

# Introduction

For a variety of political and organisational reasons, India is saddled with a nuclear force management system that is seriously inadequate for the work it needs to do. Two of these reasons stand out prominently. The first is, with the debatable exception of France, India is the only Nuclear Weapons State (NWS) that started its nuclear programme without the clear intention of producing weapons. For the first decade and a half, the programme was wholly civil oriented — its objectives were to produce electricity, modernise the economy, and contribute to national self confidence in the post colonial era. As a result, when the need arose in 1964<sup>1</sup> to develop nuclear weapons, a framework for managing *all* nuclear activities, through a scientists-controlled system, had been firmly in place. The second major reason is the barren relationship that developed between the political leadership and the armed forces of the country soon after independence, resulting in the rapid whittling down of the latter's contribution to national security policy making. As a result, when consideration of starting a nuclear weapons programme began, the military was not even at the periphery of discussions.

The military's exclusion from policy level nuclear force management has predictably created a poorly functioning system. Nuclear forces of every NWS are directly commanded and closely controlled by the national leadership. But in every one of these countries, except India, these forces are *managed* by the armed forces under the supervision of the political leadership. In none of these countries — the US, Russia, the UK, France, China, Israel and Pakistan — does the technical establishment play a direct role in managing the nuclear forces. India, where the responsibility for management is shared amongst the Defence Research & Development Organisation (DRDO), the Department of Atomic Energy (DAE), and the three armed forces, is

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<sup>1</sup> China's first nuclear test in 1964 had an outsize strategic and political impact on India because of the traumatising Chinese invasion two years earlier.

the singular exception to the global pattern. This troika style management, which degrades both effectiveness and accountability, is not the result of any unique environment surrounding India's nuclear forces. It is merely a fallout of the two earlier mentioned factors that had got entrenched before the country had even thought of acquiring nuclear weapons.

India has had a vigorous public discourse on nuclear weapons. It began with the first Chinese test in 1964, and gathered strength through India's nuclear device test in 1974, Pakistan's unexpectedly rapid nuclear progress during the early 1980s, and the considerable pressure mounted on India in the mid-1990s to sign the Non-Proliferation Treaty (NPT) and the Comprehensive Test Ban Treaty (CTBT). In Stephen Cohen's words, 'no other country has ever engaged in as lengthy, wide-ranging, and intensive debates as India did before it crossed the various nuclear thresholds' (Cohen 2001: 159). These debates essentially revolved around two issues — the strategic and political need for India to go nuclear, and the political and technological penalties it might have to pay if it did. As it turned out, India found that going overtly nuclear, in 1998, did not lead to any penalty but actually to sizeable gains. The tests boosted both self image and security assurance within the country. External political gains, highlighted by the new close relationship with the US and the global recognition of India as a *de facto* NWS, also came quickly.<sup>2</sup> Technological gains, through making India the sole exception to the ban imposed by Nuclear Suppliers Group (NSG) on transfer of nuclear technologies to non-NPT members, came a few years later. Strategic gains were less clear. On the one hand, India's new status opened another window to balance China, but on the other, was the reality that Pakistan too had become a proven and globally accepted nuclear weapons power.

From the very beginning, political factors — international prestige and enhancement of domestic confidence — have played major roles in shaping India's nuclear discourse.<sup>3</sup> India's steadfast and ultimately

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<sup>2</sup> India's new close relationship with the US is driven primarily by the growing strength of India's economy, but the nuclear tests helped to show that this economic ascent is accompanied by stronger political will.

