On 11 May 1998, the Indian Prime Minister, Atal Bihari Vajpayee, tersely announced that New Delhi had conducted three nuclear tests, one of which involved the detonation of a thermonuclear device. As a stunned global community struggled to respond to this development, India announced two days later that it had conducted two more detonations. In the aftermath of these tests, India declared itself to be a 'nuclear weapon state'¹ and formally announced its intention to develop a 'minimum credible (nuclear) deterrent'.²

This decision to create a deterrent, however, did not imply that India would automatically develop an arsenal of the sort maintained by the established nuclear powers. Rather, its traditionally anguished relationship with nuclear weapons³ almost ensured that its new determination to formally create a strategic deterrent – far from closing the national debate about nuclearization irrevocably – would only focus attention, once again, on the five choices that India had grappled with since its independence in 1947: (1) Renounce the nuclear option; (2) Maintain a South Asian nuclear free zone; (3) Persist with simply maintaining the nuclear option; (4) Acquire a 'recessed deterrent'; and, finally, (5) Develop a robust and ready arsenal immediately.

While the first two alternatives in different forms were vigorously promoted by the international community in the aftermath of the May 1998 tests,⁴ the national debate within India focused mainly on the last three

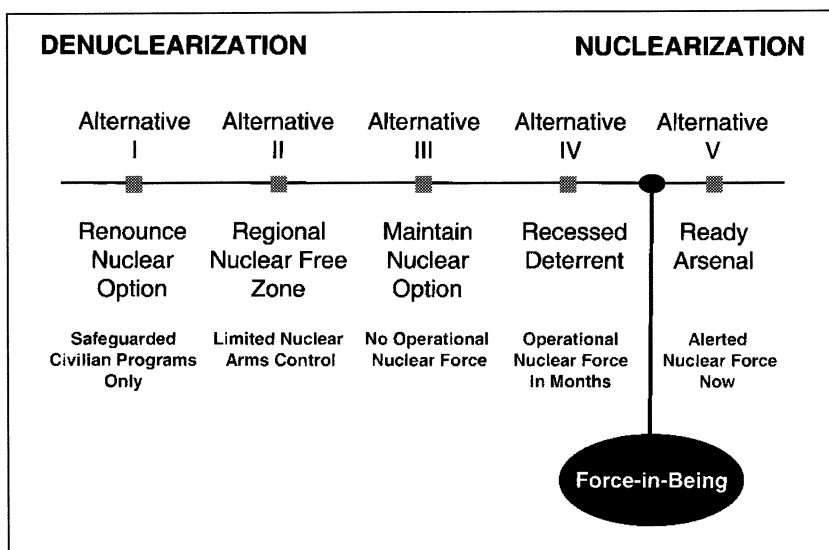
alternatives, thus signaling that denuclearization was simply not viable given the new security environment facing the country.

While the proponents of alternative (3) argued that India, despite having tested, ought not to acquire a nuclear force for both moral and strategic reasons,⁵ they appear to be marginal in the Indian strategic debate, which has for most part been dominated by proponents of alternatives (4) and (5). The former argue that a 'recessed deterrent', which allows India to constitute a nuclear arsenal within a few months, ought to suffice for Indian security, especially if New Delhi can utilize the threat to overtly deploy nuclear weapons as leverage both to accelerate the pace of global nuclear arms reductions and to secure preferential economic and political gains for India.⁶

The latter, in contrast, argue simply that India has already crossed the Rubicon by resuming nuclear testing and, consequently, should not halt its nuclearization until it acquires a large, diverse, and ready nuclear arsenal that will bequeath New Delhi both security and status.⁷ By all indications, and in contrast to the views held by many within and outside India, the Indian government currently has chosen to split the difference between the positions advocated by the proponents of alternatives (4) and (5) (see Figure 1). The Indian nuclear force will be configured neither as a recessed

FIGURE 1

INDIA'S FORCE-IN-BEING IN THE CONTEXT OF ITS STRATEGIC ALTERNATIVES



deterrent nor as a ready arsenal but as a *force-in-being*, that is, a deterrent consisting of available, but dispersed, components that are capable of being constituted into usable weapon systems during a supreme emergency.

This article seeks to explicate the logic, structure and utility of this distinctive nuclear force posture. Toward that end, it is divided into three sections. The first section describes why the solution represented by the force-in-being today appears attractive to Indian policymakers in the context of other past efforts to operationalize similar strategic regimes. The second section describes in some detail the anatomy of the force-in-being itself. The third and final section explores the kind of nuclear posture that might replace the force-in-being after it has outlived its current utility as an instrument for safeguarding Indian security.

THE ATTRACTIVENESS OF THE 'FORCE-IN-BEING'

A synoptic comparison of the three alternatives defining nuclearization in the aftermath of the May 1998 tests should indicate why the traditional Indian posture of 'maintaining the option' – Alternative III described earlier – cannot be a destination that New Delhi will return to in its search for a credible deterrent. This alternative, by eschewing the development of an arsenal of *any* sort, simply nullifies the Government of India's decision to create a strategic force and, consequently, has not been pursued. Alternative IV – the 'recessed deterrent' – has been rejected as well, since its emphasis on readying supporting capabilities rather than nuclear weapons and delivery systems prevents the development of those critical components required by a minimum deterrent.

Alternative V, in contrast – a 'robust and ready arsenal' – clearly enables New Delhi to pursue a 'minimum credible (nuclear) deterrent' but, by being too expensive, likely violating its desire for strict civilian control, and possibly being subversive of crisis stability, represents a posture that is much too extravagant for India's deterrence needs.

