COMMAND AND CONTROL OF NUCLEAR WEAPONS IN INDIA



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AUGUST 1, 2019

I. INTRODUCTION

In this essay, M.V. Ramana and Lauren Borja state that Indian nuclear weapons reportedly are "controlled by the Nuclear Command Authority, a two layered structure, one of which is headed by the Prime Minister. Nuclear command and control in India," they conclude, "has been shaped by an ongoing rivalry between civilian authorities and the military."

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II. NAPSNET SPECIAL REPORT BY M.V. RAMANA & LAUREN J. BORJA

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Summary

Indian strategists and policy makers have been grappling with the challenges of setting up a system for the command and control of nuclear weapons since the 1960s, when some in the country started debating whether to acquire nuclear weapons. The country seems to have set up a rudimentary system in the 1980s, which appears to have been consolidated after the 1998 nuclear weapon tests. The Draft Nuclear Doctrine of 1999 laid out a number of objectives, including tight control and authority for release residing only with the Prime Minister of India or the designated successor. The more official statement from 2003 claimed that a Cabinet Committee was satisfied with the existing command and control structures as well as other elements of nuclear weapons deployment and use strategy. Nuclear weapons are said to be controlled by the Nuclear Command Authority, a two layered structure, one of which is headed by the Prime Minister. Nuclear command and control in

India has been shaped by an ongoing rivalry between civilian authorities and the military.

Introduction

It should surprise no one that there is little information in the public domain on the command and control of nuclear weapons in India. There has been a history of secrecy surrounding all nuclear matters in the country.[1] Political scientist Vipin Narang argues that "the level of opacity surrounding India's nuclear posture is extraordinary, and held tightly by just a handful of senior civilian officials, scientists, and officers in a dedicated Strategic Forces Command."[2] As a result, it is hard to put together a comprehensive account of nuclear command and control in India.

On May 11 and 13, 1998, a newly elected coalition government led by the Hindu nationalist Bharatiya Janata Party (BJP) set off five nuclear explosions at Pokhran in the Rajasthan desert and declared to the world that India was now a nuclear weapons state. Some months after ordering the nuclear tests, the BJP government set up a National Security Council (NSC). The NSC is the apex body in a three-part structure, with a Strategic Policy Group (SPG) and a National Security Advisory Board (NSAB) constituting the other two parts.[3]

The Prime Minister heads the NSC, and the ministers for defense, home, external affairs and finance as well as the deputy chairperson of the Planning Commission are also involved. In contrast, the SPG is composed of both civil and military service people. Officials in the SPG include the cabinet secretary; service chiefs for the army, navy, and air force; secretaries for the foreign, home, defense, and finance ministries; secretaries for defense production and revenue; secretaries of the Department of Atomic Energy and Department of Space; the governor of the Reserve Bank of India; the director of the Intelligence Bureau (responsible for internal intelligence); secretary of the Research and Analysis Wing (responsible for external intelligence); scientific advisor to the defense minister; and chairperson of the Join Intelligence Committee. Finally, the NSAB comprises retired civil servants and military officers, academics, and other strategists. The roles of the last two groups are also different. SPG is responsible for policy-making and for follow up action in matters of national security while the NSAB does long term analysis and provides perspectives on issues of national security.[4]

In August 1999, the NSAB released its draft report on a nuclear doctrine (DND) for India.[5] Although the doctrine has never been accorded the status of official policy, the DND remains the most comprehensive view of India's emerging nuclear posture, whose viewpoints no future government can easily reverse. The formal official statement on the nuclear doctrine came in January 2003, when the Indian Government's cabinet committee on national security published a brief statement.[6] The relationship between the two documents has been elucidated by the first convener of the NSAB, who argued that the latter document shows that "the cabinet committee on national security has… accepted the draft nuclear doctrine."[7] Since then no Indian government has officially released a new or updated nuclear doctrine.

Both the DND and the official statement discussed command and control. The DND stated that "India shall pursue a doctrine of credible minimum nuclear deterrence." According to the DND, this requires: (*a*) sufficient, survivable, and operationally prepared nuclear forces; (*b*) a robust command and control system; (*c*) effective intelligence and early-warning capabilities; (*d*) planning and training for nuclear operations; and (*e*) the will to employ nuclear weapons.