<sup>3</sup> For a good exposition of how the nuclear discourse in India has centred on influencing the US and global public opinion, and not on deterring nuclear threats, see Frey (2006: 143–191).

successful resistance to the NPT regime, which had excluded it from its privileged tier, is widely seen as a unique political achievement that only a country with true great power potential could have pulled off (Israel and Pakistan had never made NPT a political issue). This line of thinking has led to the country's nuclear capability being seen primarily as a prop for its great power status, and only secondarily as something that enhances national security. The technological dimension of India's nuclear programme is looked upon in much the same way. India was the first developing country in the world to build a nuclear reactor, and that too at a time when nuclear technology was held in great awe everywhere, including in developed countries. The country took great pride in the fact that from that first step it was able to move further and actually acquire nuclear weapons, overcoming technology denial efforts. After the first set of nuclear weapon tests, on 11 May 1998, the then Prime Minister Atal Behari Vajpayee declared 11 May as the National Technology Day. As a consequence of such thinking, even today, when the country has a sizeable and growing nuclear arsenal, the management of it is seen as essentially a politico-technological enterprise with global standing the primary objective and deterrence only a secondary one.

Despite the actuality that the country's nuclear forces are manned and operationally managed by the armed forces, military leaders make no statements about the capabilities of the arsenal they are responsible for. All analyses and commentary in the media about the current and future capabilities of the country's nuclear arsenal are based on snippets of information from the DAE and DRDO scientists — in attributed, and more often, non-attributed forms. These morsels, which frequently contain dubious technical claims and projections, are treated with great respect by most Indian commentators. Because of the indiscriminate opacity that shrouds all strategic technology matters in India, analysts and commentators have no means to examine the veracity of these claims through cross checking. What should cause serious concern about this pattern of single-source flow of information is that it not only drives public narratives and analyses, but also forms the dominant basis for top leadership decisions regarding policy and management of nuclear forces.<sup>4</sup>

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<sup>4</sup> What the scientific establishment tells the national leadership is obviously different from what it feeds the media with, but it nevertheless resembles the latter in the matter of overblown claims.

It is only on the rare occasion when people, who had once been part of the technical establishment, speak out that some questions get raised about the claims made by it. The recent debate between some senior retired Atomic Energy Commission (AEC) and DRDO scientists and those currently in charge is one such instance. The issue involved was whether India can produce *reliable* fusion weapons without further testing. While the AEC and DRDO leaderships, who oversaw the 1998 tests, insist that India can create these weapons, several retired scientists, including the former AEC Chairman and Director of Bhabha Atomic Research Centre (BARC) P. K. Iyengar and former Director of BARC A. N. Prasad, have argued that India cannot (Iyengar et al. 2009). (All Indian nuclear weapons are developed and produced at BARC.) The armed forces had quietly questioned AEC/DRDO's capability to produce fusion weapons much earlier — within a year of the 1998 tests.

## The New Context

While the management approach to India's nuclear forces, with scientists at the helm, has remained much the same as was in the pre-NWS days (and thereby markedly different from those of all other NWS), the external and internal factors impinging on India's nuclear responsibilities have altered substantially. Although it is not what India had wanted from its nuclear weapons programme, the country has now become deeply enmeshed in the deterrence game. Pakistan now has a number of operationalised, adequately survivable, nuclear tipped missiles capable of striking most of India. Fissile material has largely ceased to be a limiting factor in expanding Pakistan's nuclear arsenal. At the same time, the conventional balance of power has progressively and irretrievably tilted against Pakistan making that country much more dependent on nuclear forces than it had been earlier. There is a parallel here with Russia's increased reliance on nuclear forces after the collapse of the Soviet Union.

India has now identified China as a country that needs to be deterred with nuclear weapons. Indian analysts talk frequently, and Indian officials occasionally, of the 'China threat', and the need for nuclear deterrence against it. Amongst the many factors involved in extending the country's deterrence horizon to encompass China, there are two that are essentially military. The first is that, unlike in the case of Pakistan, aircraft cannot project deterrence against China.

Only reliable, survivable missiles in the 3500–4000 km range can serve this purpose. The other is that China is on a slow, untrumpeted, yet deliberate and comprehensive path of nuclear force modernisation, aimed at improving its deterrence capability against the US and Russia. As a result, in capability terms, the nuclear threat that China can pose to India will increase in the coming years.

