

UNCLASSIFIED

MINIMAL DETERRENCE RESEARCH

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SAIC strategies GROUP
CREATING KNOWLEDGE, INTEGRATING SOLUTIONS

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BACKGROUND: The Defense Threat Reduction Agency (DTRA) was founded in 1998 to integrate and focus the capabilities of the Department of Defense (DoD) that address the weapons of mass destruction threat. To assist the Agency in its primary mission, the Advanced Systems and Concepts Office (ASCO) develops and maintains an evolving analytical vision of necessary and sufficient capabilities to protect United States and Allied forces and citizens from WMD attack. ASCO is also charged by DoD and by the U.S. Government generally to identify gaps in these capabilities and initiate programs to fill them. It also provides support to the Threat Reduction Advisory Committee (TRAC), and its Panels, with timely, high quality research.

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PREFACE

Since its formation in 1998, the Defense Threat Reduction Agency has contracted with Science Applications International Corporation (SAIC) for analytical support, through the Agency's Advanced Systems and Concepts Office (ASCO). In fiscal year 2001, the ASCO commissioned a report from SAIC on the subject of minimal deterrence. The focus of the report was the development of a bibliography that would enable analysts to investigate further how countries with small nuclear forces have approached the issue of nuclear strategy.

How deterrence operates at low levels of nuclear weapons is an issue of growing importance to the United States and Russia, as they continue to move from the many thousands of nuclear weapons each maintained during the Cold War to perhaps 2,500 weapons or less for each side. Among the key questions deep nuclear cuts will raise for Washington and Moscow is what level of threatened damage will be sufficient to deter aggression? What changes to targeting policy might be required? How might nuclear use thresholds be affected? The sources compiled for this report, as well as the individual overviews of China, France, the United Kingdom, India, and Pakistan, provide a starting point for analysts and planners to develop a better understanding of how others have approached these issues.

The team leader is indebted to the SAIC analysts that contributed to this project, be it through their research, analysis, or foreign language translation skills, and in many cases, all three. The team leader would also like to thank Mr. Brett Flanders and Mr. Bruce Swenson who converted our efforts to a web-based interface, thereby ensuring the widest possible access to analysts both in and out of government. Finally, the team leader would like to thank the ASCO team that conceived of this project, supported it, and refined the final product, specifically, Dr. Anthony Fainberg, Dr. Jeffrey Milstein, Dr. Eric Gerdes, and Dr. William Durch. Responsibility for any inaccuracies, omissions, or other lapses in judgement remains the SAIC team leader's alone.

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EXECUTIVE SUMMARY

- Minimum deterrence is a loosely defined concept. Noted nuclear strategist and historian Lawrence Freedman defines minimum deterrence as, "the possession of sufficient nuclear weapons to inflict grievous harm on the enemy in retaliation, but no more."¹ Implicit in this definition is the irrelevancy of qualitative or quantitative nuclear superiority and nuclear warfighting doctrine. Threatened national or societal destruction is at best over-kill, certainly immoral. In essence, as long as a country possesses a nuclear force that was survivable and could inflict some level of destruction unacceptable to the adversary, that country's vital interests could be defended and the adversary's use of nuclear weapons deterred. What constitutes unacceptable damage could vary, from either a large or small number of the adversary's cities to his leadership and command and control structure. China, France, the United Kingdom, India, and Pakistan all purport to have adopted minimum deterrence as their nuclear strategies, yet there are important nuances and variations in their respective interpretations.
- Setting aside prestige considerations, thus far the main motivation for countries to adopt minimum deterrence postures appears to be the paradox of resource constraints and enabling technologies. For example, Britain and France realized that they could not hope to match the nuclear might of the Soviet Union, given their limited resource bases. Yet, the unprecedented destructive power of just a few hundred nuclear weapons was judged by both London and Paris to be sufficient to deter Soviet aggression. It can be said that minimum deterrence strategy provided *ex post facto* rationalization for systemic inequities.
- In theory, both Britain and France had the American nuclear guarantee to fall back on. In reality, both countries developed – and sized – their nuclear forces according to what each believed was necessary to deter the Soviet Union in the event US nuclear forces were not available. Comments by Chinese military officials in the mid-1990s indicate that Beijing believes it can deter US military intervention in Taiwan by holding only a handful of US cities at risk. This would be consistent with China's current deployment of less than 20 ICBMs capable of reaching the United States. Britain, France, and China spent and continue to spend considerable sums of money on their nuclear forces, but settling for minimum deterrent strategies has, in their view, enabled them to deter much larger adversaries "on the cheap."
- For the most part, it does not appear that a reduction in resource constraints *per se* contributes to greater interest in more sophisticated or elaborate nuclear strategies. Britain and France's commitment to minimum deterrence has held firm for decades. Despite numerous periods of economic expansion, neither country expressed serious interest in the various nuclear warfighting doctrines espoused by the Pentagon and American think tanks. Rather, these countries have demonstrated a philosophical reluctance to explore any strategy that somehow minimizes the

¹ Freedman, Lawrence, *The Evolution of Nuclear Strategy* (London: MacMillan, 1989), 207.

horrific nature of nuclear weapons or the magnitude of their destructiveness. Even their consideration of "pre-strategic" or "sub-strategic" nuclear use is intended as a final warning to an aggressor that devastating strategic retaliation is about to be unleashed if hostilities continue.

- As for China, considerable attention has been focused on its current nuclear forces modernization program. Much of the literature reviewed indicated that this modernization effort is motivated by the perceived need to bolster the survivability of China's modest nuclear force. If China's modernization program exceeds expectations, it will likely be the result of an increased sense of threat, stemming from US missile defense deployments, not better economic performance.
- Still, there is cause for concern that China may not be fully satisfied with minimum deterrence. Under the misnomer "limited deterrence," Beijing may be exploring possible limited use of tactical nuclear weapons in a regional (i.e., Taiwan) contingency to defeat US intervention forces and signal willingness to escalate to strategic nuclear use. Analysts who subscribe to this view tend to see China as more aggressive. Skeptics have pointed to the unsuitability of China's nuclear force structure to carry out such nuclear warfighting missions.
- India and Pakistan are the latest emerging case studies in minimal nuclear deterrence. While moving at uneven paces in different areas, each country is beginning to flesh out its interpretation of minimal deterrence, the forces needed to support it, targeting policy, and command and control arrangements. Because the two countries share a common, and actively contested border, have poor intelligence and warning capabilities, and are moving to deploy nuclear-capable missiles, analysts, mainly outside of South Asia, have expressed their concern that minimal deterrence in South Asia may not hold up under the pressure of crisis and conflict.

MINIMAL DETERRENCE RESEARCH

SECTION ONE: INTRODUCTION

At the request of the Defense Threat Reduction Agency, Advanced Systems and Concepts Office (DTRA/ASCO), SAIC's Strategies Group performed background research related to nuclear strategies involving small numbers of weapons. Typically, these strategies are referred to as minimal or sufficient deterrence. While definitions of these concepts vary, they generally convey the essence of nuclear deterrence – threatening retaliation that would be unacceptable to a potential aggressor – but on a scale that stops short of national or societal extinction. In practice, minimal deterrence is equated with the nuclear strategies of China, France, and the United Kingdom. Certainly, each of these countries officially describes its nuclear posture as one of minimal deterrence, although there are important nuances and variations, as this report describes. Following the 1998 nuclear weapons tests by India and Pakistan, both countries have similarly espoused minimal deterrence strategies and have been added to this discourse as a result. Implicit in the ongoing reductions in U.S. and Russian nuclear forces, and official indications that strategic nuclear forces on each side could be cut further to 1,600 or fewer weapons over time, is the recognition that changes in nuclear targeting policies and strategy could be required. A more detailed understanding of how other countries approach deterrence at low levels of weapons can help inform discussions of the future of U.S. and Russian nuclear strategy.

As initially conceived by the sponsor, this project was intended to provide a bibliography of sources on minimal deterrence for subsequent use by analysts at ASCO and elsewhere. Hence, the heart of this project is the bibliography, located in the appendix. To provide researchers with more context, an executive summary was added. This summary provides an overview of nuclear strategy in China, France, and the United Kingdom. The Chinese overview is treated in greater detail as it is probably less familiar to most analysts than the nuclear strategies and postures of our allies. While still in an early formulation stage, overviews for Indian and Pakistani nuclear strategy are also included. The overviews are structured to address key facets of nuclear strategy and force posture. This structure was adopted to help analysts determine for themselves if each country's nuclear forces, targeting policies, alert patterns, and command and control (C2) arrangements are consistent with minimal deterrence. Analysts are encouraged to access the full range of sources listed in the bibliography for a more complete unclassified treatment of the subject matter. In many cases, these sources can be accessed via hyperlinks in the bibliography.

SAIC employed a broad-based strategy to compile the minimal deterrence bibliography. To maximize time and funding resources, the SAIC team concentrated on: 1) sources available over the Internet; 2) sources available at the Library of Congress and other local libraries, including SAIC's own; and 3) searches of limited access databases, including: the Defense Technical Information Service; the Foreign Broadcast Information Service; and Lexis-Nexis. The collection strategy focused on sources from the countries in question, both primary (i.e., official nuclear posture statements and

speeches) and secondary. With respect to secondary sources, SAIC concentrated on widely recognized and respected scholars. In addition, SAIC included material from various non-governmental organizations (NGO), such as the Campaign for Nuclear Disarmament. While such NGOs have a clear political agenda, their views are included to provide balance – in the form of deterrence skepticism – and because in key cases they provide details that appear credible but could not be readily found in other sources.

To identify, access, and assess foreign language material, the SAIC team included analysts fluent in Chinese and French. Full translation of the material they reviewed was beyond the scope of this project. Rather, the task of these analysts was to determine if a given foreign-language source should be included in the bibliography as an insightful, credible work that other analysts should be made aware of. To help such analysts determine if they should seek full translations on their own, the SAIC team translated brief abstracts of this foreign language material. SAIC also included in the bibliography sources that addressed in a theoretical or general fashion the issue of deterrence at low levels of nuclear weapons. The translated abstracts, as well as the full set of bibliographic references, are to be posted to the DTRA/ASCO web site (<http://www.dtra.mil>).

The three principle subjects of this project have been nuclear weapons states for many decades and there is a considerable body of literature on their nuclear strategies. The SAIC team focused on more recent treatments of the subject matter, although some earlier seminal works are also included. While it contains over 250 sources, It is inevitable that the bibliography prepared by SAIC is incomplete to some degree.

SAIC prepared this report using the following process:

- Step 1: One or more SAIC analysts assigned to a particular country identified, collected, and reviewed suitable material on that country for inclusion in the bibliography. A draft version of the bibliography was submitted to the sponsor for review.
- Step 2: As the analysts prepared the bibliography, they also entered the source data into an MS Access™ database (provided to DTRA/ASCO). The database enables analysts to conduct searches by various means, such as country, author, title, and date.
- Step 3: The analysts then prepared an overview of each country's nuclear strategy and force posture, which was reviewed by the SAIC team leader.

The SAIC team leader bears sole responsibility for any errors or omissions in this report. This report does not necessarily represent the views of SAIC, its sponsor, or the US Government.

SECTION TWO: CHINA

I. Nuclear Doctrine

From its inception, the relationship between China and the nuclear bomb has been one of frustrated awe. China understands the necessity of having nuclear weapons in its arsenal; however, its nuclear doctrine appears to be reactive and fluid as China attempts to keep pace with nuclear powers such as the United States and Russia. In fact, for almost three decades after developing the nuclear bomb, China had no publicly articulated doctrine. What is known publicly about China's nuclear strategy suggests that while ideology has and continues to exert a heavy influence, technological developments and changing threat perceptions could loosen Beijing's attachment to minimal deterrence in favor of a greater war-fighting orientation.

A. The People's War

China's initial reaction to nuclear weapons was to feign indifference. Under Mao Zedong's People's War doctrine, China was to overwhelm its enemy by drawing it into Chinese territory, mobilizing the Chinese masses, and using them to drive the enemy out. This doctrine hailed the people as the key weapon of the state, investing them in its defense. When 'the bomb' appeared, Mao held that the "bomb's destructiveness ought not to be exaggerated" lest the masses be demoralized. Mao labeled the nuclear bomb a "paper tiger" for China meaning that while the bomb could cause devastation, it would not affect China the same way it would affect other countries because of China's rural demographics. Mao declared that, under China's specific conditions, any war against China would still require a military invasion and as a consequence the mobilizing of the masses to drive the enemy out.¹

While Mao espoused his "paper tiger" analogy in public, he privately realized the necessity of having nuclear capabilities, as changing internal and external factors became evident. The Korean War alerted the Chinese leadership to the need for modern weaponry. Additionally, the relationship between China and the Soviet Union began to sour. China questioned the reliability of the Soviet Union after it played a distant observer role during the Taiwan crises with the United States in the late-1950s. These events only reinforced China's desire for self-reliance and the nuclear capability to ensure it. Consequently, China diverted resources from conventional forces and elsewhere in order to develop nuclear weapons.²

Once the decision had been made to develop nuclear weapons, Mao met with the Central Military Commission (CMC) in 1958 where they formulated "The Guidelines for Developing Nuclear Weapons." The Guidelines addressed strategy in only a cursory fashion:

¹ Pande, Savita. "Chinese Nuclear Doctrine," *Strategic Analysis* (March 2000): 2011-2036. Internet: <http://www.idsa-india.org/an-mar00-2.html>

² Ibid.