The decision to acquire a nuclear deterrent configured as a force-in-being, rather than the robust and ready arsenal advocated by many Indian hawks, then represents a *compromise* choice on the part of Indian policymakers that seeks to service many external demands and internal constraints simultaneously. It provides India with *strategic* advantages insofar as the presence of nuclear weapons in some form suffices to prevent blatant blackmail by China and Pakistan. It bequeaths New Delhi with *diplomatic* benefits by exemplifying 'restraint', particularly in comparison with an overt arsenal, and – in so doing – holds the promise of attenuating

US nonproliferation pressures on India.

It offers *psycho-political* reassurance insofar as it bolsters the confidence of India's national leadership, enhances its resolve in crises with local adversaries, and simultaneously provides the country with status as a nuclear weapons power. It buttresses existing *domestic* political structures by enabling India's civilian security managers to institutionally exclude the military from the day-to-day control and custody over the most critical components of India's strategic capability. And, finally, it portends *budgetary* relief insofar as its relatively quiescent force posture avoids all the high costs usually associated with the procurement, deployment, and operation of a ready arsenal.

The key idea encompassed by the notion of a force-in-being is that the entire 'arsenal' functions as a *strategic reserve* – neither fully visible nor operationally alerted – yet nonetheless present and available for employment – after some preparation – when strategic necessity dictates. The weapons and delivery systems *are* developed and produced, with key sub-components maintained under civilian custody, but these assets are sequestered and covertly maintained in distributed form, with different custodians exercising strict stewardship over the components entrusted to them for safekeeping.

The quiescence of the force-in-being at the operational level does not translate, however, into inactivity at the level of strategy. A force-in-being is indeed very active at the grand strategic levels of diplomacy and political choice, but this activity is manifested not so much by its tempo as by its effects. Its very existence as a potentially complete – but dormant – capability serves as a deterrent to possible adventurism by an adversary: it constantly hovers in the adversary's consciousness, commands its attention, keeps it at bay, and prevents it from attempting anything that would result in risk and hazard to itself, while constantly obliging it to think of nothing but being on guard against the terrible attack that would follow in retaliation against any of its provocations.⁸

Not surprisingly, a deterrence posture modeled on the notion of a force-in-being also functioned as the template governing the disposition of other Indian strategic assets. For example, New Delhi pursued a large chemical weapons research, development and production program covertly for almost two decades prior to the conclusion of the Chemical Weapons Convention (CWC), which banned all such weapons universally. The Indian government consistently denied the existence of a chemical weapons program in the early years of the negotiations leading up to the CWC,⁹ and even the Indian military was largely in the dark about the character and the extent of these weapons, which were maintained completely under the

control of the civilian Ministry of Defence.

Another example relevant to this discussion concerns India's short-range ballistic missiles (SRBM), notably the land-based versions of the Prithvi, which are intended as conventional deep attack systems that will eventually be available in three different range variants with five alternative types of conventional warheads.¹⁰ Fears about the system's nuclear potential raised by both Pakistan and the United States have resulted in India treating the Prithvi force as if it were a strategic asset held in inert reserve. The Indian Army's missile inventory is not maintained by its controlling units in their designated area of operation. Instead, the unit slated to operate the missiles, the 333rd Missile Group, is based in Secunderabad in South India, while the missiles themselves are secured in storage bunkers – unfuelled – close to the Indo-Pakistan border.¹¹

Both the chemical weapons program and the Prithvi SRBM force highlight two separate but related characteristics of the future Indian nuclear force-in-being. The former example suggests that the nuclear arsenal will be highly opaque, with great deception, denial, concealment, and mobility, utilized to hide the location of critical assets like weapons, delivery systems, assembly sites, and wartime command posts. Information about all the details pertaining to these assets will be hidden from most, including the Indian military, whose senior officers will be told just what they need to know in order to develop the relevant contingency plans relating to retaliation in the aftermath of India's absorbing a nuclear attack.

The latter example suggests that the nuclear arsenal will be distributed with weapons, and possibly even parts of weapons, kept separately from one another and from the delivery systems. While the delivery vehicles will remain in military custody because they are warfighting instruments *per se*, they are likely to be prepared and secured in secret locations that will neither be easily identifiable nor positioned close to the borders with Pakistan and China. Only when these weapons are required in moments of supreme emergency would the various component parts of the deterrent be brought together, integrated, and released to the end user – the uniformed military – with the objective of executing the acts of vengeance demanded by India's retaliatory response.¹²

THE ANATOMY OF THE 'FORCE-IN-BEING'

Both these examples serve to limn the future shape of India's nuclear deterrent: *a force-in-being that is limited in size, separated in disposition, and centralized in control*. Each of these variables will be analyzed further

in some detail but before that investigation is undertaken, one important inference ought to be underscored. The Indian decision to develop a force-in-being implies that New Delhi's post-1998 nuclear posture – despite all the contrary rhetoric and expectations aired in New Delhi, Islamabad, and elsewhere in the world – will not be *radically* different from that which has been in place since about 1992–94.

The biggest difference, of course, is that India today is a declared nuclear weapons power: as such, its national leadership can openly discuss its nuclear capabilities in Parliament and with external interlocutors; the myriad research and development efforts pertaining to India's emerging nuclear capabilities can also be carried out without the pervasive subterfuge of the past; and, planning for strategic nuclear operations too can be pursued far more systematically and without hesitation, embarrassment, or dissembling.