Besides the changes in India's deterrence equations with Pakistan and China, there are other factors that call for a major overhaul of India's nuclear force management system. An important one is that fissile materials have now ceased to be a problem in expanding India's arsenal. The United States-India Nuclear Cooperation Approval and Non-proliferation Enhancement Act of 8 October 2008, and the concurrence accorded to it by the NSG and the International Atomic Energy Agency (IAEA) have seen to this. These agreements have also led to lowering the hurdles in India's path to acquire useful dual-use (nuclear and non-nuclear) technologies, which can also help in India's missile and command and control (C&C) programmes. India can now upgrade and expand its nuclear forces more easily than it could earlier. To ensure that this new freedom is used thoughtfully and to the best advantage, the country needs to have a much more sophisticated and multi-disciplinary understanding of the strategic, technological, operational, and cost implications of future force development decisions.

It is important to figure out the best way to improve India's deterrence capability against China. The chances of the US ratifying the CTBT do not look good in the short term, but the current global consensus on the need for all countries to maintain their unilateral moratoriums on testing remains strong. There is also a fair chance that in the medium term the US will ratify the CTBT because, objectively viewed, it has much to gain from doing so. Even if the US merely continues with its present position on CTBT (signed but not ratified), it is doubtful whether the balance of political and strategic fallout of additional nuclear tests by India will be to the country's advantage. For one, no NPT-recognised NWS has tested since 1996. The only countries that have tested since then are India and Pakistan, in 1998, and North Korea, in 2006 and 2009. Besides the likely adverse international political fallout, India must also reckon with the strategic consequences of more tests. Indian tests will open a political window for Pakistan to conduct more tests, and this time possibly for China as well — and both could use the 'respondent' argument.

It is difficult to predict whether India will improve its strategic position vis-à-vis Pakistan if that country tests too — with boosted fission tests very likely, and thermonuclear tests a possibility.<sup>5</sup> There is no question that if India can weaponise thermonuclear warheads through new tests, it will improve its deterrence position vis-à-vis China. But, new tests by China will help improve its own deterrence position, relative to the US — a chain of events the US is unlikely to welcome. Moreover, in the emerging global environment, where because of worsening proliferation and terrorism risks the entire world wants to reduce the salience of nuclear weapons, there will be broader costs too for a high profile nuclear pursuit. It may be more prudent for India to increase its deterrence capability by enhancing the range, reliability, robustness, and survivability of its strategic missiles, as well as the operating prowess of its personnel and organisations, than by seeking to improve warhead explosive power through thermonuclear capability.

For India's strategic force capabilities to improve, a clearer distinction needs to be made between the objectives of prestige (both internal and external) and deterrence. Not only do the two objectives now call for diverging force development paths, but the prestige path has reached a dead end. Now that a large number of countries can make nuclear weapons, if they choose not to abide by NPT restraints, and an even larger number can make Medium Range (1000–3500 km) Ballistic Missiles (MRBMs), should they set their mind to it, there is little prestige to be gained from technology demonstrations in the strategic field. This is true even if such demonstrations include a thermonuclear bomb and an Inter-Continental Ballistic Missile (ICBM). When considering the prestige dimension, it is useful to note that India is no longer the underdeveloped country it was in the 1970s when nuclear and missile demonstrations could give it a big image boost. Today, India is a fast rising power in fast rising Asia. It is a country that has demonstrated not only economic vibrancy of a high order but also a high level

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<sup>5</sup> Indian scientists have a long history of underestimating Pakistan's strategic technology capability. This comes from not taking adequate account of the extraordinary importance Pakistan places on nuclear deterrence against India and the help China could render Pakistan. The dominant Indian view that Pakistan cannot develop fusion, or even boosted fission weapons might therefore prove incorrect as many such estimates about Pakistan's capabilities have in the past.

of innovative capability in many fields of non-strategic technologies. Strategic technology demonstrations cannot add anything to India's already high global status.