- "Our country is developing nuclear weapons in order to warn our enemies not to make war on us, not in order to use nuclear weapons to attack them..."
- "The main reason for us to develop nuclear weapons is to defend peace, save mankind from a nuclear holocaust, and reach agreement on nuclear disarmament and the complete abolition of nuclear weapons."
- "To this end, we have to concentrate our energies on developing nuclear and thermonuclear warheads with high yields and long-range delivery vehicles. For the time being we have no intention of developing tactical nuclear weapons."
- "In the process of developing nuclear weapons, we should not imitate other countries. Instead, our objective should be to take steps to 'catch up with advanced world levels' and to 'proceed on all phases [of the nuclear program] simultaneously.'"³

B. People's War Under Modern Conditions

China's nuclear strategy emerged slowly after the explosion of its first nuclear weapon in 1964 and had to be reconciled with Mao's ideology. As China scholars Lewis and Xue write of the period, "[o]ne might say the weapons, once deployed, spoke for themselves. In their silent vigils, megaton warheads could proclaim a powerful new doctrine of assured retaliation."⁴

China's first attempt at codified thinking regarding nuclear weapons and delivery systems was reflected in the doctrine of People's War Under Modern Conditions. This new doctrine signified noticeable departures from the traditional People's War. For instance, it called for defeating the enemy close to the border rather than drawing it in. It also relied on early decisive battles as opposed to protracted wars of attrition, as well as defending cities rather than abandoning them, as was the plan under the People's War. Finally, the doctrine moved toward a "notion of strategic deterrence through retaliation."⁵

C. Active Defense

The next significant shift in Chinese military doctrine came when Chinese military leaders adapted Mao's theory of Active Defense. China's lesson from the Vietnam War was that new conflicts would most likely be border conflicts or limited wars, particularly in the maritime regions. At this same time, China also was building up its industrial centers and had more to lose by pursuing the traditional strategy of the People's War and mobilizing the masses. The battlefield environment for China had changed.

³ Lewis, John Wilson and Xue Litai. *China Builds the Bomb*. Stanford: Stanford University Press, 1988: 70.

⁴ Ibid, 211.

⁵ Li, Nan. "The PLA's Evolving Warfighting Doctrine, Strategy and Tactics, 1985-95: A Chinese Perspective," *China Quarterly* 146 (June 1996): 443.

Echoing some of the themes from the People's War Under Modern Conditions, the doctrine of Active Defense in limited war conditions focused on engaging the enemy in a newly established "zone of active defense" around China in order to defeat the enemy close to the border. Active Defense also relied on early and decisive battles and victories. While Active Defense did not provide a specific nuclear dimension, it supported the development of counter-value and soft counter-force targeting capabilities and enabled China's military leaders to incorporate the nuclear force into the overall defense posture.⁶

D. Limited Local War Under High Tech Conditions

The 1991 Gulf War, like the Korean War, reminded China that its military capabilities continued to lag well behind those of the United States and its Western allies. This encouraged China to develop the doctrine of Limited Local War Under High Tech Conditions. This doctrine acknowledges that in the immediate future, China faces limited conflicts that are likely to be intense and frequent stemming from the growing strength of China's neighbors. The main features of this new doctrine include:

- Engaging a fixed number of strategic targets;
- The need for quick decisions regarding engagement of combat targets;
- High technology and low force levels;
- Sudden occurrence of wars after confrontation;
- Limited surface area but three-dimensional battlefields; and,
- The need for forces that are efficient and flexible.

In terms of its nuclear dimensions, this doctrine encouraged China to step up its development of smaller nuclear weapons and improved command and control arrangements.⁷

E. Recent Official Statements and Writings

Recent official statements by Beijing shed a little more light on the role of nuclear weapons in Chinese strategy. In a 1998 white paper, the Chinese government acknowledged that: "China possesses a small number of nuclear weapons, entirely for meeting the needs of self-defense. China upholds the principle of self-defense by the whole people and the strategic concept of People's War, and works hard to enhance the defense consciousness of the whole people, perfect the defense mobilization system and intensify the building of the reserve force for defense."⁸ This statement tends to support the view that China is pursuing a minimum deterrence doctrine.

⁶ Pande, *op cit.* Internet: <http://www.idsa-india.org/an-mar00-2.html>.

⁷ Ibid.

⁸ People's Republic of China. Information Office of the State Council. *China's National Defense*. July 27, 1998. Internet: http://tiger.uic.edu/~rodrigo/white_paper_98.htm.

China's 2000 defense white paper addresses nuclear doctrine in somewhat more detail. Like the 1998 white paper, it claims that China possesses a small number of nuclear weapons purely for self-defense purposes. The 2000 white paper reiterates China's widely publicized policy of no first-use (NFU) of nuclear weapons and non-use against states that do not have nuclear weapons. It also claims that China does not participate in nuclear arms races, nor does it deploy nuclear weapons beyond its borders. The 2000 white paper acknowledges the strategy of Active Defense, and notes that under it China will maintain a small, effective nuclear counterattacking force to deter nuclear attacks that would require a retaliatory strike.⁹ The most notable difference between the 1998 and the 2000 documents is the specific statement of the nuclear counterattacking force.

Recent Chinese military writings provide other insights into how the People's Liberation Army views the role and utility of nuclear weapons. According to these writings, nuclear weapons fundamentally alter international relations. However, Chinese access to nuclear weapons is different from that of other states, primarily because China is not interested in pursuing hegemonic domination. Instead, China's nuclear weapons are a means of deterring other states from undertaking aggressive actions against it. In this regard, Beijing does not view its nuclear stance as being either "minimal" (their description of the British nuclear force) or "limited" (the French nuclear deterrent). Instead, it views its nuclear force as "defensive."¹⁰

Nuclear weapons were a major shift in international power, because strategic aims could now be achieved without requiring operational and tactical objectives being accomplished first. That is, strategic leaders could directly influence and control outcomes. Moreover, their power can be felt whether they are actually used or not. One consequence has been that nuclear-armed states do not go to war lightly.¹¹

Chinese military writings contend that China will not be the first to use nuclear weapons, nor does it threaten their use. It will also not use them against a non-nuclear state, nor against states in nuclear-free zones. China advocates the total elimination of all nuclear weapons. At the same time, however, the Chinese military also recognizes that it is unlikely that nuclear weapons will disappear. Even if conventional weapons such as precision guided munitions (PGMs) are common and effective, there will likely remain a nuclear threshold.¹²

Chinese military thinking on nuclear warfare revolves around "total" nuclear conflict, and limited nuclear conflict. The former is marked by an objective of thorough and complete destruction of an opponent's society, industry, and wealth, whereas limited nuclear

⁹ People's Republic of China. Information Office of the State Council. *China's National Defense in 2000*. 2000. Internet: <http://www.fas.org/nuke/guide/china/doctrine/cnd0010/china-001016wp.htm>.

¹⁰ People's Republic of China. *Strategy*. PRC National Defense University Publishers, 2000. Translated summary by Dean Cheng.

¹¹ Ibid.

¹² Ibid.

warfare envisions more limited objectives, area of use, target selection, and numbers of weapons employed.¹³

Deterrence in either case requires not only numbers, but also reliability of the systems. There may also be a case for preemptive attacks, since nuclear forces are charged with being able to strike at an opponent's "strategic counterattack capability," their C2 structure, and their military-industrial capacity. Nuclear defense entails the capacity strike the enemy's deep strategic reserves, in order to disrupt their strategic plans. To attain this, there must be a reconnaissance capability (to determine targets' location, value, etc.), a command, control, and communications (C3) infrastructure capable of coordinating nuclear forces, as well as nuclear weapons of necessary accuracy, firepower, controllability, survivability, etc.¹⁴

The preferred targets for a limited number of nuclear weapons are urban ones, which can create political, economic, morale, and military effects, and may be the most efficient targets to hit if there are only a limited number of available warheads. However, in some cases, it may behoove the planner to strike military targets, such as in order to minimize civilian casualties or in order to seize the military initiative. As hard-target and point-target kill capabilities improve, military targets become not only more viable, but also more desirable.¹⁵

Finally, there must be a willingness to use nuclear weapons, if a deterrent is to be credible. Therefore, nuclear weapons are, fundamentally, political in nature. Towards this end, it is important to understand an opponent's morale and decisionmaking structures, so that deterrence can be effective.¹⁶

According to these Chinese military views, nuclear weapons would be used at the operational level of conflict in order to achieve special, specific aims. In particular, they are to be utilized to strike at key enemy targets, including C2 systems and military industry. They are as much political as military weapons, however, with the capacity to disrupt, if not defeat, an opponent's battle plans through their use. Towards these ends, China's nuclear forces must operate in conjunction with other forces, including air defenses, ground security forces, electronic warfare units, etc., as defensive, self-protective measures are an essential element of all nuclear operations.¹⁷

Nuclear weapons can only be utilized, in the Chinese military's view, by the highest national command levels. This is in part because nuclear deterrence relies upon the interplay of political, military, and diplomatic factors. Only at the highest levels, therefore, is the full diplomatic and political meaning clear. The emphasis is on land-

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ People's Republic of China. *Campaigns*. PRC National Defense University Publishers, 2000. Translated summary by Dean Cheng.

based nuclear missiles as the primary nuclear delivery system; readiness of these systems must be high.¹⁸

These recent Chinese statements and military writings fuel the growing debate on whether China remains committed to minimal deterrence or is shifting to a "limited deterrence" doctrine.

F. From Minimal to Limited Deterrence?

China officially claims a minimal deterrent doctrine, meaning that it will only maintain a nuclear force at minimum quantitative levels needed to deter a nuclear attack. This small nuclear force will be widely dispersed, camouflaged, and maintained at low levels of readiness.¹⁹ Minimum deterrence generally eschews or de-emphasizes actual nuclear warfighting.

At the same time, Chinese military writings have started to define and flesh out the concept of limited deterrence. Four main criteria characterize these writings. First, limited deterrence requires the ability to inflict damage with a few hundred warheads. Second, the goal is to develop mutually assured destruction second-strike capabilities. Third, a limited deterrent should be able to respond quickly to any level or type of attack (tactical or strategic), and the initial response should be calibrated to the scope of the initial attack. Fourth, it requires the ability to strike both counter-value and hard and soft counter-force targets.²⁰ In short, limited deterrence evidently envisions limited nuclear warfighting capabilities rather than just retaliatory capabilities as provided for under minimum deterrence.

The rationale for moving toward limited deterrence is provided by Chinese strategists Liu Zhenwu and Meng Shaoying, who criticize minimum deterrence as unable to deter anything beyond a counter-value first-strike: "A number of people have the view that one only needs a few nuclear weapons to scare people and that is sufficient. This view is a product of a lack of understanding of the real meaning of nuclear deterrence and the relationship between nuclear deterrence and actual warfighting; it is biased, harmful and we ought to take the lead and correct it."²¹ In contrast, limited deterrence necessitates the development of capabilities to "deter conventional, theater and strategic war and to suppress escalation during a nuclear war" as well as "a recognizable, realistic ability to fight and inflict sufficient counter-force and counter-value

¹⁸ Ibid.

¹⁹ Nacht, Michael and Tom Woodrow. "Strategic Trends in China: Session 6: Nuclear Issues," *Global Beat* (June 1998). Internet: <http://www.nyu.edu/globalbeat/nuclear/nacht0698.html>

²⁰ Tanks, David. "Chapter 3: China and the Northeast Asian Powers: The Great Challenge of Tomorrow," *Exploring U.S. Missile Defense Requirements in 2010: What Are the Policy and Technology Challenges*. Washington, D.C.: Institute for Foreign Policy Analysis, April 1997. Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>, June 19, 2001.