On all other matters, the continuities between its post-1992/94 variant of 'maintaining the option' and its post-1998 posture of a developing a 'force-in-being' will be far greater and much more significant than most public commentators in India, Pakistan, and the United States usually recognize.

Limited in Size

All Indian discussions about their future force posture emphasize one element uniformly: that the desired nuclear deterrent will be limited in size. The Prime Minister, Atal Bihari Vajpayee, using language that is by now fairly common among the country's strategic community, authoritatively staked out this position in Parliament when he asserted that India would not seek more than a 'minimum, but credible, nuclear deterrent'.¹³ Leading strategic analysts have amplified this leitmotif, with K. Subrahmanyam, for example, arguing that India is centered 'on minimum deterrence combined with no-first use'.¹⁴

Very rarely, some commentators have given vent to dissenting views on this question, as for example Brigadier V. P. Naib, who asserted that the need to retaliate against a nuclear strike would require India to have 'in readiness a reliable ability to inflict unacceptable damage at any time during the strategic exchange'.¹⁵

In a similar vein, one of India's most prominent civilian hawks, Bharat Karnad, said that, for India, the most effective solutions are personified by a 'maximally strategic'¹⁶ deterrence posture built around multiple kinds of high-yield nuclear weapons and numerous, diverse delivery systems which, taken together, would create the 'full and robust deterrent'.¹⁷

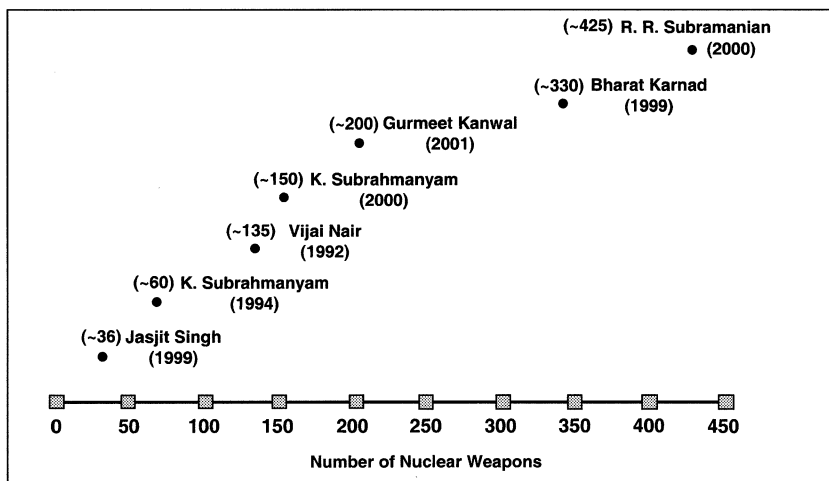
Such arguments, however, do not appear to command a strong following

among either the civilian leadership at both the political and the bureaucratic levels, or the higher leadership of the armed services, or the more numerous retired service officers who have written on this subject. Among this last group, a more typical example is represented by Major-General (ret.) Ashok Mehta, who noted that 'minimum deterrence and an NFU (no-first-use) policy allow for the maintenance of a limited nuclear arsenal – warheads and delivery systems – and a small, not-too-elaborate command and control structure. This makes the strategic deterrent affordable and prevents a nuclear arms race'.¹⁸

While the general consensus in India, both among civilian commentators and the armed services, thus seems to converge on the desirability of a 'minimum deterrent', it is not surprising to find that Indian 'defence experts ... seem to be divided over ... what constitutes a minimum deterrent'¹⁹ (see Figure 2).

Indeed, the concept of minimum deterrence – being borrowed from Western debates on the subject – has been controversial right from the very beginning of its history. The simplest conceptions of minimum deterrence have defined it as a 'nuclear strategy in which a nation (or nations) maintains the minimum number of nuclear weapons necessary to inflict unacceptable damage on its adversary even after it has suffered a nuclear attack'.²⁰ Intuitively, this definition suggests that such a nuclear force would be oriented towards countervalue targeting since the small number of weapons presumably entailed by the adjective 'minimal' ultimately requires

FIGURE 2
ALTERNATIVE INDIAN CONCEPTIONS OF 'MINIMUM DETERRENCE'



'city-busting' in order to satisfy the need for 'unacceptable damage'.

This predicate of minimal deterrence, however, left many theorists dissatisfied on both moral and prudential grounds and, consequently, a number of alternatives ranging from 'finite counterforce' to 'limited nuclear options' were advanced in order to allow for the possibility of limiting damage and controlling escalation if deterrence were ever to fail.²¹

Each of these alternatives, however, brought new problems in its wake, and ultimately the notion of 'minimal deterrence' – defined as 'a secure second-strike force of sufficient size to make threats of AD [assured destruction] credible'²² – came to be seen more as an ideal type that was valuable because it provided an eidetic image which contrasted strongly with its polar opposite, 'maximal deterrence'. This was defined as a posture 'capable of fighting, and in some sense winning, nuclear wars across a spectrum of contingencies'.²³

Since the notion of minimal deterrence did not (and could not) define any unique force size or structure, it was compatible with numerous nuclear architectures ranging from a few dozen warheads to perhaps even a few thousand weapons, all depending on the strength, resilience, and risk-taking propensities of the adversary. Western views on minimal deterrence have traditionally centered on the belief that 'the main challenge [was how] to achieve [stability] at lower nuclear force levels'.²⁴ The specific problem, then, consisted of appreciating the limits of 'successive build down'²⁵ or, in other words, the floor beyond which progressively deeper cuts in the number of nuclear weapons could not be safely undertaken.