The 2003 official statement by the Indian Government announced that a two-layered structure called the Nuclear Command Authority (NCA) had been set up to manage its nuclear and missile arsenals. The NCA is composed of the Political Council, chaired by the prime minister, and the Executive Council, chaired by the national security adviser to the prime minister. According to the

announcement, the Political Council is the "sole body which can authorize the use of nuclear weapons," but the same press release also announced that there were "arrangements for alternate chains of command for retaliatory nuclear strikes in all eventualities."[8]

History

Discussions about command and control featured even in early debates over nuclear weapons policy in India and setting up a suitable system was seen as a major challenge. In one of the early debates over whether India should acquire nuclear weapons following the first Chinese nuclear weapons test in 1962, Major General Som Dutt, the first director of the Institute for Defence Studies and Analyses, an official think tank, listed command and control systems as one of the many elements that would have to be acquired if India were to try to match China.[9] Likewise, in 1981, one analyst wrote "Maintaining a nuclear deterrent requires a very high level of managerial ability. It becomes necessary to maintain an early warning system; to indulge in wargaming nuclear scenarios; to maintain security of launchers/warheads/communications; to prevent an unauthorised launch; and to maintain a national command authority. Given the way India generally functions, is it necessary to go in for a tool so dangerous that the slightest error can be catastrophic?"[10]

Nuclear weapons advocates, however, felt that an adequate command and control system could be established. A prominent advocate, General K. Sundarji, who later went to become the country's chief of the Armed Forces, argued that "Land based [missile] systems can be more effectively and reliably tied into C3 [command, control and communications] systems, with plenty of built-in redundancy. SSBNs [nuclear powered ballistic missile submarines] on the other hand pose serious problems."[11]

Another major perceived challenge was with the control of nuclear weapons and whether the military would end up dominating decision making. At least till 1998, and perhaps even much later, the military has been largely excluded from decision making. According to political scientist Gaurav Kampani, apparently "the military was told neither of the exact number of nuclear weapons that India might have, nor how they would be employed in a nuclear war. But the civilians drew up detailed instructions to deal with problems in the absence of a formally articulated nuclear doctrine."[12]

In the 1990s, well before the nuclear tests of May 1998, Stephen Rosen from Harvard University studying the problem of civil military relations in India wrote that the country had established a command and control system that was "rudimentary but adequate for Indian needs." Specifically, Rosen quoted V. S. Arunachalam, a former director of India's Defence Research and Development Organization and Scientific Advisor to the Prime Minister, saying that "if New Delhi goes up in a mushroom cloud, a certain theatre commander will go to a safe, open his book, and begin reading at page one, paragraph one, and will act step-by-step on the basis of what he reads."[13]

This rudimentary system might be what Abdul Kalam, Arunachalam's successor, mentioned in May 1998 at an official press conference featuring the top scientific and technical leaders involved in the nuclear tests. In response to one of the questions, Kalam announced, "As for command and control systems, we have different forms presently, and are moving towards that."[14]

Following the tests, command and control systems appear to have been one area of development, especially after the publication of the Draft Nuclear Doctrine in 1999. The three armed service headquarters were subsequently reported to be "drawing up detailed schemes for inducting a variety of nuclear armaments and ancillary and support equipment in their orders-of- battle…[and] appropriate command and control frameworks."[15]

The DND itself laid out a number of stipulations, the most important of which are as follows: “1. Nuclear weapons shall be tightly controlled and released for use at the highest political level. The authority to release nuclear weapons for use resides in the person of the Prime Minister of India, or the designated successor(s). 2. An effective and survivable command and control system with requisite flexibility and responsiveness shall be in place. An integrated operational plan, or a series of sequential plans, predicated on strategic objectives and a targeting policy shall form part of the system. 3. For effective employment the unity of command and control of nuclear forces including dual capable delivery systems shall be ensured. 4. The survivability of the nuclear arsenal and effective command, control, communications, computing, intelligence and information (C4I2) systems shall be assured.”[16]

Although stated as assertions, it should be apparent that these are just a set of desirable objectives, not achieved realities. Even in a state with decades of experience in deploying nuclear weapons, it is hard to believe that anything, including survivability, can really be assured.

Despite these objectives being very challenging, the Indian government has been projecting the doctrine, announcing in a press release “The Cabinet Committee on Security (CCS)…reviewed the existing command and control structures, the state of readiness, the targeting strategy for a retaliatory attack, and operating procedures for various stages of alert and launch. The Committee expressed satisfaction with the overall preparedness,” and “The CCS also reviewed and approved the arrangements for alternate chains of command for retaliatory nuclear strikes in all eventualities.”[17]

Technical Features of the Command and Control System

There is even less information available about the technical aspects of the command and control system when compared to the institutional aspects of the system. Most public statements are fairly general, though a few go beyond to offer some details.