²¹ Johnston, Alastair Iain. "Prospects for Chinese Nuclear Force Modernization: Limited Deterrence versus Multilateral Arms," *China Quarterly* 146 (June 1996): 548.

damage on an aggressor...if that fails, it assures an ability to prevent an enemy victory.”²²

The open sources generally agree that Chinese nuclear doctrine is in transition again. They differ, however, on China's desire and ability to implement a limited deterrent posture. Those who question the shift to limited deterrence point out the unsuitability of China's current nuclear forces for warfighting missions. Specifically, over half of China's current ballistic missiles are liquid fuelled with reaction times exceeding two hours. This reaction time could make the missiles vulnerable to preemption, assuming their locations could be established. The circular error probable (CEP) of DF-3 and DF-4 ballistic missiles is 1000 meters, making them less accurate than desired for counter-force missions. Moreover, China's nuclear stockpile of approximately 300 weapons will not be able to hit all necessary counter-force and counter-value targets, particularly if the United States deploys missile defenses. According to one China analyst, “it is fairly safe to say that Chinese capabilities come nowhere near the level required by the concept of limited deterrence.”²³

Other Western analysts counter that China is indeed pursuing a limited deterrent, that is, developing a force structure capable of fighting short limited wars in the region while posing significant nuclear deterrence to global powers who may intervene.²⁴ According to this view, this move toward limited deterrence will entail significant changes in China's force structure over the next decade, such as:

- Increased numbers of smaller, accurate, survivable and penetrable inter-continental-range ballistic missiles (ICBMs);
- Submarine-launched ballistic missiles (SLBMs) for its retaliatory force;
- Tactical and theater weapons to hit battlefield and theater military targets and suppress escalation;
- Ballistic missile defense;
- Space-based early warning and C2 systems;
- Anti-satellite weapons to hit enemy military satellites;²⁵
- Better yield-to-payload ratios;
- MIRVed, solid-fueled, road mobile missiles; and,
- Decreased launch preparation time.²⁶

This school of thought contends that Beijing is already giving greater emphasis to tactical nuclear weapons and short-range ballistic missiles. For example, they note that the Second Artillery Corps, the military organization in charge of China's nuclear

²² Johnston, *op cit.*: 291.

²³ Ibid: 294.

²⁴ Tanks, *op cit.* Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>.

²⁵ Pande, *op cit.* Internet: <http://www.idsa-india.org/an-mar00-2.html>.

²⁶ Saunders, Phillip C. and Jing-dong Yuan. “China's Strategic Force Modernization: Issues and Implications for the United States.” In *Proliferation Challenges and Nonproliferation Opportunities for New Administrations*, Occasional Paper No. 4, Ed. Michael Barletta. Center for Nonproliferation Studies, September 2000. Internet: http://cns.miis.edu/cns/projects/eanp/conf/op4_sjd.pdf.

weapons, fired the missiles used in the 1996 missile tests near Taiwan.²⁷ These analysts warn that the episode could represent both a symbolic shift in doctrine and training for new nuclear war-fighting strategies.

Indeed, one American source sees tactical weapons as becoming a mainstay of the Chinese nuclear force: "China does not view its nuclear weapons as unusable. It does, however, hope to be able to create nuclear firebreaks in its military planning so that local battles can be contained without escalating them to the strategic level. This means that China would likely use its tactical capabilities in local war, to include WMD if it should prove necessary, and then threaten the use of strategic force if the conflict begins to escalate."²⁸

Still other analysts question if the major premise of China's minimal deterrence doctrine, no first use of nuclear weapons, is or ever was ironclad. For example, China strongly promotes its NFU policy as proof of its defensive stance regarding nuclear weapons. However, the NFU policy has caveats, specifically in regard to Taiwan. Since China claims Taiwan as sovereign territory, its NFU policy does not apply.²⁹ This sovereignty caveat begs the question of how NFU might or might not be observed in other areas where China has a disputed territorial claim, such as its border with India and the South China Sea. Chinese authors subscribing to limited deterrence are also discussing NFU under a new framework that would allow for retaliatory nuclear strikes on warning or even when clearly threatened, that is, "anticipatory retaliation."³⁰ In a related development, the Chinese government declared in July 1999 that it had enhanced radiation weapon (ERW) technology. The announcement spurred China's state-run media to run pieces advocating use of such weapons against Taiwan.³¹ These new discussions show that NFU may not be a concrete nuclear policy.

While the open source debate over Chinese doctrine unfolds, various internal and external factors are seen as influencing the outcome. The internal factors include financial resources, technological capability, weight of the People's Liberation Army (PLA) in strategic policymaking, and the balance between economic development and military modernization. External factors include most notably US national and theater missile defense (N/TMD) deployment, as well as China's arms control commitments, major power relationships, foreign assistance, international strategic trends, decisions by other major nuclear weapons states, and the status of global arms control regimes.³²

US NMD deployment could prompt China to significantly increase the size of its ICBM force, while extending TMD to Japan could likewise encourage China to increase its number of medium-range ballistic missiles (MRBMs). The need to maintain a credible

²⁷ Rajesh Rajagopalan. "Prospects for Stability in a WMD Environment." *Strategic Analysis* (January 2000): 1733-1747. Internet: <http://www.idsa-india.org/an-jan00-6.html>.

²⁸ Tanks, *op cit.* Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>.

²⁹ Rajagopalan, *op cit.*

³⁰ Tanks, *op cit.*

³¹ Furumori, Yoshihisa. "Signs of Change Seen in China's Nuclear Strategies." *Tokyo Sankei Shimbun* (August 6, 1999).

³² Saunders and Yuan, *op cit.* Internet: http://www.cns.miis.edu/cns/projects/eanp/conf/op4_sid.pdf.

retaliatory capability could persuade China to step up its modernization efforts, increase the deployments of current missiles, or both. It might also retain older missiles in its inventory rather than retire them.³³ Some analysts believe that barring a severe economic downturn, China has the financial resources to build as many missiles and warheads as it deems necessary to oppose US N/TMD plans. One estimate suggests China would have to spend less than one-tenth of what the United States spends to maintain parity between Chinese ballistic missiles and US missile interceptors.³⁴ Chinese military writings already reflect the N/TMD threat in their modernization plans. For example, the Chinese military wants to 1) improve the survivability of strategic nuclear weapons; 2) improve the striking ability of strategic nuclear weapons; and 3) improve penetration technology of strategic weapons.³⁵

The other significant external factor involves China's relationship with India. India's May 1998 tests caused China to question its future as the dominant Asian nuclear power.³⁶ In the view of one Indian analyst, India's nuclear tests threaten China on two counts:

1. "It sees a challenge in India going overt as a nuclear power – it thinks this will considerably weaken China's position as the sole leader of the developing world in the global arena....
2. The Indian nuclear tests have ...compelled it to rethink its strategic perceptions (by compelling) China to take a fresh look at its options along its borders as well as in other spheres in dealing with India."³⁷

This new regional challenge has encouraged China to step up its activity in the international arms control community. However, its commitments in this area remain vague. In the view of one analyst, "The one thread linking the various Chinese positions on arms control over the years is that all have the virtue of allowing Beijing to avoid becoming entangled in arrangements constraining its nuclear behavior."³⁸ Using the CTBT as an example, the agreement would restrict China's ability to design a wider range of warheads and develop MIRVs; however, since the entry into force provisions of the CTBT requires Indian accession, the treaty will not become binding anytime soon. Thus, according to this view, China reaps the political benefits of signature while sacrificing nothing.³⁹ Some analysts predict that if China believes it is necessary to test new miniaturized nuclear warheads for MRV/MIRV development, then it may withdraw from the CTBT.⁴⁰

³³ Saunders and Yuan, *op cit.* Internet: http://www.cns.miis.edu/cns/projects/eanp/conf/op4_sid.pdf.

³⁴ Ferguson, Charles. "Sparkling a Buildup: U.S. Missile Defense and China's Nuclear Arsenal," *Arms Control Today* (March 2000). Internet: http://www.armscontrol.org/act/2000_03/cfmr00.asp - backtab1.

³⁵ Yang, Major General Huan. "China's Strategic Nuclear Weapons," *Chinese Views on Future Warfare*, Ed. Michael Pillsbury, Washington, D.C.: National Defense University Press, 2000. Internet: <http://www.ndu.edu/inss/books/chinview/chinapt3.html - 3>

³⁶ Rappai, M.V. "India-China Relations and the Nuclear Realpolitik." *Strategic Analysis* (April 1999): 15-26. Internet: <http://www.idsa-india.org/an-apr9-2.html>.

³⁷ Ibid.

³⁸ Manning, Robert A. "China's Nuclear Doctrine," *The Wall Street Journal*, June 25, 1999.

³⁹ Nacht and Woodrow, *op cit.* Internet: <http://www.nyu.edu/globalbeat/nuclear/nacht0698.html>.

⁴⁰ Saunders and Yuan, *op cit.*

Table II-1 summarizes one view of possible outcomes for China's nuclear posture over the next 10-25 years. Looking ahead 5-15 years, it appears that China's official doctrine could evolve slowly from minimum deterrence to limited deterrence, as modernization programs open new options and N/TMD deployments pose new challenges.

Table II-1: Three Scenarios for China's Strategic Modernization

	Current Forces	Scenario 1: Minimal Deterrent (2010)	Scenario 2: Minimal Deterrent w/ NMD (2010)	Scenario 3: Doctrinal Change (2020-25)
ICBMs	18-26 (DF-5A)	About 50 (DF-5A, DF-31, DF-41)	100-200 (DF-5A, DF-31, DF-41)	100-200 (DF-5A, DF-31, DF-41)
Range (km)	13,000 +	13,000+ (DF-5A)	13,000+ (DF-5A)	13,000+ (DF-5A)
Fuel	Liquid	Solid	Solid	Solid
CEP (km)	0.5 – 3.0	0.7 – 0.8	0.7 – 0.8	0.7 – 0.8
Launch preparation time	2 hours (DF-5A)	5-10 minutes (DF-41)	5-10 minutes (DF-41)	5-10 minutes (DF-41)
Mobility	None	Road Mobile (DF-31/DF-41)	Road Mobile (DF-31/DF-41)	Road Mobile (DF-31/DF-41)
MRBMs	100 (DF-3/3A, DF-21, JL-1)	100	100	100-300
Advanced Early Warning	No	No	No	Yes
Launch Authorization	Landline/senior officer in command	Radio communication/ more junior officer in command	Radio communication/ more junior officer in command	Radio communication/more junior officer in command
Accidental Launch Risk	Nil (warhead not mated to missiles)	Minimal (warheads mated to mobile missiles)	Minimal (warheads mated to mobile missiles)	Minimal (warheads mated to mobile missiles)
Launch-on-Warning	No	No	No	Possible
Multiple Re-Entry Vehicles	None	Possible	Yes	Yes
Penetration Aids	None	Possible	Yes	Yes
Doctrine	Minimal Deterrent	Minimal Deterrent	Minimal Deterrent	Limited Deterrent

Source: Saunders and Yuan, 2000.

II. Nuclear Strategy and Doctrine Formulation

Not much information is available in open sources regarding who specifically is responsible for developing Chinese nuclear doctrine. However, Chinese sources claim the Central Committee of the Chinese Communist Party and the CMC decide what strategic doctrinal changes will affect military development.⁴¹ Chinese media also mention the December 2 Project. This initiative is charged with improving nuclear combat effectiveness and counterattack capabilities. It is led by Hu Jintao and deputy

⁴¹ Yang, *op cit.* Internet: <http://www.ndu.edu/inss/books/chinview/chinacont.html>.

leaders Wan Jiabao and Chi Haotian with a membership including Guo Boxiong, Cao Gangchuan, Wang Zuxan, Yang Guoliang, Huang Cisheng, Shen Binyi, and Li Yongde.⁴² Hu Jintao is the only one mentioned without a military background other than his role on the CMC.

III. Nuclear Force Posture

Open sources typically put the Chinese nuclear arsenal at 300 strategic and 150 tactical weapons. China has developed a classic triad of nuclear delivery systems, including land-based missiles, ballistic missile submarines, and aircraft. Table II-2 provides an open source summary of China's current and future missile capabilities.

TABLE II-2: Open Source Summaries of Chinese Nuclear Weapons Systems

Type	Designation	Description	Range	Payload	Yield
ICBM	DF*5/DF-5A (CSS***-4)	2-stage - storable liquid propellant (N204/UDMG) - gyro-platform with onboard computer 30-60 minute launch preparation time	13,000+ km	3,200 kg	1 x 4-5 mt
ICBM	DF-31 (CSS-X-9)	3-stage - solid propellant - possible MRV/MIRV capability - tested and under development with its warhead awaiting certification - same missile as the JL-2	8,000 km	700 kg	1 x 200-300 kt
ICBM	DF-41 (CSS-X-10)	3-stage - solid propellant - possible MRV/MIRV capability - under development - expect 3-5 minute launch preparation time	12,000 km	800 kg	1 x 200-300 kt
SLBM	JL**-1 (CSS-N-3)	2-stage - solid propellant - gyro-platform inertial guidance with onboard computer - Same missile as the DF-21/DF-21A	1,700 km	600 kg	1 x 200-300 kt
SLBM	JL-2 (CSS-NX-5)	3-stage - solid propellant - possible MRV/MIRV-capable - tested and under development with its warhead awaiting certification - same missile as the DF-31	8,000 km	700 kg	1 x 200-300 kt

⁴² Wen, Jen. "Beijing Starts 'December 2' Strategic Weaponry Project." *Hong Kong Tai Yang Pao* (December 11, 2000).

TABLE 2: Open Source Summaries of Chinese Nuclear Weapons Systems (cont.)