## **The Need for Comparison**

During its long and unfocused nuclear weapons quest, India came to develop a highly self-absorbed approach. This was because India's dominant objective was political and technological prestige, while for every other NWS it was deterrence. This basic difference in terms of primary objective logically led to an avoidance of comparison with other countries, and a resultant inwardness in nuclear thinking — both at leadership and analyst levels. This evasion persisted even after Pakistan acquired nuclear weapons in 1988–89, and nuclear deterrence thereby became an unavoidable and critical necessity for India. The country's failure, even at that stage, to deal with deterrence the way other NWS do had to do with the weight of the past, the composition of the country's nuclear policy makers, and an ingrained disdain within India's strategic Science and Technology (S&T) establishment for Pakistan's technological capabilities. There has always been a widely-shared, though not well thought-through, confidence that India's broad S&T superiority in the nuclear field can, by itself, neutralise any Pakistani nuclear threat. As for the threat from China, while the conventional dimension of that threat is taken seriously by the government, the nuclear dimension is not, despite the occasional contrary posturing.

To the small extent that analysts make comparisons of Indian nuclear capabilities with those of its potential adversaries, the criteria used are limited to headline technical characteristics, such as the explosive power of warheads and ranges of missiles. The more difficult to assess hardware parameters such as reliability, accuracy, ease-of-operation and ruggedness, all of which are crucial to deterrence projection, are never compared. Nor is comparative scrutiny exercised with regard to the even more important man-machine matters concerning how well are personnel trained and organisations enabled to handle their hardware — not just in static peacetime conditions, but in dynamic alerted conditions under expectation of war. These factors are difficult to assess for any but extremely well informed analysts. In the case of assessment of conventional capabilities, Indian analysts not only have far more data that they can access but also have

subject expertise, often from past military service. Equally important, the basic patterns of operation of Indian conventional forces, unlike the case is with nuclear forces, are broadly comparable to those of other countries. With regard to nuclear capabilities, Indian analysts face a paucity of both, reliable data and expertise.

There are many inter-country differences amongst the other seven NWS in the way their nuclear forces are managed, but these stem from variations in threat perception, resource availability, and strategy chosen. There is no difference amongst them with regard to the understanding that deterrence, projected at the operational level, is the prime purpose of nuclear capability, and that nuclear force management must assiduously prepare for the infinitesimal, nevertheless alive possibility of deterrence breakdown. They all understand that while the prospect of a country being subjected to nuclear attack is indeed miniscule, that possibility cannot be ruled out, and therefore needs to be prepared for with the utmost seriousness. India, by its post-1998 conduct, has made it appear that its views are different on this fundamental issue. To outside observers India's preference to soft-pedal the need for operational level deterrence, achieved through efficacious management, is hard to comprehend. This is because, India is one amongst only about a score of countries that are actively targeted by nuclear weapons, and one of only about half a dozen that are targeted by the weapons of more than one country.

India's longstanding evasion of comparison with other countries in nuclear management matters has hindered nuclear learning at all levels in the country. This is a cause for serious concern because India is now deep in a mutual deterrence relationship with one adversary, and in a potential one with another. Without developing a comparative perspective there can be no real understanding of the effectiveness of the country's nuclear forces in generating deterrence, especially during crises. There is six-and-a-half decades of accumulated experience of deterrence creation and nuclear force management in the world outside. It is important that India studies the management practices in different NWS, especially with regard to operational structures and processes, and draw India-relevant lessons. In a way, both of India's adversaries — Pakistan and China — can offer valuable insights. Both these countries had developed nuclear capabilities against opponents stronger than them — the US and the Soviet Union in the case of China, and India in the case of Pakistan. Both countries had inferior

political, financial and technological resources, yet they managed to project adequate deterrence, through appropriately tailored strategies and management.

## Adequate Operationalisation

The failure to operationalise its nuclear forces adequately is the other major reason that has retarded deterrence understanding in India. The term ‘operationalisation’ encompasses the processes which readies a weapon system fully — in material, human and organisational terms — to perform its intended tasks in war. Operationalisation is needed not only to create an effective nuclear force, but also to provide experience-based feedback to planners and policy makers. India’s nuclear forces are certainly operationalised, but to a much lesser degree than those of other countries, and for that matter India’s own conventional forces. This has led to an over simplified approach to deterrence that is too abstract, as well as reliant on dubious assumptions. In India it is common to see strategically well informed commentators going along with operational level assumptions that stretch credulity. An adequate degree of operationalisation, from top to bottom, is necessary to gain insights into the great mass of phenomena that constitutes nuclear operations. Much of the crucial understandings needed to manage nuclear forces effectively are operationally contingent. Without adequate operationalisation it will not be possible to close the wide gaps that currently separate assumptions-driven images of the mind from realities on the ground.