One example is a widely reported speech from 2013 by Shyam Saran, a career diplomat and former chairman of the NSAB, that discussed various developments in India’s nuclear arsenal. In that, Saran stated that the Indian government “has had to create a command and control infrastructure that can survive a first strike and a fully secure communication system that is reliable and hardened against radiation or electronic interference. A number of redundancies have had to be created to strengthen survivability. In all these respects, significant progress has been achieved. To expect that these should have emerged overnight after May 1998 is a rather naïve expectation.”[18] Saran also revealed that the “National Command Authority works on a two-person rule for access to armaments and delivery systems” and that “Regular drills are conducted to examine possible escalatory scenarios, surprise attack scenarios and the efficiency of our response systems under the no first use limitation. Thanks to such repeated and regular drills, the level of confidence in our nuclear deterrent has been strengthened. Specialized units have also been trained and deployed for operation in a nuclearized environment.”[19] Shortly thereafter, in a newspaper article, Saran explained that these measures are “clearly not the record of a state which regards its nuclear arsenal as having only symbolic value.”[20]

There might also be some ongoing changes in how nuclear weapons are handled in India, which would affect their command and control. Historically, it is reported, the fissile cores of the nuclear warheads were kept separated from the rest of the warheads, with the former being in the custody of the Department of Atomic Energy (DAE) and the latter with the Defence Research and Development Organization (DRDO).[21] The delivery vehicles were under the control of the armed forces. This separation, it is believed, means that “neither the DAE nor the DRDO nor the uniformed military would be able to launch a nuclear weapon independently, since none of the

organizations—acting autonomously—would have all the necessary components to assemble a completed weapon and deliver it to target without explicit authorization from the national leadership."[22]

This might have changed with more recent tests of the Agni missile that are said to be from a canister.[23] The missile is stored inside a tube, called a canister, so that the missile can be protected from the elements while being transported. This makes for easier handling of the missile.[24] If appropriately designed, the tube can also function as the location for missile launch.

The significance of this configuration is explained by strategist Bharat Karnad: "the ongoing process of canisterising Agni missiles…provides the country not only with a capability for launch-on-warning but also for striking pre-emptively should reliable intelligence reveal an adversary's decision to mount a surprise attack…Nuclear missiles in hermetically sealed canisters are ready-to-fire weapons and signal an instantaneous retaliatory punch to strongly deter nuclear adventurism."[25] If quick launching is indeed the purpose, then the nuclear warheads should be mated to the missiles.

If fissile cores are inserted into nuclear warheads and warheads are mated to missiles or other delivery vehicles, then this potentially makes it easier, even if not always possible, for a lower level official to launch a nuclear weapon without authorization. That said, officials and military officers who spoke to political scientist Vipin Narang asserted that "highly centralized procedural control still exists over India's nuclear arsenal."[26]

Coming to other technical features, we also know something about India's interest in acquiring early warning capabilities that will presumably feed information to the command and control system. The draft nuclear doctrine of 1999 included a call for "early warning capabilities," such as "space based and other assets" for "early warning, communications, damage/detonation assessment."[27]

One part of the early warning system is radar-based. In 2002, India acquired the Green Pine radar from Israel.[28] It is reported that two Green Pine radars are deployed in India.[29] The Indian military is also acquiring various space assets that could be used to provide early warning.[30]

However, the geographical proximity of Pakistan and India means that the flight time for missiles between the two countries would be very short and any warning provided by early warning systems would not afford decision makers much time to deliberate before the incoming missile detonates.[31]

India might also have received some technology from the United States, although there is no confirmation of this fact. In the "Next Steps in Strategic Partnership" agreement of January 2004 between the United States and India, the two countries promised to "expand cooperation" in civilian nuclear activities, civilian space programs, and high-technology trade, as well as on missile defense.[32] John Gershman and Zia Mian point out "the obvious, namely that cooperation in this context is a euphemism for the United States providing to India access to aid, information and technology in these areas."[33] While speaking about this agreement, a State Department spokesperson explained that the United States was ready to "help India" with command and control, early warning, and missile defense and noted that "Some of these items may not be as glamorous as combat aircraft, but I think for those of you who follow defense issues you'll appreciate the significance."[34]

Finally, one magazine story from July 1998, i.e., just two months after the nuclear tests, by a knowledgeable journalist known to have contacts with high-level policy makers reported: "it is learnt that the Government is setting up a national command post outside Delhi which would not only have all communication and radar facilities but also the strength to withstand a direct hit.