Type	Designation	Description	Range	Payload	Yield
MRBM	DF-2 (CSS-1)	recently taken out of service	1,250 km		
MRBM	DF-3/DF-3A (CSS-2)	1-stage - storable liquid propellant (AK27/UDMH) - fully inertial strap-down guidance system 120-150 minute launch preparation time	2,800 km	2,150 kg	1 x 1-5 MT
MRBM	DF-4 (CSS-3)	2-stage - non-storable liquid propellant 60-120 minute launch preparation time	4,750 km	2,200 kg	1 x 1-5 mt
MRBM	DF-21/DF-21A (CSS-5)	2-stage - solid propellant - gyro-platform inertial guidance system with onboard computer 10-15 minute launch preparation time - Same missile as the JL-1	1,800 km	600 kg	1 x 200-300 kt
SRBM	DF-11/M-11 (CSS-7)	2-stage - solid propellant - strap-down inertial computer digitized guidance system with terminal control 30-45 minute launch preparation time - M-11 version designed explicitly for export	300 km	800 kg	1 x 350 kt
SRBM	DF-15/M-9 (CSS-6)	1-stage - solid propellant - strap-down inertial computer digitized guidance system with terminal control - trying to enhance accuracy with GPS technology 30-minute launch prep. time - M-9 version designed explicitly for export	600 km	950 kg	1 x 50-350 kt

*DF- Dong Feng

**JL – Julang

***CSS – US designation

Sources: Cordesman 2001; IISS 1999, table 53; Jane's Strategic Weapons Systems 1998; CNS 1999; US DoD 2001.

The day-to-day readiness levels of China's nuclear forces are presently low. The DF-5A and DF-4 are not mobile and require significant launch preparation time. These missiles also do not have mated warheads. This situation is expected to change with the introduction of the DF-31 and DF-41, both of which will have significantly decreased launch preparation times and potentially mated warheads.

The open sources disagree on China's current MIRV capabilities. One source claims that at least four DF-5s have already been MIRVed.⁴³ However, most support the claim that no DF-5s have been fitted with MIRV warheads, but that MIRVing will occur in the near future on the DF-31 and DF-41. Some believe China will not pursue MIRV capabilities because they have too few nuclear warheads for counterforce strikes.⁴⁴

China has gone to great lengths to secure and camouflage its missile force. There are an estimated 10-18 silos with DF-5 missiles that were "improved" in 1994, but the nature of the silo improvements was not described in open sources. China also rebuilt a number of false shell-wells at the same time, presumably as dummy silos.⁴⁵

In 1995, Chinese media announced the completion of the Great Wall Project. The report claimed that "tens of thousands" of army engineers built tunnels through a North China mountain range over a 10-year period in an effort to harden China's missile storage and launch sites. Analysts believe the range to be the Tai-Hang, located 400 km southwest of Beijing between Hebei and Shanxi. One estimate calculates a network of tunnels up to 5,000 km long. This project indicates that China has plans to put much of its strategic missile forces underground in a tunnel system where, according to one analyst, they would be invulnerable to a preemptive strike, but from which could easily be moved to launch positions in surrounding gorges.⁴⁶ China has also abruptly canceled mining contracts with Western firms for selected minerals in the Yunnan and Hunan provinces leading some analysts to conclude that China is converting underground mines to missile launch sites.⁴⁷

While China relies heavily on its missile force for nuclear weapons delivery, the Chinese military community realizes the necessity of building a strong strategic air force. Currently, there are approximately 100 B-6 (Tu-16) and A-5 (modified MiG-19) nuclear capable bombers. Although updated with new technology, they were originally designed and built with 1950s Soviet technology. Their ability to penetrate contemporary air defenses is minimal, limiting their utility as regional and tactical bombers.⁴⁸ China is developing a new supersonic, modern, all-weather bomber through the Xi-an Aircraft company that will be deployed to both naval and air forces.⁴⁹

China's naval nuclear force will be composed of four to six new Type 094 nuclear submarines expected to begin production between 2003-2005. They will mount 16 JL-2

⁴³ Tanks, *op cit.* Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>.

⁴⁴ Ferguson, *op cit.* Internet: http://www.armscontrol.org/act/2000_03/cfmr00.asp - backtab1.

⁴⁵ Markov, David R. and Andrew W. Hull. "The Changing Nature of Chinese Nuclear Strategy." Institute for Defense Analyses (January 1997): 18.

⁴⁶ Tanks, *op cit.*

⁴⁷ Information in this paragraph was derived from Tanks, 1997. According to Tanks, China takes considerable effort to conceal missile capabilities beyond hardening sites. It uses dummy sites, hides missiles in civil buildings with removable roofs, places missiles in mines, caves and tunnels, and has even considered deploying DF-5s inside fake bridge towers and railway cars.

⁴⁸ Godwin, Paul H.B. "China's Defense Modernization: Aspirations and Capabilities." Washington Journal of Modern China, Spring 2000, Vol. 6, No.1. Internet: <http://www.ndu.edu/inss/symposia/pacific2000/agenda.html>.

⁴⁹ Pande, *op cit.* Internet: <http://www.idsa-india.org/an-mar00-2.html>.

nuclear-tipped missiles and incorporate significant amounts of Western and Russian technology.⁵⁰ The Type 094 is expected to be a great improvement over the Type 092, which was plagued with technical failures and poor engineering.

Nuclear capability projections in the open source community cover a wide range of potential developments. A more alarmist view claims that by 2010, China plans to have 75-80% of its ballistic missiles capable of targeting the US and Russia and that China has the capability of expanding its nuclear inventory to 3,000-5,000 nuclear weapons in the same timeframe, although its actual weapons objective is thought to be much lower.⁵¹ According to one view, China's future nuclear force will be made up of three categories: strategic, theater, and tactical systems. The strategic force will consist of DF-41s and JL-2 (on 3-4 ballistic missile submarines or SSBNs). The theater force will use DF-31s, cruise missiles (Russian RK-55s and indigenous models), and 150-160 Su-27 Flankers and Tu-22 M Backfires. The tactical force will experience the most growth with 200 FC-1/J-10 multi-role fighters, 50-100 J-811 multi-role fighters, nuclear torpedoes, and nuclear artillery projectiles.⁵²

IV. Nuclear Targeting

Table II-3 provides an open source summary of Chinese missile base locations as well as their likely targets. The DF-2 was to target Japan, but has been removed from service and its targeting requirements most likely assigned to the DF-3. The DF-3 was initially targeted at US military bases in the Philippines, but since the United States closed those bases in the late-1980s, these missiles are now likely targeted at Taiwan, Northeast Asia, and Southeast Asia. The DF-4 is designed to target Moscow and the US military base in Guam. The DF-5 is designed to target the western United States. The DF-31 is expected to be deployed to launch sites in Manchuria and targeted toward the northwest corner of the United States. Once the Chinese SSBNs are equipped with the JL-2, they would only need to patrol just to the northeast of the Kuril Islands to hold 75% of the United States at risk.⁵³ Based on this information, China does not appear to have SRBMs or tactical nuclear weapons in Tibet, and it is also doubtful if MRBMs are in the Tibetan Autonomous Region, despite Indian claims to the contrary.⁵⁴

⁵⁰ Tanks, *op cit.* Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>.

⁵¹ Ibid.

⁵² Markov and Hull, *op cit.*: 20.

⁵³ Tanks, *op cit.*

⁵⁴ "Nuclear Weapons and Sino-Indian Relations." Southern Asia Policy Brief Series. Confidence Building Measures Project. The Henry L. Stimson Center (June 15, 1998). Internet: <http://www.stimson.org/cbm/sapb/brief2.htm>.

Table II-3: Open Source Summary of China Ballistic Missile Bases and Targeting Information

Base	Location	Brigades	Missiles	Target
51	Shenyang, Jilin	3	DF-3/DF-21	Northeast Asia
52	Huangshan, Anhui	2-3	DF-15	Taiwan
53	Kunming, Yunnan	2	DF-3/DF-21	Southeast Asia/India
54	Luoyang, Henan	3	DF-4/DF-5	Russia/US
55	Huaihua, Hunan	2	DF-4	Russia
56	Xining, Qinghai	3	DF-3/DF-4	Russia, India

Source: The Henry L. Stimson Center, 1998

According to Mr. He Zhaxiu, formerly with the China Association for Science and Technology, China's nuclear missiles are aimed at soft targets – those that are hard to defend and constitute centers of economic or military power with concentrated populations.⁵⁵ China's ICBMs will likely continue to target large US cities because as long as Beijing maintains its ability to destroy a percentage of US cities, it believes that it will have achieved its goal of deterring the United States.⁵⁶ China also targets cities because of the relatively low accuracy of its current missile force.⁵⁷ China's consideration of US cities as strategic targets, at least for deterrent purposes, is documented in a quote stemming from discussions between former US Ambassador Chas Freeman and Chinese military officials regarding the American reaction to Chinese exercises in the Taiwan Straits. As one of the Chinese officials stated:

And finally, you do not have the strategic leverage that you had in the 1950's when you threatened nuclear strikes on us. You were able to do that because we could not hit back. But if you hit us now, we can hit back. So you will not make those threats. In the end you care more about Los Angeles than you do about Taipei.⁵⁸

The quote implies that China specifically will threaten large US cities to cause the most unacceptable losses possible.

China's MRBMs and SRBMs could also play a greater role in the delivery of tactical nuclear weapons. With the perception of increased localized conflict, tactical nuclear weapons could become an increasing threat to China's neighbors, particularly India, the Central Asian republics, Vietnam and Southeast Asia.⁵⁹

⁵⁵ "China's Few Nukes Target Big Cities." *Washington Times*, November 8, 1994, p. A13.

⁵⁶ Nacht and Woodrow, *op cit.* Internet: <http://www.nyu.edu/globalbeat/nuclear/nacht0698>.

⁵⁷ Ferguson, *op cit.* Internet: http://www.armscontrol.org/act/2000_03/cfmr00.asp-backtab1.

⁵⁸ Cirincione, Joseph. "Did China Threaten to Bomb Los Angeles?" Non-Proliferation Project Issue Brief v. 4, no. 4. Carnegie Endowment for International Peace (March 22, 2001). Internet: <http://www.ceip.org/files/Publications/ProliferationBrief404.asp?from=pubtitle>.

⁵⁹ Tanks, *op cit.* Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>.

V. Nuclear Command and Control (C2)

China's nuclear forces are maintained by the PLA Second Artillery Corps. This Corps consists of 90,000 troops organized by headquarters:

- Early Warning System Division;
- Communication Regiment;
- Security Regiment;
- Technical Support Regiment; and,
- 6 Ballistic Missile Divisions.

The Second Artillery Corps is under the operational control of the PLA General Staff, but *de facto* control is exercised directly by the CMC.⁶⁰ The 2000 defense white paper, for example, puts the nuclear force under the command of the CMC.

At least two hardened C2 bunkers have been identified in open sources. The primary underground command facility used by the CMC is located under Yuquan Shan Mountain in the Western Hills outside Beijing. A second national military command bunker is reportedly located at Hohhot, north of Beijing near the border with Mongolia. At least 8 very-low frequency (VLF) transmitters are identified throughout China, enabling communications with China's current and future ballistic missile submarines. An integral part of China's missile warning and space tracking network includes large phased array radars (LPAR). At least one LPAR has been identified at Xuanhua, and is believed to be manned by Second Artillery forces. China has also deployed an Over-the-Horizon Backscatter Radar [OTH-B] to provide surveillance of the South China Sea. However, the location of this facility remains unclear.⁶¹

China's C2 structure has a variety of weaknesses including deficiencies in early warning systems, limited communications, and poor mobility and dispersal capabilities.⁶² PLA strategists acknowledge that the Strategic Missile Force Command "is deficient in targeting intelligence, and lacks more complete 'firepower plans' that specify targets and the deployments and sequencing of weapons to be used in a counter-attack, among other weaknesses."⁶³

According to one Indian analyst, China does not have the command, control, communications and intelligence (C3I) capabilities for commanding limited war-fighting operations. It lacks the technical ability to detect an incoming first strike and "launch on tactical warning."⁶⁴ China needs to improve in three areas: early warning satellites, reconnaissance satellites (an imaging satellite was last launched in 2000), and

⁶⁰ Tanks, *op cit.* Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>.

⁶¹ Information in this paragraph has been derived from the Federation of American Scientists web site: <http://www.fas.org/nuke/guide/china/facility/c3i.htm>.

⁶² Saunders and Yuan, *op cit.* Internet: http://www.cns.miis.edu/cns/projects/eanp/conf/op4_sjd.pdf.

⁶³ Johnston, *op cit.*: 295.

⁶⁴ Pande, *op cit.* <http://www.idsa-india.org/an-mar00-2.html>.

telecommunications systems. China is currently in the market to acquire improved nuclear detection satellites.⁶⁵

China's nuclear warheads are not secured by permissive-action-link (PAL) devices. However, China does follow other procedures such as two-man launch and keeping warheads separated from missiles. These measures are based on political control of the weapons and are not guaranteed in times of political instability.⁶⁶ Control risks could increase as warheads become mated to missiles in the new generation of weaponry.

In the 1980s, China conducted efforts to train the strategic missile forces to launch under simulated nuclear war conditions, but it is not publicly known what kind of training is occurring today.⁶⁷

In terms of China's modeling of nuclear exchanges with the US, China ascribes high capabilities to US Navy lower tier and theater-wide missile defense systems. Chinese planners envision a network of radar and C2 systems in which a variety of TMD systems forward-deployed in Asia provide a capability amounting to boost-phase intercept of Chinese strategic nuclear forces.⁶⁸

VI. Conclusion

Given the limited information available on China, understanding Chinese nuclear doctrine and capabilities is a challenging task. Most of the information published speculates on China's nuclear weapons capabilities. The level of information drops significantly regarding other topics such as command and control and targeting practices.