In contrast to such Western concerns, the Indian approach to minimal deterrence involves exactly the opposite problem. The specific challenge facing New Delhi today is that of a *build-up* – not a draw-down – of its nuclear forces, given that its strategic deterrent hitherto has been largely latent, symbolic, and nominal. This challenge, however, generates a set of questions similar to that engendered by the Western debate, namely, 'how much is enough?' for purposes of both deterrence and stability.

This question exercised Western strategists greatly during the Cold War and a variety of sophisticated analytical techniques were developed in an effort to address this issue satisfactorily.²⁶ While a consensus solution ultimately proved elusive, at least the framework governing the solution became clear: the number of nuclear weapons deemed to be sufficient were a complex function of the type, yield and reliability of the weapons themselves and the number of targets needed to be held at risk, this last variable being affected, in turn, by the number, types and reliability of the weapons possessed by the adversary and the nuclear strategy it was

expected to pursue.²⁷

Indian security managers have not thus far defined their requirements with respect to any of these issues publicly, and they will probably never define these requirements openly in the future. But, while the upper and lower bounds of India's strategic requirements are unknown, what is clear is that New Delhi believes successful 'deterrence is not dependent on matching weapon to weapon, but [rather, hinges] on the ability to retaliate with a residual capability'.²⁸

This position is obviously borrowed from the writings of K. Subrahmanyam who, in response to the US demand for a quantification of India's deterrent, has argued that 'minimum deterrence is not a numerical definition but a strategic approach. If a country is in a position to have a survivable arsenal, which is seen as capable of exacting an unacceptable penalty in retaliation, it has a minimum deterrence [as] opposed to an open-ended one aimed at matching the adversary's arsenals in numerical terms'.²⁹ This notion that minimum deterrence is a strategic approach, and hence beyond quantification, has been criticized vehemently by other Indian analysts, however, who note that 'for deterrence to be credible, it has ultimately to be based on numbers'.³⁰

Such criticisms overlook the subtlety of the official Indian position. Clearly, both Subrahmanyam and India's security managers amply recognize that deterrence, in the final analysis, *is* about numbers: the numbers of weapons that are possessed by India, the numbers of weapons that can survive a first strike, the numbers of weapons that could be successfully carried to and detonated on target, and the numbers of weapons required to wreak unacceptable damage on an adversary who threatens Indian security.

What they are attempting to suggest, therefore, through their claims that deterrence is not about numbers, is that the number of nuclear weapons judged to be essential to Indian security is not something they are willing to disclose either to their own body politic, or to their adversaries, or to any other interested interlocutors like the United States. In part, this response is conditioned by the fact that they cannot be certain today what their eventual stockpile of fissile materials and the quality of their future nuclear weapons designs would look like.

Even though India's security managers probably have a good idea about where they would prefer to end up, they are quite unlikely to reveal this information – for reasons relating both to the exigencies of public diplomacy and the requirements of deterrence stability – to any one who might have the temerity to ask.

In their public statements, India's security managers have continued to

emphasize that the relative number of nuclear weapons possessed by India *vis-à-vis* its adversaries is less important than the fact that even a few surviving weapons would cause more pain than is worth any of the objectives sought by the latter. In some instances, they have explicitly affirmed that India is in fact content to accept nuclear inferiority *vis-à-vis* China, both in terms of numbers and qualitative capability, because such inferiority does not in any way prejudice their ability to preserve India's security and autonomy.³¹ Whether a similar position would be maintained *vis-à-vis* Pakistan is unclear, despite Jaswant Singh's insistence that 'the question of an arsenal larger than that of country X or Y [is] a non-question'.³²

The only thing worth stating on this matter is that Indian security managers traditionally have always believed that New Delhi's strategic pre-eminence *vis-à-vis* Islamabad was not simply a fact of life but an operating condition that had to be assiduously maintained because of their judgment of Pakistan as a risk-acceptant, if not an irresponsible, state.

On the assumption, therefore, that India continues to enjoy nuclear superiority over Pakistan, even as it remains inferior by many comparable measures to China, New Delhi has repeatedly affirmed that the very notions of 'superiority' and 'inferiority' are politically irrelevant so long as the residual capability to devastate a certain fraction of the adversary's assets always exists inviolate even amidst the carnage of war.³³ Though partially conditioned by the confidence that India already possesses nuclear superiority over Pakistan, this affirmation also draws sustenance from a variety of larger beliefs held in India about: the gradual decay in the efficacy of nuclear threats since the beginning of the nuclear era; the strong presumption already existing against any nuclear use; and the progressively declining thresholds that define unacceptable damage as societies continue to modernize economically.