Measures have also been taken to ensure proper coded security to authorise a strike. Instead of the press of the button it is more likely to be agreed codes sent over several separate communication channels so that the armed force in charge of nuclear weapons knows it is an authentic order."[35]

Organizational Structure

The most elaborate official announcement about the organizational structure governing nuclear command and control (C2) is provided in the Joint Doctrine of the Indian Armed Forces in the section titled "Nuclear Command Authority."[36] The relevant section reads: "Nuclear weapons shall be tightly controlled and released for use at the highest political level. An effective and survivable C2 with requisite flexibility and responsiveness is in place. The overall C2 structure ensures maximum restraint in employment with an effective interface between civilian and military leaders."[37] Regarding the nuclear command authority, the NCA, the joint doctrine says that it "is a two layered structure—the Political Council (PC) assisted by an Executive Council (EC). The NCA is responsible for the deployment, control, and safety of nuclear assets. Chaired by the prime minister (PM), the PC is the only body empowered to take a decision on nuclear issues while the ultimate decision to authorize the use of nuclear weapons rests solely with the PM. The EC is chaired by the NSA, provides the necessary inputs for effective decision making by the PC, and is responsible for executing directives received from the PC. The Service Chiefs are members of the EC. Alternative chains of command for retaliatory strike exists for all eventualities."[38] It also states that the Strategic Forces Command (SFC), which "manages the nuclear arsenal," "comprises representatives of the three Services besides civilian staff, experts from Indian Atomic Energy Commission, and missile experts from Defense Research and Development Organization (DRDO). The tri-service SFC is the NCA's operational arm, having its own Commander-in-Chief reports to the COSC as well as National Security Advisor (NSA), and controls all of India's nuclear warheads and delivery systems." Finally, it asserts that the "defining issues for Nuclear C2 is to; maintain a credible deterrence; no first use; civilian authorization; and dispersed arsenal structure to ensure option to retaliate is available." Note that COSC stands for Chiefs of Staff Committee.

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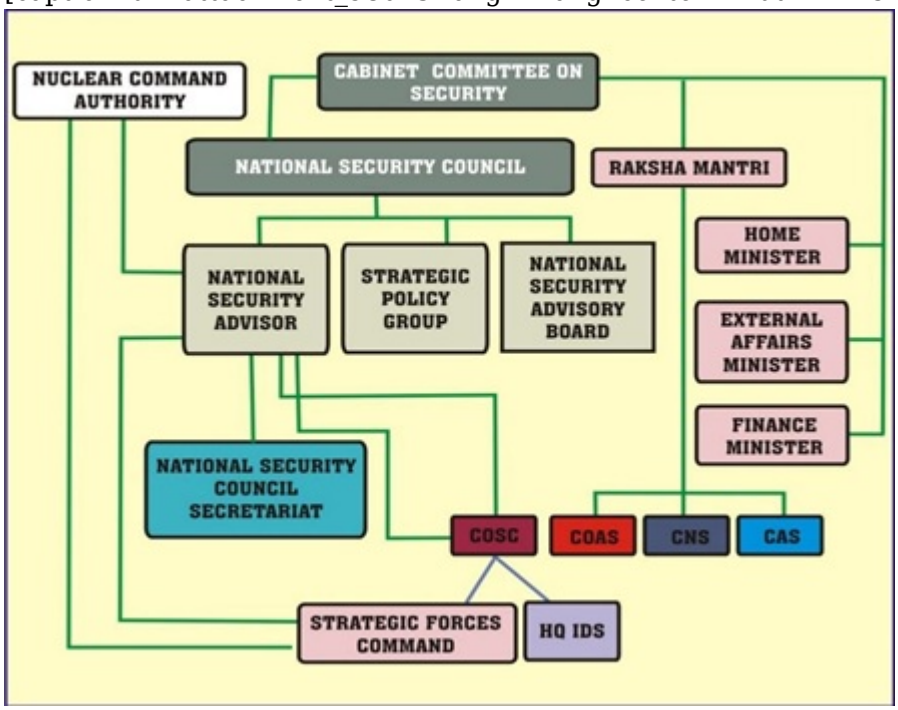


Figure 1: Indian NC3 Structure[/caption]

Source: Indian Armed Forces, "Joint Doctrine."