Most of the open source assessments agree that Chinese doctrine is changing but the secrecy surrounding Chinese nuclear forces makes it difficult to draw definite conclusions.⁶⁹ This secrecy is a deliberate doctrine in and of itself. For example, as one Chinese official notes, "Warfare is a matter of deception – of constantly creating false appearances, spreading disinformation, and employing trickery and deceit."⁷⁰

⁶⁵ Markov and Hull, *op cit.* 13.

⁶⁶ Tanks, *op cit.* Internet: <http://www.ifpa.org/pubs/2010/2010toc.htm>.

⁶⁷ Pande, *op cit.* Internet: <http://www.idsa-india.org/an-mar00-2.html>.

⁶⁸ Nacht and Woodrow, *op cit.* Internet: <http://www.nyu.edu/globalbeat/nuclear/nacht0698.html>

⁶⁹ Rajagopalan, *op cit.* Internet: <http://www.idsa-india.org/an-jan00-6.html>.

⁷⁰ Pande, *op cit.*

SECTION THREE: FRANCE

1. Nuclear Doctrine

The open sources describe the core of French nuclear doctrine and strategy as purely deterrent. The French nuclear arsenal is structured to provide technical and political credibility to this doctrine of deterrence. This credibility stems primarily from the quality and survivability of the nuclear components of its naval and air forces (the Marine Nationale and the Armée de l'Air), rather than the quantity of missiles, warheads, or launchers. French nuclear forces are maintained at a level of strict sufficiency.

Nuclear deterrence also remains at the core of French defense policy writ large. For example, according to the Marine Nationale Web site, nuclear deterrence is the primary mission of the French Navy (protecting French global interests is the second mission; power projection is the third).

Public opinion generally supports the official French nuclear doctrine and strategy. French nuclear capabilities are seen as a counterweight to US military might, a critical component in a strategy of autonomous defense, and a sign of continued international status.

There is currently a significant debate among the French élite as to the role of French nuclear forces in a European defense structure, as the current doctrine of sufficient deterrence are purely national in character, and the force posture is adapted accordingly.

The open sources concur that France's current nuclear strategy and doctrine are consistent with the country's force structure, readiness levels, exercise patterns, and C2 arrangements. Although France has reduced the size of its air and naval arsenal and eliminated its land-based missile components since the end of the Cold War, it continues to modernize, update, and retrofit its remaining forces in a manner consistent with its doctrine of dissuasion. For example, French missile supplies are maintained in a manner consistent with its long-standing policy of only equipping four nuclear submarines concurrently.

A. Deterrence: "From the Weak to the Strong"

The French Atomic Energy Commissariat was created in 1945 in the wake of the Hiroshima and Nagasaki bombings. Its first five-year plan (1951-56) focused primarily on redressing France's energy deficit through the use of atomic energy. The prominence of the Communist party in France in the 1940s – with its strict non-proliferation philosophy – precluded the development of nuclear weapons. However, in the 1950s, with French military defeats in Southeast Asia and the emerging Suez crisis, the French government began embracing the notion of a nuclear weapons program as a sign of national prestige. The development of a French atomic bomb was authorized by Prime Minister Pierre Mendès-France in 1954. A Committee for the Military

Applications of Atomic energy was created secretly in 1956, and Charles de Gaulle established the definitive timetable for the French nuclear program in 1958. France's first nuclear explosion took place in 1960.

Following the 1960 test, French strategists began the task of devising a nuclear doctrine. The key challenge was to develop a strategy that could credibly deter the main threat to France, the Soviet Union. French strategists concluded that, because of their enormous destructive power, even a handful of nuclear weapons could enable a medium power such as France to deter a larger rival, provided three conditions were met. Namely, the weaker power's nuclear capability had to be credible (i.e., survivable); the vital interests of the weaker state had to be at stake; and the leader of the weaker state had to be willing to use nuclear weapons. This concept was known as "la dissuasion du faible au fort" ("deterrence from the weak to the strong"), often referred to outside of France as proportional deterrence. It has remained the core of France's deterrent posture for over 25 years.⁷¹

Key dimensions of French nuclear strategy include rejection of the notion of nuclear warfighting. In essence, the purpose of nuclear weapons is to deter war, not win it. Thus, while France went on to develop tactical nuclear weapons, it referred to them as "pre-strategic." That is, they were not an extension of conventional warfare but rather were to be used in a single "ultimate warning" to an aggressor that a failure to cease hostilities would trigger an all-out strategic nuclear strike by France. To lend credibility to its nuclear deterrent, France also developed at great expense a complete triad of nuclear bombers, intermediate-range ballistic missiles (IRBMs) and ballistic missile submarines.

Under President Charles De Gaulle, France's nuclear capability became the centerpiece of a policy designed to establish the country's independence from NATO and the American nuclear umbrella. Gaullist France considered the U.S. guarantee of NATO to be unreliable. At the same time, Paris was also concerned that Washington's global interventions could potentially draw France into a war it did not want. These concerns were articulated by France's General of the Army, Charles Ailleret, in his "tous azimuts" (all points of the compass) concept. Namely, France needed to preserve its flexibility in how it responded to global threats and the way to do that was to maintain an independent French nuclear capability with a worldwide scope. The concept was not without flaws, one of which was France's failure to develop a truly global nuclear reach.⁷² Nonetheless, this deep-seated desire to assert France's independence of American nuclear strategy remained a cornerstone of French nuclear doctrine.

While France reserves the right to use nuclear weapons to defend its vital interests (typically defined as its national sanctuary or territorial integrity), it has offered certain negative security assurances. Namely, in 1982, France declared that it:

⁷¹ Grand, Camille. "French Nuclear Policy After the Cold War: How to Combine Deterrence and Arms Control", *Strategic Analysis*, Vol. XXII, No. 4, July 1998. Institute for Defence Studies & Analyses. Internet: <http://www.idsa-india.org/an-jul8-3.html>, June 29, 2001.

⁷² Freedman, Lawrence, *The Evolution of Nuclear Strategy* (London: MacMillan, 1989), 313-324.

...will not use nuclear arms against a state that does not have them and that has pledged not to seek them, except if an act of aggression is carried out in association or alliance with a nuclear-weapon State against France or against a state with which France has a security commitment.⁷³

In 1995, France brought its negative security assurance into conformity with those of the United States, Russia, and the United Kingdom:

France reaffirms that it will not use nuclear weapons against non-nuclear-weapon states parties to the [Nuclear Non-Proliferation Treaty] NPT, except in the case of an invasion or any other attack on France, its territory, its armed forces or other troops, or against its allies or a state toward which it has a security commitment, carried out or sustained by such a state in alliance or association with a nuclear-weapon state.⁷⁴

B. The 1994 Defense White Paper

The end of the Cold War marked the beginning of a significant turning point in French military strategy, although the core doctrine of deterrence remained intact. The main focus on deterring "greater power" aggression against France gave way to a less-specific deterrence orientation. These changes came about due to: new international political realities and attendant changes in threat perception; the pending obsolescence of parts of the French arsenal; and the need for military budget cuts. A 1994 White Paper on Defense – France's first in 22 years – reflected both the change and continuity in French military strategy.⁷⁵

Specifically, the White Paper reaffirmed that French "...nuclear forces must permanently be capable of fulfilling two functions: to inflict a striking force causing unacceptable damage and liable to be repeated; to proceed to a limited striking force on military targets in view of the ultimate warning." The White Paper also contained six notional scenarios, two of which involve French nuclear weapons. The first of these envisaged a regional conflict that either involved French "vital interests" in Europe, the Mediterranean, or the Middle East. The White Paper concluded that "[a] deterrent maneuver adapted to this particular context, might be necessary to accompany our decision to intervene." What constituted a "deterrent maneuver" was left undefined. The other scenario postulated the resurgence of a "major" (i.e., Russian) threat to Western Europe. Here, the White Paper noted that the role of nuclear deterrence would be "central."⁷⁶

While the 1994 White Paper emphasized France's growing concern over emerging proliferation threats, it demonstrated no interest in developing a "counter-proliferation

⁷³ Quoted in Grand, *op cit.*, n. 34. Internet: <http://www.idsa-india.org/an-jul8-3.html>.

⁷⁴ Grand, *op cit.*

⁷⁵ French Ministry of Defense. "Livre Blanc sur la Défense". Paris: Ministère de la Défense, Service d'Information et de Relations Publiques des Armées, 1994.

⁷⁶ Quoted material from Grand, *op cit.*

doctrine," a topic then in vogue in the United States. Indeed, US discussion of counter-proliferation was viewed by many strategists and policymakers in France as essentially a preemptive nuclear strategy that undermined deterrence and nonproliferation. At the same time, the White Paper set the stage for tailoring France's nuclear forces to reflect the other major external development, the end of the Cold War.

French President Jacques Chirac declared in 1996 that "[w]e must take advantage of the respite offered by the current strategic situation to rethink our nuclear posture. The choice of our means must be based on the principles of sufficiency and credibility which have, moreover, always been ours."⁷⁷ In 1995, France also became the first nuclear power to promote the "zero option" in nuclear testing, and ceased all of its own testing in January 1996.

As part of the new nuclear strategy, French nuclear forces were restructured to scale down the number of operational SSBNs from five to four; lower the alert status of the forces; end all Mirage-IVP nuclear bomber missions; dismantle the Hadès ground-launched missiles; and dismantle the S3D IRBMs. France also undertook a modernization program of its remaining nuclear assets.

C. Concerted Deterrence

Proposals to "Europeanize" the French nuclear deterrent, that is, extend it to other European nations and develop a common nuclear policy, have been floated since the 1950s. The topic gained notoriety again in the early- to mid-1990s with President Francois Mitterrand's broaching of the subject at a European summit and the subsequent introduction of the concept of "concerted deterrence." As laid out by Foreign Minister Alain Juppe in 1995, this concept stopped short of proposing a shared nuclear deterrent but offered a European dialogue to at least coordinate on nuclear issues. Concerted deterrence met with little interest in other European capitals. This ambivalence has been attributed largely to the perception that this was a tactical move by Paris to defuse mounting criticism of France's resumption of nuclear testing. Still, French officials and analysts remain interested in this concept and point to growing coordination with the United Kingdom on doctrinal issues as a hopeful sign of progress towards an eventual common nuclear policy in Europe.⁷⁸

⁷⁷ Chirac, Jacques. Speech given at the École Militaire, Paris, 23 February 1996. Quoted by the Federation of American Scientists in their Fact Sheet on "French Nuclear Forces - Nuclear Weapons", July, 1998. Internet: <http://www.fas.org/nuke/guide/france/nuke/index.html>, July 4, 2001.

⁷⁸ Boniface, Pascal. "The Future of the French Nuclear Posture", *Strategic Analysis*, Vol. XXIII, No. 8, November 1999. Institute for Defence Studies & Analyses, (nd). Internet: <http://www.idsa-india.org/an-nov9-6.html>, July 4, 2001.

D. The Future of French Doctrine

According to the open sources – both government and non-governmental – French nuclear doctrine is not likely to change significantly in the next decade. Within the French analytical community, there is little expectation that France will make a commitment to the no first-use of nuclear weapons, as the recourse to nuclear use in defense of French vital interests lies at the heart of deterrence doctrine. Similarly, France is seen as supporting nuclear disarmament in principle but will retain its nuclear capability for the foreseeable future. France remains opposed to missile defenses, as they are perceived to undermine the foundation of nuclear deterrence. As summarized by Prime Minister Lionel Jospin in 1998:

France's nuclear deterrent has today entered into a new era. The evolution of the strategic context permits a reduction in the number of weapons, as well as in the state of alert of the forces, but nuclear deterrence remains at the center of our defense. France will continue, therefore, to have a nuclear presence, albeit one that has adapted, in terms both of its arsenal and its posture. For France, as well as for European security, nuclear weapons will continue to be necessary so long as a general and complete disarmament remains to be accomplished.⁷⁹

2. Nuclear Strategy and Doctrine Formulation

Historically, the strongest proponents of the development of a French nuclear weapons program and the most important contributors to French nuclear doctrine and strategy have been France's generals. The four most significant have been Charles Ailleret (Army), who oversaw the first French nuclear test (*Gerboise Bleue*) in 1960; Pierre Gallois (Air Force); Lucien Poirier (Army); and André Beaufre (Army).

The French President, as Commander-in-Chief of the armed forces, plays a significant role in the implementation, revision, and advocacy of French nuclear doctrine, and almost always spearheads doctrinal changes. As President François Mitterrand stated in 1983, "the centerpiece of France's strategy of dissuasion is the Head of State – it is me."⁸⁰ The French President would personally order a nuclear launch in the event that a defensive use of nuclear weapons were required.