Deterrence is made up of material, ideational and operational elements. Because of the high technologies involved in producing fissile materials as well as in using them to produce usable weapons, the material element is always dominant at the time when nuclear weapons are first created in any country. But thereafter ideational and operational elements have to come to the fore to transform nuclear weapons into deterrence generating nuclear forces. The ideational element, while very important, is largely a matter of appropriate adaptation of matters well known today. The operational element is different. It has to be developed *ab initio* by each NWS. Moreover, ideational matters can be handled by a fairly small number of people while operational issues affect the entire force. These two factors — lack of accessible knowledge and the large number of people involved — make the

acquisition of operational capabilities a highly demanding task. Functioning effectively in the operational nuclear realm is not as simple as India's management approach seems to assume. Seeking an under-operationalised path in nuclear matters not only prejudices deterrence, but it also worsens safety and security risks under *alerted* conditions.

India's failure to adequately operationalise its nuclear forces has several reasons. One is that the armed forces, that bear nearly the entire burden of conducting nuclear operations, notwithstanding the fact that bombs and warheads are in the custody of DAE/DRDO and C&C channels run through these agencies as well, have little say in nuclear policy matters even today. Linked to this is the fact that an increase in the degree of operationalisation will expand the role of the military in the management of nuclear forces. This is not something the beneficiaries (from their narrow institutional points of view) of the present set up, or the top national leadership (which for cultural and organisational reasons is less comfortable with the military than with civilian officials) would welcome. There is also a perception that a more operationalised force will be riskier. This is a serious misconception that stems from confusing greater *operationalisation*, which actually makes nuclear operations safer, with greater *readiness*, which can certainly enhance risks. Operationalisation and readiness, though often conflated, are not Siamese twins.

Both doves and hawks skirt operationalisation issues in India. Doves fear that greater operationalisation will lead to force expansion and risk enhancement, while hawks worry that discussions about operational matters will weaken the image of India's current capability. There is also the fact that technical and ideational aspects of nuclear forces are easier to comment upon. India is not charting a new path in either area, and so the possible paths open to the country in both areas are well known. This is not the case with nuclear operations. The details of how other NWS operate their forces are shrouded in secrecy, although outlines are often available. India, therefore, has to break substantial new ground here. There is a tendency in the country to gauge force capability from the numbers and technical characteristics of strategic hardware. Because of a lack of appreciation that weapons by themselves cannot project deterrence, the term nuclear forces tends to convey an image of hardware with human beings playing a peripheral role. Operationalisation to the levels practised by other NWS will force upon India the much needed understanding of the large human role that is indispensably required in the projection of deterrence.

The confident operational capability to carry out nuclear strikes under high stress conditions lies at the heart of deterrence. While nuclear deterrence is intended to prevent the other side from using nuclear weapons, this power is rooted in the ability of one's nuclear forces to destroy a certain number of enemy targets, effectively and confidently. This requires paying close attention to myriad minutiae concerning nuclear operations. It was sensing India's obfuscation of this military necessity that Ashley Tellis wrote in 2001 that

'The challenge of devising rational military response in the face of deterrence breakdown involving the possible use of nuclear weapons is therefore one that India cannot avoid either through rhetoric or through repeated assertions of its declaratory posture. Indeed this is one of those conundrums that inevitably come in the wake of possessing nuclear weapons, and the obligation to address all the dilemmas it entails cannot be escaped so long as there is even a minuscule prospect that nuclear weapons might actually be employed in anger. Moreover these dilemmas must be confronted expressly at the level of operational policy' (Tellis 2001: 300–301).