Irrespective of these expectations turning out to be correct, they still need to be translated into a weapons inventory that is consistent with the overarching concept of 'minimum deterrence'. One of India's most widely read commentators on nuclear matters, Vijai Nair, has attempted to provide just such a numerical estimate of how the country's evolving deterrent ought to be sized. Nair estimates that *vis-à-vis* Pakistan, a nominally weaker nuclear adversary, India should acquire the ability to target:

six metropolitan centers including port facilities; one corps sized offensive formation in its concentration area; three sets of bottlenecks in the strategic communications network; five nuclear capable military airfields; two hydroelectric water storage dams. A total of 17

nuclear engagements.³⁴

Vis-à-vis China, a superior nuclear adversary, Nair argues that India ought to focus on large punishing strikes that would retard postwar Chinese capabilities relative to its other adversaries. This implies that India would need a weapons capability able to pull out 'five to six major industrial centers, plus two ports, to service China's strategic missile submarine (SSBN) fleet. This makes a total of eight nuclear strikes'.³⁵ Against such a target array, Nair argues that

the ideal configuration of warhead numbers and yield would be: two strikes of one megaton each for metropolitan centres and port facilities; two strikes of 15 kiloton (kt) each for battlefield targets; one strike with a yield of between 200 and 500 kt each for dams; one strike of 20 to 50 kt each for military airfields; and one strike each of 15 kt for strategic communication centres.³⁶

After reliability parameters are factored in, at the rate of two weapons for each autonomous strike, with 20 per cent of the entire force structure maintained as a postwar reserve, the 25 designated targets in China and Pakistan are calculated as requiring an overall Indian arsenal of 132 weapons of varying size and yield.³⁷

Other commentators have also offered similar, though sometimes less detailed, assessments. General K. Sundarji, for example, has concluded that against a small country like Pakistan 'up to 1 MTE [megaton equivalent] (say 50 x 20 kt weapons) might do. Even for deterring a large country, one is most unlikely to require more than 4 MTE'.³⁸ These totals are difficult to translate into specific numbers of weapons because the design yields of India's nuclear weaponry are not publicly known. Sundarji suggests, however, that targeting 15 conurbations in both Pakistan (5) and China (10) should suffice for minimal deterrence: each of these targets could be attacked with 'three fission warheads of 20 kt each, detonated as low airbursts',³⁹ and from this requirement he deduces that India 'would need 45 warheads (and their delivery means) to survive an adversary first strike'.⁴⁰

These numbers are explicitly based on weapons designs producing nominal yields in the ~20 kt range, and after factoring in reliability parameters and possible losses to an adversary's first strike, Sundarji concludes that 'a low estimate of 90 weapons and an upper estimate of 135 weapons would be reasonable'.⁴¹ K. Subrahmanyam too argues for a comparable class of numbers: in 1994, he declared that India needed only '60 deliverable warheads'⁴² which, in practice, probably meant some larger

number if the reliability quotient and the possible attrition of these assets are taken into account. General V. N. Sharma, a former Indian Army Chief of Staff, for example, 'believes that around 50 bombs should do, but calls for 'going the whole hog' in delivery systems'.⁴³

In sharp contrast to these more moderate estimates, Bharat Karnad has argued that strategic sufficiency for India cannot consist of anything less than the ability to interdict ~60 primary and secondary targets in China and Pakistan and, accordingly, demands a nuclear force of well over 300 weapons by the year 2030 – most of which must be high yield thermonuclear devices.⁴⁴

While the size of the weapons inventory has received some attention, the number of desired delivery systems has not been specified in comparable detail in Indian discussions thus far. In part, this is because deducing the minimal numbers of delivery vehicles necessary requires complex operations research and analysis as well as prior knowledge of many variables like basing modes, relative hardness and mobility, and estimates of success accruing to deception and denial. The kind of delivery system chosen also affects the final force size: while ballistic and cruise missiles, which are single-use vehicles, would correlate with their nuclear payloads in a one-to-one relationship, strike aircraft, being reusable, do not lend themselves to such a simple metric for force sizing.

The lower penetrative capacity of aircraft can increase the gross numbers required, and complex planning tools are therefore necessary if good estimates of operational requirements are to be derived. Given the lack of access to such planning tools, it is not surprising that various Indian commentators have advanced different estimates of the delivery systems required to carry their preferred inventory.

In 1994, K. Subrahmanyam argued that his force of about 60 nuclear weapons be carried on 20 Prithvi SRBMs, 20 Agni intermediate-range ballistic missiles (IRBMs), and the rest on strike aircraft.⁴⁵ Two years later, Sundarji, in contrast, argued for a force of ~150 warheads carried on 45 Prithvi SRBMs and 90 Agni IRBMs, with the balance carried by aircraft.⁴⁶ Vijai Nair has argued for at least 5 SSBNs, in order to maintain 48 SLBMs ready at all times for use against China and Pakistan, in addition to 36 SRBMs and IRBMs and various other unspecified numbers of manned aircraft.⁴⁷

And, in the most expansive version of all, Bharat Karnad has argued for a force of 4 SSBNs contributing a total of 48 SLBMs, 25 intercontinental ballistic missiles (ICBMs), 40 IRBMs, and 70 manned aircraft, all to be complemented by another 70 air-to-surface missiles and 25 atomic

demolition munitions.⁴⁸ The exact nature of the calculations leading up to these force architectures is not known.⁴⁹

Despite the lack of consensus among commentators, there are some interesting similarities between these estimates. All posit essentially finite arsenals, that is, weapons inventories and delivery systems that do not inexorably grow in size once the ability to service certain destruction requirements is assured. Further, the level of destruction thought to be sufficient for successful deterrence is relatively small and generally centers around the ability to destroy 8–15 target complexes in China and Pakistan, even though precisely what constitutes destruction may vary from analyst to analyst. Many accept a certain redundancy in capabilities to allow for reliability constraints, attrition as a result of first strikes, and delivery failures, yet none argue for a force posture that is in any way automatically or consistently keyed to the size and character of the adversaries' nuclear capabilities.