France's civilian population and French civil servants have a significant influence on French nuclear doctrine formulation and development. There has consistently been widespread domestic support for French defense and nuclear policies (over 60% popular approval for the doctrine and strategic manifestation of deterrence in 1999), as well as consensus among most of France's major political parties. The French "nuclear consensus" is based upon "the maintenance of a policy of deterrence; the rejection of a posture of nuclear warfighting; the establishment of some tangible connection between

⁷⁹ Quoted in Boniface, *op cit.* Internet: <http://www.idsa-india.org/an-nov9-6.html>.

⁸⁰ Federation of American Scientists. Fact sheet on "French Nuclear Forces – Doctrine", July, 1998. Internet: <http://www.fas.org/nuke/guide/france/doctrine/index.html>, July 5, 2001.

France's nuclear arsenal and European defense; and the creation of a linkage between deterrence and nuclear disarmament."⁸¹

External experts are frequently invited to help shape French nuclear and defense strategy. These experts also tend to publish prolifically, thus influencing popular opinion as well as military and government decision-making. The writing of the 1994 White Paper on Defense included four independent experts from both think tanks and industry, including the Chairman of French Institute for International Relations (IFRI), Thierry de Montbrial. In addition to IFRI, groups such as the Centre de Recherche en Économie et Statistique (CREST) and the Fondation pour les Études de Défense Nationale (FEDN) publish reports that are used in French nuclear and defense debates. Alumni from the élite French universities such as the École Nationale d'Administration (ENA) and the École Polytechnique – who include many military leaders and high-ranking civil servants – form networks that are equally important in the strategic assessment and policy formulation process.

3. Nuclear Force Posture

France's nuclear force posture currently consists of a nuclear diad. France's IRBMs were deactivated in 1996; its current missile forces are launched from air and sea only.

France currently has 45 Mirage 2000N bombers configured for a nuclear role. Each aircraft can carry one air-to-surface missiles ("Air-Sol Moyenne Portée" or ASMP), which delivers a TN-81, 300-kiloton bomb over a standoff range of up to 160 nautical miles (300 km) and can reach speeds of Mach-2 to Mach-3. Roughly 100 of these missiles have been built, with roughly 80 available warheads.⁸² France also has 24 Super Étendard strike aircraft each equipped with one ASMP missile. These are based on the *Charles de Gaulle*, France's only operational aircraft carrier.

France has the three *Redoutable* class ballistic missile submarines still in service – *Le Tonnant* (The Thunderer), *L'Indomptable* (The Indomitable), and *L'Inflexible* (The Unyielding) – each carries 16 M-4 A/B SLBMs. Each M-4 carries six 150 kt multiple independently-targeted reentry vehicle (MIRV) TN-70/71 warheads to a range of 2,370-3,240 nautical miles (4,400-6,000 km). According to the Natural Resources Defense Council, there are only 32 M-4 SLBMs currently deployable, for a total of 192 warheads. The newer *Triomphant*-class submarines carry 16 M-45 SLBMs. Each M-45 carries six 100 kt TN-75 MIRVed warheads to a range of 3,240 nautical miles (6,000 kilometers).⁸³ With two *Triomphant*-class SSBNs currently in service (the lead ship and *Le Téméraire*), the number of TN-75 warheads comes to 192.

⁸¹ Boniface, *op cit.* Internet: <http://www.idsa-india.org/an-nov9-6.html>.

⁸² Aldridge, *op.cit.* See also French Ministry of Defense, Armée de l'Air Web site for a description of strategic forces (in French, with partial English translation), <http://www.defense.gouv.fr/air/index.html>, July 5, 2001.

⁸³ Boniface, Pascal, *op.cit.*, Internet: <http://www.idsa-india.org/an-nov9-6.html> and Aldridge, *op.cit.*, Internet: <http://www.defense.gouv.fr/air/index.html>.

Of the nuclear warheads cited above, the TN-75 is the only one currently being manufactured (at the Centre d'Études de Valduc, near Dijon).

The open source literature reviewed was not specific on the day-to-day readiness of the French nuclear force. Several sources cited measures related to the de-alerting of French nuclear forces, announced and implemented in 1992 and 1996.

According to the Fact Sheet supplied by the Marine Nationale, the aircraft carrier *Charles de Gaulle*, when accompanied by its supply craft, can remain at sea almost indefinitely. No specific mention of speed of deployment of SSBNs and SLBM warheads in time of crisis was mentioned in the literature reviewed.

Consistent with its strategic outlook, France will continue to upgrade and improve its remaining nuclear capabilities over the coming decade. Defense Minister Alain Richard signed a directive on 28 July 2000 to begin production of the fourth *Triomphant*-class SSBN, to be named *Le Terrible* (a name already used in a previous generation of submarines). This SSBN will be commissioned in 2008. A third ship in this class, *Le Vigilant*, will be fully operational in 2004. This schedule is consistent with the capabilities of the current operational submarine fleet. The French Délégation Générale pour l'Armement (DGA) will oversee the conceptual development of *Le Terrible*, which will be built and assembled at the Direction des Constructions Navales (DCN) Cherbourg.⁸⁴

The new *Triomphant*-class SSBNs will initially carry 16 M-45 SLBMs, each fitted with "improved penetration aids and lighter warheads." Circa 2010, they will be backfitted with the new M-51 SLBM. The M-51 will be able to carry 12 MIRVed TN-76 warheads, but is more likely to carry 8. Its range will be close to 5,900 nautical miles (11,000 km).⁸⁵

ASMP missiles also are scheduled to be upgraded in 2010 to ASMP "Amélioré" ("improved"), known as ASMP-Plus. These will have improved stealth features and almost double their current range (to 500 km), while maintaining a comparable weight and size. Deployment of the ASMP-Plus is anticipated on both the Mirage 2000Ns and Rafale strike fighters.⁸⁶

As stated above, the French ceased all nuclear testing in 1996. France is developing the PALEN program ("Préparation à la Limitation des Essais Nucléaires"), centered around a facility using computer simulation of nuclear testing to develop new warheads, in lieu of actual nuclear explosions. The French are also building a large laser-based

⁸⁴ Information brief issued by the French Ministry of Defense – Information and Defense Communications Branch (Délégation à l'Information et à la communication de la Défense), Paris, July 28, 2000. Internet: <http://www.defense.gouv.fr/actualites/communiqués/c280700/280700.html>, July 5, 2001.

⁸⁵ Aldridge, Bob. "Nuclear Weapons Inventories of the Eight Known Nuclear Powers". Santa Clara: Pacific Life Research Center Paper #970508D, revised 9 September 2000. Internet: <http://www.gzcenter.org/plrc/>, July 7, 2001.

⁸⁶ French Ministry of Defense. Fact Sheet on "Le Rafale Marine" on French Navy Web site, <http://www.defense.gouv.fr/marine/embarque/rafale/rafale.htm>. See also Aldridge, *op. cit.*

program for fusion research, known as the "Laser Megajoule" (LMJ). This program was begun in 1992 under the auspices of the French Atomic Energy Commissariat's Military Applications Directorate.

The French conducted a nuclear security exercise as recently as 6 February 2001 on the *Charles de Gaulle* aircraft carrier. According to the French Ministry of Defense, the French Navy regularly conducts such exercises to perfect their response in the event of an incident or accident within an on-board nuclear installation.⁸⁷

The open source literature does not point to a French "use them or lose them" perception of nuclear forces.

4. Nuclear Targeting

During the Cold War, France's deterrence doctrine included an "anti-city" strike component, namely, cities such as Moscow were acceptable nuclear targets. Since the end of the Cold War, and riding the wave of popular opinion, French defense leaders have called for greater selectivity and discrimination in targeting, to minimize civilian casualties.⁸⁸

Following the deactivation of France's land-based missile force in 1996, President Jacques Chirac announced that "no part of the French nuclear deterrent forces is any longer targeted."⁸⁹ France's SSBNs patrol the Atlantic Ocean, Norwegian waters, and in the Mediterranean. They are able to fire from their home port in Brest and hit targets as far as Russia. The open source literature commented on targets that *could* be hit as a defensive measure in the event of an attack on vital French national interests, e.g., parts of the Middle East. However, the literature reviewed did not describe specific targets.

5. Nuclear Command and Control (C2)

As indicated above, the authority to use nuclear weapons resides with the French president. More detailed information about France's nuclear C2 principles and practices are generally lacking in the open sources. A US Congressional report from 1975 outlined the following arrangements for French nuclear bombers:

- Two distinct command chains existed between the French president, the commander of France's strategic air arm, and the bomber pilots.

⁸⁷ Information brief issued by the French Ministry of Defense – Information and Defense Communications Branch (Délégation à l'Information et à la communication de la Défense), Paris, 21 February 2001. Internet: http://www.defense.gouv.fr/actualites/breves/informations_generales/b022101/022101b.htm, July 5, 2001.

⁸⁸ *Changing Targets: Nuclear Doctrine from the Cold War to the Third World*. Nuclear Campaign Report, Greenpeace, March 1, 1995. Internet: <http://www.greenpeace.org/~usa/reports/nuclear/changing.html>, July 4, 2001.

⁸⁹ Federation of American Scientists. Fact Sheet on "French Nuclear Forces - Nuclear Weapons", July, 1998. Internet: <http://www.fas.org/nuke/guide/france/nuke/index.html>, July 4, 2001.

- Separate sets of orders had to be issued to launch the planes and later activate the nuclear weapons on-board.
- The planes were equipped with "black boxes" that could be activated remotely by the civilian leadership to neutralize the atomic bombs on board.⁹⁰

Though dated, this information underscores the extent to which France employed technology and techniques to ensure tight control over nuclear weapons. Similar approaches could be presumed to govern other French nuclear forces.

In terms of current infrastructure, France's entire SSBN fleet is based in Brest. Its communication center is located in Rosnay. Most of France's C3I systems and equipment are manufactured by Matra Systèmes et Information, an affiliate of the Groupe Aérospatiale Matra.

France has been upgrading its airborne early warning capabilities. The French Navy has ordered 3 Hawkeye E-2C aircraft from the United States. The first two were delivered in 1998 and 1999. The third will be delivered in 2003. No further orders are planned. The French Air Force uses the Boeing E-3F airborne early warning and command system (AWACS).⁹¹

France also has contributed to the CTBT International Monitoring System by setting up 27 international monitoring stations, 11 in cooperation with other countries.⁹² Its *Hélios* intelligence and reconnaissance satellites are also an integral part of French monitoring of nuclear activity.

⁹⁰ US Congress. House (1975) Report of the Subcommittee on International and Scientific Affairs, *Authority to Order the Use of Nuclear Weapons (United States, United Kingdom, France, Soviet Union, People's Republic of China)*. 94th Congress, 1st Session, December 1.

⁹¹ French Ministry of Defense Web sites for Air Force and Navy: <http://www.defense.gouv.fr/air/index.html> and <http://www.defense.gouv.fr/marine/index.html>, July 3, 2001. See also the report #358 of the French Senate, "L'Avenir du Groupe Aéronaval" (The Future of the Naval Airborne Strike Force), appendix to the transcript of the May 25, 2000 Senate session. Internet: <http://www.senat.fr/rap/r99-358/r99-3584.html>, July 9, 2001.

⁹² Federation of American Scientists. Fact Sheet on "French Nuclear Forces - Nuclear Weapons", July, 1998. Internet: <http://www.fas.org/nuke/guide/france/nuke/index.html>, July 4, 2001.

6. Conclusion

France's unswerving commitment to its version of minimum deterrence, the doctrine of proportional deterrence, has provided it with a stable platform upon which to conduct an independent foreign policy. Having eschewed warfighting and other fleeting nuclear doctrines over the years, France no doubt would take some satisfaction in the movement of the United States and Russia toward minimum deterrent postures. Having been served well by this strategy, minimum or proportional deterrence is likely to remain the foundation of France's nuclear posture well into the next two decades.

SECTION FOUR: THE UNITED KINGDOM

1. Nuclear Doctrine

The United Kingdom's nuclear doctrine has changed little since it became a nuclear power in the early 1950s. That doctrine is centered on deterring aggression through the threat of massive nuclear retaliation. In contrast to France, where nuclear weapons are touted as a symbol of national independence and pride, the British have maintained a lower nuclear profile. Close relations with the United States, limited financial resources, and political imperatives have dampened any interest in Britain for more elaborate nuclear doctrines or force postures. While the United Kingdom remains committed to nuclear deterrence, the changes brought about by the collapse of the Soviet Union have enabled it to reduce its nuclear forces to a single weapons system, the Trident SLBM.

A. Massive Retaliation

The United Kingdom's contribution to the US Manhattan Project and its own nuclear test in 1952 marked the country's emergence as a nuclear power. Despite this long history, the strategy underpinning Britain's nuclear posture has not seen much elaboration. Various reasons account for this lack of scrutiny. In large measure, Britain's decision to go nuclear was motivated by political and prestige considerations. To assert itself in the Post-World War II era as an enduring major power, London concluded that it needed to possess nuclear weapons. Speaking in 1958, Prime Minister Harold Macmillan observed that a British nuclear capability:

...gives us a better position in the world, it gives us a better position with the United States. It puts us where we ought to be, in the position of a Great Power. The fact that we have [nuclear weapons] makes the United States pay a greater regard to our point of view, and that is of great importance.⁹³

This view was subsequently expressed as gaining Britain a "seat at the table."