It would seem that in nuclear matters India's leadership has a problem of presbyopia. It can see distant strategic issues well, but perceives operational matters close at hand only hazily. This leads to details of conducting nuclear operations not being looked at carefully, and their efficiency being taken for granted. There is a comfortable coexistence of strategic ambition and operational neglect. Effective operational preparedness of arsenal is necessary for both deterrence and crisis stability. Using inadequately prepared nuclear forces to generate deterrence will be similar to the inadequately supported forward policy that India had adopted along the Tibet border in 1959. Technical capability is of little consequence outside operational context. The failure to effectively operationalise an arsenal weakens deterrence, not just by the inability to conduct operations in an assuredly safe and reliable manner, but also by revealing a lack of seriousness of purpose.

Operationalisation is as much needed for safety and security as for reliable use. The functioning patterns of nuclear forces change radically when war looms, and the progressive process of alerting takes them into increasingly unfamiliar territory. Safety and security matters will then assume very different shapes and will pose much more demanding challenges. What a high degree of operationalisation does is to reduce the distance between normal and alerted status, thereby making the

latter condition less unfamiliar and easier to cope with. A higher level of operationalisation and much greater involvement of the military in nuclear matters are essential both for robust deterrence and for safe and secure operations under alerted conditions.

Adequate operationalisation is also needed to ensure that on-ground realities inform nuclear policy making and management. It will create greater perceptiveness with regard to what needs to be done and what does not. Without sufficient ground level feedback, uncertainty about assumptions can bedevil the top leadership and force commanders. Both need to know how their concepts and perceptions match with what will actually happen on the ground when a crisis develops and escalates. Many contradictions and problems that arise at the operational level are impossible to visualise and anticipate without adequate field level inputs. Nuclear operations are not conducted in sterile conditions devoid of Clausewitzian *friction* and the accompanying fog of war.<sup>6</sup> Without adequate operationalisation, deficiencies and failure-risks do not get exposed. The largely abstract conception of deterrence that prevails in India has led to airy assumptions about procedures developed being faultless, and executed error free in a crisis. Even with India's tightly conceived, three-path C&C chain, actual nuclear operations will get decentralised in the face of operational complexities, friction and fog of war. Painstakingly acquired expertise, acculturation and operational discipline are essential to minimise risks and ensure effectiveness under such conditions.

Adequate operationalisation will also lead to an arsenal smaller than what many Indian strategists consider necessary today. This is because technical limitations can be overcome to a good extent through superior exploitation practices. This in turn will reduce the need to mitigate technical uncertainties through greater numbers and increased explosive power. Without adequate feedback from operationalisation there cannot be enough realism about force development plans. Far too ambitious force creation targets are being set today, exacerbating the divergence between reality and rhetoric. Expanding nuclear

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<sup>6</sup> Clausewitzian friction, which results from many small things going wrong and many small difficulties cropping up unexpectedly, makes actual operations more difficult than plans envisage. It stands between military plans and their full realisation. In nuclear operations, friction comes to the fore when moving from normal to alert conditions.

forces, without underpinning them with operationally-realistic concepts of management, is a recipe for reduced effectiveness and wastage of resources, as well as for potential disaster in times of crisis.

## Effective Management

Nuclear force management has to marry very important ideational issues and technical capabilities with no less important operational practices. It must bridge the big gap that currently exists in India between deterrence policy and deterrence achievement. India's current patterns of nuclear force management are an outgrowth of the esteem-focused path that the country had traced while acquiring nuclear weapons. There is a persisting belief in many quarters that nuclear weapon use against India can be forestalled under *all* circumstances through political means. The weakly structured deterrent capability India has created is seen as only a means to augment the country's political capability in this regard. This approach is fundamentally unsound when Pakistan has created a potent nuclear force, and has made it clear that it is relying on that force to blunt India's conventional superiority. There is also the reality that India has designated China as a potential nuclear adversary, and the political and strategic circumstances that surround India–China relations in the coming decades are unclear.