In all probability, however, most decisions about the size of India's nuclear arsenal will be made ultimately on considerations *other than merely operational requirements*. It is, in fact, almost likely that the size of the nuclear weapons stockpile will be defined eventually by the quantum of fissile materials available to India – and not necessarily by the size of the target set defined by India's numerous security commentators. Similarly, the yield of the nuclear weapons themselves will be determined fundamentally by the designs that Indian scientists have been able to validate thus far or appear to have the greatest preference for – and not necessarily by the demands imposed as a result of the technical characteristics of the target array.

This by itself should not be surprising because India's political leadership does *not* seek to create a large and complex nuclear arsenal, even if its scientific community yearns to push the envelope with respect to more and more sophisticated weapons designs. Further, the principal criterion for strategic adequacy in Indian eyes is not that the damage inflicted by its weapons ought to be greater than that which can be inflicted by an adversary, but only that the costs resulting from Indian retaliation ought to be greater than any political benefits accruing to the adversary as a result of its nuclear threats or first use.

The requirements for effective deterrence in the Indian context are thus truly low because state managers in New Delhi have already concluded that there are very few political benefits which could be secured by any adversary through aggression – with or without nuclear weapons – against India. Given this generally modest criterion of strategic adequacy, even

small numbers of relatively low-yield fission bombs could suffice to provide India with the deterrence it desires.

Although India's nuclear force may therefore be defined eventually more by technical limitations and political constraints rather than by strict operational requirements, Indian policymakers today believe that prudence requires that they keep all their options open. On this issue, both the government of India and security élites within the country at large appear to be of one mind. Both groups are agreed that India's strategic policies with respect to matters affecting the size and quality of its future deterrent ought to have three components.

First, India should not foreclose any possibilities unless the payoffs from foreclosure incontrovertibly exceed the costs. In practical terms, this implies that India will be quite loath to quickly sign and ratify the CTBT and assist the Fissile Materials Cut-off Treaty (FMCT) negotiations to a speedy and successful conclusion, because surrendering the benefits embodied by such actions would occur only if there was some prospect of securing suitable political advantages as compensation.

Second, India should not make any formal commitments to limit the upper bounds of strategic capability. In practical terms, this implies that Indian security managers will not provide any binding assurances to either the United States or the international community that their desired force-in-being will not exceed certain quantitative or qualitative thresholds.

Third, India should not restrain its domestic research, development and production activities relating to nuclear weapons, fissile materials, and delivery systems. In practical terms, this implies that India will continue to press ahead with its existing efforts in all three arenas, although these may be accelerated in some areas – like the production of fissile materials, for example – while remaining more or less constant in others – such as the development of delivery systems.

This threefold strategy is clearly intended to minimize, on the one hand, the extent of the formal obligations restraining India's emerging strategic capabilities while, on the other hand, producing the largest and most effective deterrent force possible within more or less the limits of its current capabilities.⁵⁰ The latter objective is not simply to expand the size of the nuclear weapons inventory for its own sake, but rather to increase the extent of the residual fraction that would survive a nuclear strike that might be mounted by its adversaries.

The 'Draft Report of [the] National Security Advisory Board on Indian Nuclear Doctrine' captured this requirement succinctly when it noted that India's operational policy of 'retaliation only' makes 'the survivability of

our arsenal ... critical'.⁵¹ The Advisory Board pointed out, quite accurately, that the size of India's nuclear force eventually would be conditioned by many variables, including the capability and the disposition of the nuclear forces maintained by India's adversaries, the demands levied on penetrativity in the face of the incipient transformations in the present offense-dominant global nuclear regime, and the state of political relations: between India and its immediate adversaries; between those adversaries themselves; and between India and other key powers in the global system.

A recognition of these factors led the Board to insinuate that the size of India's emerging nuclear force would have to be sufficiently variable to ensure survivability in the light of the potential changes in these issue-areas.⁵² The prospect of such variability, however, cannot imply that the size of India's nuclear force would, by definition, be open-ended. Most Indian security managers recognize that at some point in the future a FMCT, if successfully concluded, would compel them either to terminate the production of weapon-usable materials or at least transparently account for all their future inventories.⁵³

This fact, coupled with the constraints imposed by the parlous state of India's nuclear infrastructure, sets a ceiling on the size of India's future nuclear arsenal which cannot be negotiated away unless the country is willing to make a massive investment in new nuclear production facilities right away in the hope that it can dramatically distend its potential arsenal before the decade is out (which is when the constraints emerging from a FMCT could conceivably kick in).⁵⁴

K. Subrahmanyam, in recent writings, has sought to clarify what the outer limits of the Indian minimum deterrent might be by affirming that the country's emerging arsenal will probably be pegged eventually at about a 150 nuclear weapons⁵⁵ – a judgment obviously based on the premise that no FMCT restrictions will be operational for at least another decade *and* that India can improve the efficiency of its plutonium production for weapons purposes in the interim.

All this implies that the emerging Indian nuclear deterrent eventually will be quite limited in size: it will be a relatively small force consisting of about 150 weapons (and possibly even fewer) by the year 2010, most of which likely will be capable of producing only comparatively small yields of about 20 kt (if New Delhi persists with its current moratorium on nuclear testing). India will continue to pursue a variety of delivery systems, especially ballistic and cruise missiles, and will acquire as many of these systems as is necessary to deliver its nuclear weapons under a wide variety of operational contingencies.