Apart from this political rationale, Britain's defense planners were quick to sense that nuclear weapons had irrevocably altered the strategic landscape. In 1952, Britain's Chiefs of Staff concluded that there was no defense against nuclear weapons other than to deter their use – or aggression more generally – through the threat of massive nuclear retaliation. The Soviet threat of invasion was paramount at the time and the British military and political establishment avidly subscribed to the doctrine of massive retaliation against Soviet political and economic centers as the way to keep peace in Europe.⁹⁴ British strategists never demonstrated much enthusiasm for nuclear doctrines that otherwise diluted the impact of massive retaliation.

⁹³ Quoted in Freedman, Lawrence, *The Evolution of Nuclear Strategy* (London: MacMillan, 1989), 311.

⁹⁴ Ibid., 78-81.

B. The Second Center Concept

Within the framework of massive retaliation, the United Kingdom developed other rationales for maintaining its own nuclear capabilities. Among these was the proposition that a second nuclear power in NATO would complicate Soviet military plans and raise the stakes of aggression. This proposition required Britain to walk a fine line as far as not openly calling into question the American nuclear umbrella over NATO. London finessed the issue by arguing that another nuclear deterrent was needed in Europe in case the *Soviet Union* mistakenly concluded that Washington would not use its nuclear forces unless the United States was attacked directly. As British nuclear strategist Lawrence Freedman notes, this concept never rested on a firm foundation, as it was difficult to imagine scenarios in which Britain would be facing the Soviet Union alone.⁹⁵

C. A "Sub-Strategic" Nuclear Strike Option

While the United Kingdom paid little attention to tactical warfighting doctrines, it did acknowledge in the early 1990s that a non-strategic use of nuclear weapons might be needed under certain circumstances. Speaking in 1993, Defense Minister Malcolm Rifkind said:

It is...important for the credibility of our deterrent that the United Kingdom also possesses the capability to undertake a more limited nuclear strike in order to induce a political decision to halt aggression by delivering an unmistakable message of our willingness to defend our interest to the utmost.⁹⁶

In this regard, British nuclear doctrine echoed that of France, which had long included a "pre-strategic" use of nuclear weapons to warn an aggressor that strategic nuclear use was imminent. The motivation behind the introduction of this sub-strategic role appears to be an effort by the British Ministry of Defense to reserve the right to retaliate with nuclear weapons against a proliferator's use of chemical or biological weapons. Britain's positive assurance not to use nuclear weapons against a non-nuclear weapon state that is a member of the NPT would appear to limit the use of sub-strategic strikes for this purpose:

Britain has repeatedly made it clear that we will not use nuclear weapons against a non-nuclear weapon state not in material breach of its nuclear non-proliferation obligations, unless it attacks us, our Allies or a state to which we have a security commitment, in association or alliance with a nuclear weapon state.⁹⁷

Policy constraints aside, the United Kingdom gave form to this concept by adding sub-strategic roles to its Trident submarines beginning in 1996. It is believed that a Trident submarine assigned to a sub-strategic mission will carry three or four Trident missiles

⁹⁵ Ibid., 311-312.

⁹⁶ Data obtained from the web page of the Scottish Campaign for Nuclear Disarmament (CND): <http://ds.dial.pipex.com/cndscot/wmd/ch5tother.htm>. July 12, 2001.

⁹⁷ U.K. Ministry of Defence. "Deterrence, Arms Control and Proliferation," August 2000. Internet: <http://www.nyu.edu/globalbeat/nuclear/ukdefence0798.html>.

that are equipped with only a single warhead. It is not known if this will be the standard 100 kt warhead carried by the Trident or a lower yield version.⁹⁸

D. The 1998 Strategic Defense Review

Acknowledging the fundamental political changes that accompanied the collapse of the Soviet Union, the United Kingdom undertook a far-reaching strategic defense review in 1998. Highlights from the review are as follows:⁹⁹

- Britain will maintain fewer than 200 operationally available nuclear warheads (a reduction of one third from the previous government's plans);
- Trident submarines on deterrent patrol will carry 48 warheads (this compares with the previous government's ceiling of 96 warheads on each submarine and is the same number as carried on the Polaris submarines when they entered service in the late-1960s); and,
- Britain has no operational need for any more than the 58 Trident missile bodies already delivered or on order.

The Strategic Defense Review also acknowledged that the end of the Cold War made possible the elimination of the following British nuclear capabilities:

- Nuclear Lance missile and artillery roles previously undertaken with US nuclear weapons held under dual-key arrangements;
- Maritime tactical nuclear capabilities, so that Royal Navy surface ships no longer have any capability to carry or deploy nuclear weapons; and,
- All air-launched nuclear weapons.

Consistent with these changes, the readiness levels of Britain's sole remaining nuclear platform, the Trident submarine, were reduced (see below).

At the same time, the Strategic Defense Review called attention to the threat of proliferation and reiterated that, "nuclear deterrence still has an important contribution to make in insuring against the re-emergence of major strategic military threats, in preventing nuclear coercion, and in preserving peace and stability in Europe."¹⁰⁰

2. Nuclear Strategy and Doctrine Formulation

The Strategic Defense Review was also notable for its publicized use of non-governmental experts. Eighteen experts from a diverse range of disciplines contributed to the review (see Table IV-1). Additionally, the Ministry of Defence received over 500 submissions from Members of Parliament, Peers, local authorities, academics, industry,

⁹⁸ Scottish CND, *op cit*. Internet: <http://ds.dial.pipex.com/cndscot/>.

⁹⁹ U.K. Ministry of Defence. "Deterrence, Arms Control and Proliferation," August 2000. Internet: <http://www.nyu.edu/globalbeat/nuclear/ukdefence0798.html>.

¹⁰⁰ Ibid.

interest groups, journalists and members of the public, as well as 100 submissions from Service and civilian personnel.¹⁰¹

Table IV-1: Expert Contributors to the 1998 Strategic Defense Review

Name	Profession
Sir Michael Alexander	UK Ambassador to NATO 1986-92, Chairman of the Royal United Services Institute (RUSI)
Professor Lawrence Freedman	Professor of War Studies, King's College, University of London
Air Marshal Sir Timothy Garden	Former Assistant Chief of the Air Staff, now Director of the Royal Institute of International Affairs (RIIA)
Lord Gladwin of Clee	Former Regional Secretary, General and Municipal Workers Union (GMWU); Member of the Employment Appeals Tribunal
Dr. James Gow	King's College, University of London; Expert Advisor to the Office of the Prosecutor, International Criminal Tribunal for the Former Yugoslavia (1994-97)
Professor Colin Gray	Director of Security Studies, University of Hull; Formerly Director of National Security Studies at the Hudson Institute, New York
Simon Jenkins	Columnist of the Year 1993; Columnist for The Times and the London Evening Standard and formerly editor of both newspapers
Richard Lapthorne	Vice Chairman of British Aerospace plc; member of the Industrial Development Advisory Board
Dr. Patricia Lewis	Formerly Director of the Verification Technology Information Centre (VERTIC); Director of The United Nations Institute for Disarmament Research (UNIDIR)
Admiral of the Fleet Sir Julian Oswald	Chief of the Naval Staff 1989-93; currently Chairman of Aerosystems International
Trevor Phillips	Presenter of London Weekend Television's The London Programme, and weekly Columnist for The Independent
Sir Michael Quinlan	Director of the Ditchley Foundation; formerly Permanent Secretary at the Ministry of Defence 1988-92
John Rose	Chief Executive of Rolls Royce plc
Dr. Alan Rudge	Chairman, WS Atkins plc; Chairman of The Engineering and Physical Sciences Research Council; Chairman of The Engineering Council; and Chairman of ERA Technology Ltd.
Colonel Terence Taylor	Assistant Director of the International Institute of Strategic Studies (IISS); editor of The Military Balance
Field Marshal the Lord Vincent	Chief of the Defence Staff 1991-92; Chairman of the NATO Military Committee 1993-96

3. Nuclear Force Posture

The United Kingdom maintains a credible, albeit very limited, nuclear capability consistent with its minimal deterrent doctrine. Having eliminated its air- and land-based

¹⁰¹ Langhorne, Nicholas. "The Strategic Defence Review," *Newsletter No. 98-04*, Edison House Information Services, July 1998. Internet: <http://www.ehis.navy.mil/nlnews4.htm>.

nuclear weapons, Britain has only one remaining nuclear weapon system – the Trident submarine.¹⁰²

The United Kingdom used to have eight squadrons of dual-capable Tornado GR.1/1A aircraft. However, the Tornado's nuclear role was terminated in 1998 when the last WE177 bombs were removed from service.¹⁰³ This ended 40 years of Royal Air Force nuclear missions.

Britain had four *Resolution* class ballistic missile submarines, known as Polaris after the missiles they carried. The *Resolution* was the first to deploy, from 1968 to 1994, with 61 patrols. The *Revenge* patrolled from 1970 through 1992 after 56 patrols.¹⁰⁴ The *Renown* (completed 52 patrols) and the *Repulse* (completed 60 patrols) were retired in 1999.

The UK's present nuclear posture consists of three Trident submarines – the *Vanguard*, *Victorious*, and *Vigilant*. The *Vanguard* made its initial patrol in December 1994. *Victorious* entered active service in December 1995. The *Vigilant* was deployed in 1998. A fourth submarine, *Vengeance*, is expected to enter service in 2001.¹⁰⁵ The Ministry of Defence has said that only one ballistic missile submarine will patrol at a time, with the other three in various stages of readiness.

Britain's Trident submarines are based at the Clyde Submarine Base, Faslane, in Scotland. Warheads are stored, installed, and removed at Coulport. While Trident missiles can be loaded and unloaded at Coulport, this activity usually takes place at the Kings Bay Submarine Base in the United States.

Each Trident nuclear submarine carries 16 Trident II (D-5) SLBMs. The Trident II is a three-stage, solid-fuel missile with a 6,000 km-range and an accuracy that can be measured in meters.¹⁰⁶ As with Britain's Polaris missiles, its Trident missiles are manufactured and serviced in the United States.

The Trident II can carry up to 8 warheads, each with a yield of 100 kt. The Atomic Weapons Establishment (AWE) at Aldermaston builds the warheads for Britain's Trident missiles. Components for the nuclear weapons are transported to Burghfield and assembled. The warheads are reportedly similar to the US Trident warhead, the W76.¹⁰⁷

¹⁰² U.K. Speech by UK FCO Minister of State, Peter Hain, to the Nuclear Non-Proliferation Treaty Review Conference, "Towards a Nuclear-Free World: The UK and the Nuclear Non-Proliferation Treaty," New York, April 24, 2000. Internet: <http://www.cyberhomepage.com/nu10.html>.

¹⁰³ "NDR Nuclear Notebook: French and British Nuclear Forces", *Bulletin of Atomic Scientists* 56, no. 5 (September/October 2000): 69-71.

¹⁰⁴ Ibid.

¹⁰⁵ Stockholm International Peace Research Institute (SIPRI). "Country Profile for UK 1999 – Nuclear Forces." Internet: http://first.sipri.org/db/irsis_start3.

¹⁰⁶ United Kingdom. Royal Navy. "Trident-II D-5." *Submarines*. 2001. Internet: <http://www.royal-navy.mod.uk/content/177.html>.

¹⁰⁷ Butcher, Martin, Offried Nassauer, and Stephen Young. (1998) *Nuclear Futures III: Western European Options for Nuclear Risk Reduction*. UK American Security Information Council and the Berlin

It is generally believed that the Britain will only produce enough warheads to stock three Trident submarines, as this was common practice with the Polaris boats. Since future projections state that the United Kingdom will have fewer than 200 operationally available warheads and no more than 48 warheads per SSBN, total warheads needed would be approximately 192, if all four SSBNs had the capacity to be fully loaded.¹⁰⁸ However, given the strategic and sub-strategic roles of the SSBNs, each will carry approximately 36-44 warheads while on patrol, meaning the total warheads used would be approximately 160. The UK will probably keep an additional 15% in spares, making the total estimated stockpile 185 warheads.¹⁰⁹ It should be noted that the Strategic Defense Review excludes "missile warheads held as a necessary processing margin or for technical surveillance purposes" from the 200-warhead limit.¹¹⁰ A 1998 source claims that, depending on future plans, 40-115 more warheads will be produced in addition to the 160 to be deployed.¹¹¹

Since the current Labor Government perceives no direct threat to the UK, it originally did not want any Tridents to go on patrol. However, it was decided that one Trident submarine should be patrolling at all times out of concern that the return to a patrolling posture during a crisis could further exacerbate the situation. Defense officials also debated having any nuclear warheads on the Trident submarines. The Ministry of Defense concluded that de-mating warheads would not be in the best interest of the United Kingdom because this could similarly aggravate an existing situation if and when the warheads were moved back aboard the boats.¹¹²

In 1998, the UK government anticipated that the Trident submarine would need to remain operational for up to 30 years.¹¹³ Therefore, the Trident is expected to be operational through 2025. Britain does not presently have any plans on the drawing board to replace the Trident and, politically, it may be several years before London considers a successor system.¹¹⁴

Information-center for Transatlantic Security (BITS). BASIC/BITS Research Report 98.6. Internet: <http://www.basicint.org/nufu3-2.htm>.