Today, there is the danger of nuclear forces getting expanded and technically upgraded without enhancing deterrence substance. Unless a good management system that synergistically brings together politics, technology and operations is developed, India will not be able to incorporate nuclear forces usefully into its national strategy, or create a deterrence-purposed force development system. Without addressing the problems of management, neither an insightful nuclear strategy nor a viable force development path is achievable. Moreover, absent better management, India will not be able to exploit optimally the international technology access advantage it enjoys over China and Pakistan. India is climbing a steep deterrence hill today weighed down by a legacy system of management that is incapable of doing what it needs to do.

During the 1990s India had developed its nuclear force on the basis of unassembled weapons of uncertain operational capability. In those days, when a dozen or two bombs lay in the vaults of BARC and

delivery capability lay concealed amongst scores of indistinguishable aircraft, there was not much need for interactive management, involving those who handled the bombs (the technical establishment) and those who handled the delivery systems (the military). Now a force of roughly 150 nuclear weapons is generally seen as being aimed at and the primary means of delivery is shifting (it has yet to happen) from aircraft to missiles. Moreover, India's nuclear delivery missiles are mobile which will make the force very dispersed when it gets alerted. An enlarged, missile-based and mobile nuclear force makes safety, security and control issues far more problematic than was the case earlier.

India faces at least five major issues today with regard to nuclear force management. The biggest of these stems from the fact that India is now seeking to deter China with nuclear weapons. Detering Pakistan was, and is, relatively easy because of India's overwhelming conventional superiority, and Pakistan's extreme geographic vulnerability to nuclear strikes. China is formidably different on both counts. The second is, while Pakistan can be credibly threatened through India's well developed aircraft strike capability against that country, China can be made vulnerable only through MRBMs and Intermediate Range Ballistic Missiles (IRBMs, with ranges between 3500 and 5500 km), where India's capability has to be built up from a low base. The third is that India's emerging missile force is primarily, at least for the next decade, a land mobile one. India has a long way to go before such mobility, which calls for decentralised operations, can be operationally achieved against China. China already has the means to strike dispersed locations of missiles if they are static, and in possibly two decades might also acquire the capability to track and strike missiles on the move. The fourth is that India will increasingly need to handle integrated warheads without separable nuclear cores. Not only will this affect India's three-channel C&C system, but will also pose harder logistic and security challenges. It is easier to transport and protect nuclear cores when they are separate (and cannot explode), than when they are incorporated in much larger warhead assemblies. The fifth issue is that India may be establishing its nuclear force management and C&C systems on the basis that any nuclear attack on the country will be responded with a single massive retaliatory strike. Deterrence based only on one strike (initiating or retaliatory) does minimise force structure and C&C demands, but it is a very high risk strategy for the reasons elucidated in Chapter 2.

India can no longer responsibly avoid facing up to these and other changes that have taken place in its strategic and operational environments. To cope with them the country must get its nuclear force management system in a much better order than it is in today. It must also acquire a range of managerial competencies relevant to nuclear forces. Fortunately, India is in no urgent need to expand its forces. In strategically realist terms, no nuclear (unlike conventional) threat from China is likely to develop for at least another two decades. India, therefore, has the time to get organised in terms of both structures and competencies. But while there is no need for hurried steps, it is important that the steps taken proceed along the right lines. If the country continues to develop and expand its nuclear forces the way it is doing today, it could lead to both safety and security problems under alert conditions and deterrence credibility problems in times of crisis. For deterrence to be effective, the claims of capability that the technical establishment makes must be acceptable to the country's nuclear force operators, and for it to be credible they must be believed by the adversaries.

A big problem that India faces in improving its nuclear force management system is the fact that it has been grafted on a very sub-optimal defence management system that has been long and widely criticised. Criticisms in this area by outside observers, who inevitably bring to bear a sharper comparative perspective, have been much more trenchant than those made by Indian analysts. For India's nuclear force management system to improve, the country's defence management system, within which the former must logically function, needs to be set right first. India's defence management system in its *upper levels* is no less different from its counterparts in other NWS than India's nuclear force management system is from its counterparts in these countries. Both these systems, in India's case, are just not good enough for an NWS. The overall defence management system of any NWS needs to be very good, not only because it has to underpin a highly demanding nuclear force management system, but also because it has to manage its conventional forces in a manner that forestalls the possibility of nuclear escalation by *either* side.