Much of this is also listed by Shyam Saran in the following 2013 speech: “the Political Council…is headed by the Prime Minister and includes all the ministerial members of the Cabinet Committee on Security such as the Ministers of Defence, Home and External Affairs. Below the Political Council is the Executive Council which is headed by the National Security Advisor and includes the Chiefs of the three armed forces, the C-in-C of India's Strategic Forces Command, a three star officer, among others. There is an alternate National Command Authority which would take up the functions of nuclear command in case of any contingency when the established hierarchy is rendered dysfunctional. The NCA has access to radiation hardened and fully secured communications systems where, too, redundancies have been put in place as back-up facilities.”[39]

Saran goes on, “In order to support the NCA, a Strategy Programme Staff has been created in the National Security Council Secretariat to carry out general staff work for the National Command Authority. This unit is charged with looking at the reliability and quality of our weapons and delivery systems, collate intelligence on other nuclear weapon states particularly those in the category of potential adversaries and work on a perspective plan for India's nuclear deterrent in accordance with a ten-year cycle. The Strategy Programme Staff has representatives from the three services, from our Science and Technology establishment and other experts from related domains, including External Affairs. A Strategic Armament Safety Authority has been set up to review and to update storage and transfer procedures for nuclear armaments, including the submarine-based component. It will be responsible for all matters relating to the safety and security of our nuclear and delivery assets at all locations. This will function under the direct authority of the NCA.”[40]

Cultural Characteristics

In India, the control of nuclear weapons has been shaped by an ongoing rivalry between civilian authorities and the military. Political scientists such as Peter Feaver maintain that this rivalry has the power to shape nuclear command and control in nations that have recently acquired the bomb.[41] The general assumption is that in India the civilian leadership determines nuclear weapons policy, including nuclear doctrine and command and control. But there is reason to believe that civilian control over Indian nuclear weapons is an assumption that is unlikely to remain true over time. As has been argued elsewhere, “even if it does not start off that way, over a period of time the gap between what civilian leaders know and what is actually done with nuclear weapons would become more pronounced and the views of military planners will greatly influence operational doctrines involving nuclear weapons.”[42] Others have argued that the “evolution of India’s posture…is still driven almost entirely by technical bureaucracies and scientists” and that “civilian political leadership, particularly the Prime Minister’s Office, has exercised far too little discipline over these bodies.”[43]

It is fairly clear that organizational barriers exist between the military and civilian leadership.[44] The lack of military participation in certain committees responsible for advising members of the NSC, such as the Integrated Defense Staff (IDS), is an indication of these institutional barriers. Most of the members of the IDS are lower-level military officials and the absence of high-level military officials indicates reticence on the part of the armed forces. There are also few meetings between the Political Council and the Executive Council.[45]

Success and Failure

Because there is little information about India’s command and control structure, there is also little information about its success or failure. There are however many accounts of accidents involving nuclear weapon delivery vehicles, such as airplanes, missiles, and submarines.[46] Airplanes responsible for delivering nuclear weapons seem to be particularly susceptible. One website maintains that a total of 42 accidents have occurred with the MiG-27M since 1988, nine with the

Mirage 2000 since 1987, seven with the Su-30 MKI since 2009, and 46 with the Jaguar since 1981.[47]

Cost Estimates

To our knowledge, there is no official cost figure for a command and control system. There are, however, a range of cost estimates. Prior to the 1998 nuclear weapon tests, those advocating for India to develop a nuclear weapons capability typically argued that a modest system would be sufficient for India's requirements and this would be affordable. Typical of this was an estimate by Brigadier Vijai Nair, who put it at Rs. 22.25 billion which when updated to 2017 prices would amount to Rs. 95 billion (roughly 1.3 billion in 2017 US dollars).[48]

These cost estimates increased after the nuclear tests. In 1999, one military officer estimated that command and control could cost "up to 40 per cent of a nuclear weapons program."[49]

The following year, the military trade journal *Defense News* cited Indian defence sources to calculate a figure of $3.75 billion (roughly 9.5 billion in 2017 US Dollars).[50] That figure also roughly coincides with the estimate by an independent economist in the early 2000s.[51] There has been no significant effort for appraising the cost of the Indian nuclear arsenal since then.

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