Because none of the missiles currently existing are ideal vehicles for nuclear payloads, however, it is likely that India will continue to develop these systems to reach ranges that will probably not exceed 3,500 km. This may be so, even as it persists in experimenting with a variety of unorthodox basing modes in order to migrate gradually from the current reliance on air-breathing vehicles that will nonetheless remain the primary carriers of India's nuclear weaponry for at least some years to come.

Separated in Disposition

Although the mature Indian arsenal will remain a relatively small force, the very fact of its existence will become a source of threat to India's adversaries, both China and Pakistan, who in the event of deterrence breakdown may be forced to contemplate a variety of preemptive damage limiting strategies purely for defensive reasons.⁵⁶ An important challenge facing India's evolving arsenal, therefore, consists of ensuring its survivability against any first-strike temptations on the part of an adversary, and neutralizing such temptations successfully represents the first key to successful deterrence.

Specifically, this challenge boils down to the question of how a small nuclear force may be preserved inviolate so that, even if first strikes are unleashed *in extremis*, a substantial fraction of the nuclear assets will survive, ready to be reconstituted for the devastating retribution to follow. In general, states that already possess nuclear arsenals have adopted some combination of the following basic solutions designed to ensure survivability: 'physical hardening, geographic dispersion, mobility, redundancy, secrecy, and the active interdiction of attacking weapons',⁵⁷ each of which embodies different benefits and costs.

Since India has eschewed the development of a robust and ready arsenal in favor of a force-in-being, it is unlikely to pursue either physical hardening or active interdiction of attacking weapons as the *primary* means of ensuring survivability. It is likely to focus instead on configuring its force-in-being in such a way so as to feature *pervasively distributed capabilities in order that no completed strategic systems actually exist routinely as transparent targets for potential interdiction*. This orientation, exploiting concealment, deception, and mobility, will be defined around distributed capabilities and it is this feature which not only makes the Indian deterrent a force-in-being as opposed to, say, a robust and ready arsenal but also broadly contributes to resolving its problems of survivability – at least in principle.⁵⁸

The concept of distributed capabilities implies that the normal

peacetime posture of India's nuclear deterrent will consist of deliberately separated components maintained under conditions of great secrecy. For purposes of analysis, these components may be treated as encompassing: the weapon's core which consists of some kind of fissile material and is usually referred to as the 'pit'; the weapon assembly which consists of all the other non-nuclear elements of the device, including the safing, arming, fuzing and firing (SAFF) subsystems; and the delivery platform, whether that be an aircraft or a missile. If the delivery platform is a missile, there are strictly speaking two components, the missile itself and the launch system: the technical characteristics of the latter will vary depending on whether the missile is designed for road- or rail-mobility, or if it is intended for basing on a sea-based surface or sub-surface platform.

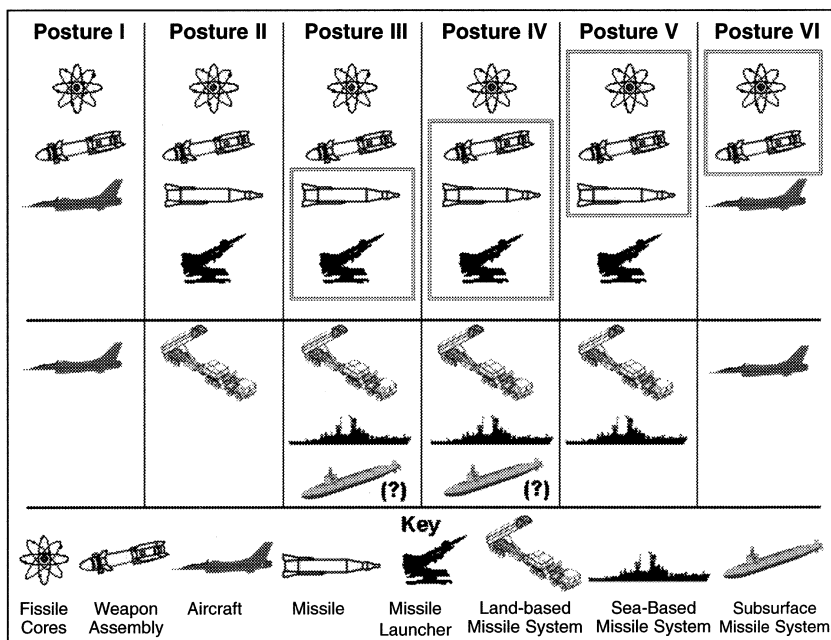
Although the exact extent of separation that will be operationalized in practice is unknown and will never be revealed by India's security managers, it is possible to identify abstractly at least six relatively distinct degrees of separation that could define the routine configuration of India's nuclear deterrent, on the assumption that this force will eventually include only gravity bombs and warheads to be carried either by land-based aircraft or land- and sea-based ballistic missiles. If the inventory were to include cruise missiles of different sorts and various kinds of tactical nuclear weapons, the postures described below would have to be further modified, but since it is likely that India's nuclear systems in the foreseeable future will consist mainly of land and sea-based ballistic missiles – the Agni and, possibly, the Prithvi, in several variants – and land-based aircraft of different kinds, the postures described below should suffice for purposes of analysis (see Figure 3).

Posture I involves a systematic separation of the pit from the weapon assembly both of which, in turn, are stored away from their aircraft delivery system. Posture II involves the same configuration but uses a missile as delivery system; the missile, as well as its launch system, is stored separately. This configuration obviously applies only to the land-based component of the deterrent force, since a sea-based deterrent either does not permit such a degree of separation or permits it only under outlandish technical and operational assumptions so to render it highly infeasible.