## About the Book

While a large number of scholarly books have been written about India's nuclear capability following the 1998 tests, *management of*

nuclear forces is one area that has been largely avoided. (The great exception to this is Tellis, 2001, which has spelt out India's possible paths towards creating a nuclear force with great conceptual and technical clarity, as well as detail.<sup>7</sup>) The main reason for this avoidance has been the scarcity of *credible* information on the subject, in both public and think tank domains. No one outside very small official circles knows authoritatively how nuclear operations are being conducted during peacetime and how they are planned to be conducted during war. There is no reliable knowledge outside of how the many issues relating to safety, security, survivability, and performance are being tackled. Even within the in-the-know institutions, the actual knowledge circles are tiny, area-specific and islanded. The problem of lack of information is compounded by the fact that there is a good deal of misinformation emanating from those who want to bolster the images of their institutions — much of this emanates from the strategic S&T community, and some from political leaders. The defence services have remained silent — neither endorsing nor (for understandable reasons) questioning such statements.

In this environment of blanket secrecy and suspect information, a book on India's nuclear force management cannot rely too much on public records, or even on off-the-record conversations. To capture enough of the elusive reality in this field, an analyst needs to evaluate the concrete evidence available about India's nuclear force management, against a backdrop provided by similar information available with respect to other NWS. This is the approach adopted in this book, the focus of which is on the management and operational dimensions of India's deterrence effort. Technological, ideational and political issues, which have been discussed extensively in many other works, have been covered only to the extent that they are relevant to the main theme.

The decade plus that has passed since India became an NWS has clearly shown that within the circles that control India's nuclear force management policy there is not enough internal thrust to set matters right. A broad public conversation can, perhaps, act as a catalyst for change. Serious discussions on this subject are needed because the organisational, and the underlying attitudinal problems, India is being confronted with, are not encountered by any other NWS. Without a

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<sup>7</sup> For other works that cover management issues, see Kanwal (2001), Menon (2000).

deeper appreciation of how deterrence actually works, there is a tendency to push for greater numbers and technical advancements, which not only may not add to deterrence but may also lead to worsening of hostility and arms race. This book seeks to raise a few issues that ought to be discussed in public if India's nuclear forces are to provide the kind of deterrence the country really needs — and provide it prudentially. Much of the writing about nuclear forces in India is about where the country is today and where it needs to go. This book seeks to go a step beyond and examine *why* things are as they are, and what management changes are needed to improve matters.

The book is divided into twelve chapters. Chapter 1, 'Strategic Considerations', addresses the geopolitical and other issues that have an impact on India's deterrence needs. Chapter 2, 'The Challenge of Deterrence', deals with global deterrence history, deterrence theory, and India's approach to deterrence. Chapter 3, 'A Unique Nuclear Path', looks at how India has gone about developing its nuclear forces and compares it with the paths taken by others. Chapter 4, 'The Triad', examines the three methods of nuclear delivery that India has either developed or is in the process of developing. Chapter 5, 'Nuclear Hardware', takes up India's hardware development issues. Chapter 6, 'Hardware to Forces', discusses the issues involved in transforming the different elements of nuclear hardware into usable nuclear forces. Chapter 7, 'Operational Level Management', delves into the issue of why nuclear forces require a high degree of operationalisation. Chapter 8, 'India's Nuclear Force Management System', looks at the system that currently manages nuclear forces, and the underpinning systems that manage defence and national security. Chapter 9, 'Nuclear Strategy', considers the requirements of nuclear strategy and its need to interface well with other types of strategy. Chapter 10, 'Development of Nuclear Forces', examines how India can create a better system for the development of its forces. Chapter 11, 'The "Use" of Nuclear Forces', looks at the problem of making nuclear forces serve national purpose. Chapter 12, 'The Many-faceted Challenge', interweaves and distils the main arguments presented in earlier chapters.