The other postures describe various modes of deployment which involve smaller degrees of separation. Posture III involves separating the pit from the weapon assembly and storing these separately from the missile delivery systems which are maintained, however, in integrated form with both missiles and launchers mated routinely. Posture IV involves a further

FIGURE 3

ALTERNATE POSTURES DEFINING THE CONCEPT OF DISTRIBUTED CAPABILITY



diminution in the degree of separation, with the missile, its launcher, and the weapon assembly, routinely maintained in integrated form minus only the nuclear pit, which is stored separately and away from the rest of the integrated system.

This mode of separation can be adapted for use with respect to both land- and, with greater complexity, sea-based systems. Posture V is broadly comparable to Posture IV in that it would involve the complete mating of the nuclear pit, the weapon assembly, and the missile itself, with these completed units, however, stored separately and away from their associated launch system. This mode of separation is most feasible where land-based missiles are concerned, but is less so in the case of surface ship-based systems, and is practically impossible in the case of submarines.

Posture VI is analogous to Posture V, but applies to aircraft: the pit and the weapon assembly are fully integrated to form complete and ready gravity bombs, but these units are stored separately and apart from their delivery aircraft which, being dual-use platforms, are maintained at relatively high levels of readiness.

It is difficult to assess which model of a distributed capability Indian analysts would either approve or disapprove when they argue about the desirable character of their evolving force posture. Statements made by Indian policymakers suggest an inordinate, though justifiable, concern about the survivability of their nuclear assets.⁵⁹ In this context, it is important to recognize that the fact or extent of distribution *per se* does *not* enhance survivability: survivability is best ensured by the lack of transparency about the location of the nuclear assets.

In order to preserve opacity while simultaneously effecting the distribution of components, force planners would need to acquire a far larger number of the potentially more detectable delivery systems than would actually be required by the size of their nuclear weapons stockpile itself. Recognizing this fact, the 'Draft Doctrine of [the] National Security Advisory Board' argues that in addition to 'mobility, dispersion and deception', the 'survivability of [India's nuclear] forces will [have to] be enhanced by ...[the presence of] ... multiple redundant systems...' ⁶⁰

While this argument is certainly correct, the key analytical problem identified earlier still remains unresolved. If the only objective is to maximize survivability, it is logical for India to focus on acquiring a larger number of delivery systems than is strictly necessitated by the size of its weapon stockpile, coupled with a force posture that emphasizes higher degrees of separation among components as is exemplified, for instance, by Postures I and II. If the objective of maximizing survivability, however, is pursued concurrently with some other objective, for example, the ability to shift quickly from peacetime deployment to wartime readiness as is recommended by the Draft Doctrine issued by the National Security Advisory Board,⁶¹ then it would be logical for India to consider alternative postures, like Postures V and VI, which incorporate even lower degrees of separation.

A complete solution to the problem of assessing the appropriate degree of distribution, however, will require an analysis of not only the tradeoffs between the survivability-rapid retaliation dilemma but, equally importantly, an analysis of how any solution adopted to deal with this issue also affects India's ability to cope with other challenges, like the threats posed by accidental detonation, unauthorized use, mistaken authorized use, and terrorist seizure.

When these challenges are explicitly incorporated into the analysis, it becomes obvious that Postures V and VI may quickly become subversive of stability insofar as they require nuclear devices to subsist in completed form routinely. The threats emerging from such a posture, however, can be

reduced considerably if the nuclear weapon designs incorporate some sort of enhanced nuclear detonation safety system (ENDS) and various kinds of permissive actions links (PALs),⁶² but if such technologies are not available (or available only in relatively primitive form), other alternatives will have to be relied upon.

An alternative that resolves the survivability-rapid retaliation dilemma together with the other challenges of nuclear possession, then, can be found only among Postures I, III and IV, with Posture I being optimal for the air-breathing arm and Posture IV being optimal for the land- and sea-based missile arms of the force. Both these postures, however, would require nuclear weapons based on 'insertable pit'⁶³ designs – hardly the acme of safety technology today.

Regardless of which of the above postures Indian security managers prefer, these will be operationalized not in static but in dynamic form. That is, the many components of the deterrent force which are stored separately may be periodically moved from location to location covertly, and their relatively small size, coupled with the fact that there already exists a ready physical infrastructure designed for storing, maintaining and readying such elements, makes a distributed solution to India's strategic problem eminently feasible. There are, in general, three conditions which are necessary for the success of such an arrangement: first, there must be a large number of storage sites under the effective control of the state; second, the number of individuals with information about the physical location of the actual holdings must be small; third, there must be an organizational system capable of handing both the storage and the episodic, but covert, movements of various components.

All three conditions obtain abundantly in the case of India. While the number of facilities at which India's strategic assets could be distributed is potentially very large, the number of individuals with information about the location and status of these component parts is, in contrast, very small.⁶⁴ Those who possess a 'God's eye view' of the entire weapons program are probably less than two dozen in number, though perhaps many more individuals are aware of bits and pieces pertaining to the general effort.⁶⁵

Administrative structures in India, especially those relating to the nuclear weapons effort in particular, cut across organizational realms, and operational directives are invariably communicated informally and without any written record whatsoever.⁶⁶ These arrangements work only because the Indian administrative structure spawns very effective, but shadowy, core *networks* which are then superimposed on the existing *institutions*. In such