¹⁰⁸ Stockholm International Peace Research Institute (SIPRI). *Op cit.* Internet: http://first.sipri.org/db/irsis_start3.

¹⁰⁹ Ibid.

¹¹⁰ Butcher, Martin, Otfried Nassauer, and Stephen Young. *Op cit.*

¹¹¹ Arkin, William, Robert S. Norris, Joshua Handler. "Taking Stock: Worldwide Nuclear Deployments 1998," *Natural Resources Defense Council*, March 1998. Internet: <http://www.nrdc.org/nuclear/tkstock/download.asp>.

¹¹² U.K. Speech by the Secretary of State for Defence, the Right Hon George Robertson MP, Nuclear Disarmament in the Modern World, March 1, 1999. Internet: <http://www.fas.org/sqp/news/mod030199.html>.

¹¹³ U.K. Presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, "Chapter 4- Deterrence and Disarmament", *Strategic Defence Review*, 1998. Internet: <http://sun00781.dn.net/nuke/guide/uk/doctrine/sdr98/chapt04.htm>.

¹¹⁴ Ibid.

4. Nuclear Targeting

The United Kingdom routinely targeted Soviet cities throughout the Cold War. Reportedly, the Chief of Defense Staff developed a list in 1959 of all Soviet cities with a population of over 100,000. From this list, the largest 98 cities in terms of their administrative importance and population were selected as targets for Britain's nuclear bomber force. As Britain phased out its nuclear bombers in favor of SLBMs, the Soviet target list was pared down to 48 cities.¹¹⁵

It has been suggested that in later years, British nuclear targeting was revised again to focus on the Soviet command and control system and to reduce civilian casualties. This led to a focus on Moscow, which became and apparently remains a key criterion in British defense planning. The introduction of anti-ballistic missiles (ABMs) around Moscow in the 1970s threatened Britain's ability to hold this critical target at risk. This prompted Britain to add decoys to its SLBM warheads and adopt other measures under the Chevaline program in order to overwhelm Moscow's ABM defenses.¹¹⁶ Doubtless, a nuclear strike on Moscow's command and control targets would still have produced millions of civilian fatalities.

While Britain maintains independent target lists for its Trident missiles, they are also assigned a second set of targets as part of NATO's nuclear war plans.¹¹⁷

In a 1994 agreement, Russia and Britain agreed to no longer target each other with nuclear weapons.¹¹⁸ Instead, Britain's SLBMs are set to coordinates in the South Atlantic. Nonetheless, coordinates for targets in Russia are still held elsewhere on British submarines, in a computer disk drive connected to the missiles. Officially, Britain's Trident SLBM force has been reduced to a "day-to-day alert status" requiring "several days notice to fire." According to a former US Trident missile technician, however, it takes only 3 minutes to transfer the targeting data from these computers back into the missiles.¹¹⁹

The tactical Trident, which is more commonly referred to as sub-strategic Trident, is defined as "retaining a option for a limited strike that would not automatically lead to a full scale nuclear exchange."¹²⁰ Consistent with the de-targeting of its nuclear forces, the United Kingdom has not elaborated what types of targets would be considered sub-strategic.

¹¹⁵ Data obtained from the web page of the Scottish Campaign for Nuclear Disarmament (CND): <http://ds.dial.pipex.com/cndscot/wmd/ch3targ.htm>. July 12, 2001.

¹¹⁶ Smart, Ian. "British Foreign Policy to 1985", *International Affairs* 53 (1977): 557-71.

¹¹⁷ Ibid.

¹¹⁸ U.K. Speech by the Secretary of State for Defence, the Right Hon George Robertson MP, Nuclear Disarmament in the Modern World, March 1, 1999. Internet: <http://www.fas.org/sqp/news/mod030199.html>.

¹¹⁹ See Scottish CND, *op cit*.

¹²⁰ Butler, Nicola. "Nuclear Disarmament Issues in the UK Parliament: More Questions than Answers," *Disarmament Diplomacy* 38 (June 1999). Internet: <http://www.acronym.org.uk/38ukparl.htm>.

5. Nuclear Command and Control (C2)

The authority to use nuclear weapons resides solely with the Prime Minister. Beyond that principle, the open sources provide little insight into British nuclear command and control arrangements. According to the Scottish Campaign for Nuclear Disarmament, which closely monitors Britain's nuclear facilities, Trident command and control facilities are located primarily at Whitehall and Northwood in London and fall under the auspice of the Ministry of Defence. Related communication and intelligence facilities are located at Criggion, Rugby, St. Mawgans, Crimmond, Edzell, Kyle of Lochalsh, Anthorn, Forrest Moor, and Menwith Hill. Most of these sites have radio masts and transmitters. Trident communications sites for command and control are part of a "network of the Very Low Frequency (VLF) shore-to-submarine communications transmitters."¹²¹

6. Conclusion

For the past half-century, Britain has remained steadfastly committed to the principle of nuclear deterrence. The core of Britain's strategy has been massive retaliation against the adversary's (i.e. Soviet Union's) political and economic centers. With only limited resources, Britain has maintained its nuclear deterrent and even enhanced its survivability, mainly through close and ongoing cooperation with the United States. Despite these close ties, Britain has not been swayed by the various nuclear doctrines emanating from America's think tanks over the years. London continues to espouse a strategy of minimum deterrence. The Strategic Defense Review of 1998 codified the scaling back of Britain's already modest nuclear capability, in recognition of the end of the Cold War. As a result, the United Kingdom's nuclear prowess rests within a single weapons system, the Trident ballistic missile submarine. Official statements suggest that Britain plans to maintain this nuclear posture for at least the next 20 years.

¹²¹"Special Command and Control", Federation of American Scientist, 1998. Internet: <http://www.fas.org/nuke/guide/uk/c3i/>.

SECTION FIVE: INDIA AND PAKISTAN

The nuclear weapons tests carried out by India and Pakistan in 1998 marked a dramatic turning point in South Asian nuclear affairs. Prior to those tests, the two sides pursued a policy of deliberate nuclear ambiguity, acknowledging their ability to produce nuclear weapons but remaining silent as to whether they had actually done so. The doctrinal underpinnings of this posture were characterized by such terms as latent, non-weaponized, or recessed deterrence. In essence, the capability of both countries to fabricate nuclear weapons was seen as adequate for deterrence purposes. It was not necessary for operational nuclear forces to be deployed.

Having crossed the nuclear threshold and openly declared themselves nuclear weapons states, India and Pakistan were immediately subject to harsh international criticism and economic sanctions. Both New Delhi and Islamabad have since tried to reassure the international community that they will be responsible nuclear powers, indeed more so than the United States and the Soviet Union were during the Cold War, for example, by not engaging in a nuclear arms race or adopting nuclear warfighting strategies. The centerpiece of this posture for both countries is their promulgation of a minimum deterrence doctrine.

1. Nuclear Doctrine

India has been considerably more outspoken on the concept of minimum deterrence than Pakistan, though major ambiguities remain. In August 1999, the Indian government took the unusual step of publicly releasing a draft nuclear doctrine.¹²² Highlights from that report are as follows:

- “The fundamental purpose of Indian nuclear weapons is to deter the use or threat of use of nuclear weapons by any State or entity against India and its forces. India will not be the first to initiate a nuclear strike, but will respond with punitive retaliation should deterrence fail.”
- India is pursuing a “doctrine of credible minimum nuclear deterrence. In this policy of ‘retaliation only,’ the survivability of our arsenal is critical. [Credible minimum deterrence] is a dynamic concept related to the strategic environment, technological imperatives and the needs of national security. The actual size components, deployment and employment of nuclear forces will be decided in light of these factors.
- “...any threat of use of nuclear weapons against India shall invoke measures to counter the threat...any nuclear attack on India and its forces shall result in punitive retaliation with nuclear weapons to inflict damage unacceptable to the aggressor.”

¹²² *Draft Report of National Security Advisory Board on Indian Nuclear Doctrine*, August 17, 1999.
Internet: [http://www.indianembassy.org/policy/CTBT/nuclear doctrine aug 17 1999.html](http://www.indianembassy.org/policy/CTBT/nuclear%20doctrine%20aug%2017%201999.html). July 13, 2000.

- “India will not resort to the use or threat of use of nuclear weapons against States which do not possess nuclear weapons, or are not aligned with nuclear weapons powers.”
- “Deterrence requires that India maintain: a) sufficient, survivable and operationally prepared nuclear forces, b) a robust command and control system, c) effective intelligence and early warning capabilities, and d) comprehensive planning and training for operations in line with strategy, and e) the will to employ nuclear forces and weapons.”

While India has long been critical of Western strategic concepts, its draft nuclear doctrine contained the core elements of classic nuclear deterrence theory, such as unacceptable damage, survivability, and the importance of making nuclear threats credible. The draft doctrine also committed India to developing a full triad of air, sea, and ground-based nuclear delivery systems.

Pakistan has yet to issue formally a nuclear doctrine, though one is reported to be under development. Publicly, Pakistan’s military-led government also subscribes to minimum deterrence. In contrast to India, Islamabad has shunned any pledges on the no first-use of nuclear weapons. The reason for this is clear. With limited strategic depth and conventional force inferiority vis-à-vis India, escalation to nuclear weapons may well be Pakistan’s only hope of ensuring national survival in a future war with India.

The absence of a publicly articulated nuclear doctrine in Pakistan has left the field open to speculation, including by the country’s own analytical community. Writing in Pakistan’s *Defense Journal* in March 2000, for example, retired Pakistani Brigadier Saeed Ismat prescribed the following nuclear doctrine for Pakistan:

We should have well defined and declared strategy of using our ultimate choice of nuclear weapons aimed at the destruction of those military forces, which have intruded in our territory. Our aim should be the destruction of the invading military forces only and not his civilian population. We should aim to strike with tactical nuclear weapons at the base of enemy offensive in the proximity of the international border...¹²³

2. Nuclear Strategy and Doctrine Formulation

Nuclear strategy and doctrine formulation, while still in a very early stage in South Asia, is heavily influenced by prevailing patterns of civil-military relations. In India, the nuclear program has always been under tight civilian control. The Indian military has largely been left out of key nuclear decisions, including the decision to conduct nuclear tests in 1974 and 1998. Rather, the key decision-makers have been the prime minister and his or her closest political and scientific advisors. Even the civilian Ministry of Defense bureaucracy has been peripheral to nuclear issues, as it is mainly comprised of non-

¹²³ Ismat, (Ret.) Brig. Saeed, “Strategy for Total Defense: A Conceptual Nuclear Doctrine,” *Defense Journal*, March 2000. Internet: <http://www.defencejournal.com/s000/mar/doctrine.htm>. July 25, 2000.

specialists who typically rotate from ministry to ministry. Hence, the development of nuclear strategy in India is likely to be a top-down, civilian-driven approach. Along these lines, it is notable that the Draft Nuclear Doctrine was formulated not by the armed forces, but a panel of non-government experts attached to the recently formed National Security Council. This advisory board is chaired by K. Subrahmanyam, a long-time advocate of nuclear weapons. Bharat Karnad, another member of the advisory board, was one of the lead drafters of the proposed doctrine.¹²⁴

In Pakistan, this civil-military relationship is inverted. The Pakistani military has been in control of the nuclear weapons program since the late-1970s. While Pakistan has yet to articulate its vision of minimum nuclear deterrence, it has been publicly revealed that a Strategic Plans Division exists within the Pakistani nuclear command apparatus (see below). This division is headed by an Army three-star general and presumably is responsible for the development of nuclear doctrine and targeting.¹²⁵

3. Nuclear Force Postures

Despite their proclamations of nuclear weapons status, neither India nor Pakistan is believed to have fully assembled or deployed nuclear weapons. Yet, both countries are capable of such deployments within a few days to a week.¹²⁶ While India has a larger resource base, nuclear program, and military, its nuclear forces are considered by US officials to be smaller and less capable than those of Pakistan. At present, India is believed to possess only a handful of nuclear weapons. India is capable of delivering them only with fighter-bomber aircraft, although it is developing ballistic missiles for the purpose. In contrast, Pakistan is publicly believed to have tens of nuclear weapons and the ability to deliver them using aircraft or ballistic missiles.¹²⁷

India claims that it successfully tested a thermonuclear device in 1998. This assertion is questioned by a wide segment of non-Indian scientists, based largely on analysis of seismic data. If India's thermonuclear test was a fizzle, New Delhi could have an incentive to conduct further nuclear weapons tests for design validation purposes. As noted above, India intends to develop a triad of nuclear weapons delivery systems. Given the delays in India's nuclear submarine program, it appears willing to explore the deployment of nuclear-armed ballistic missiles on surface ships as an interim step.¹²⁸ Pakistan did not claim to have tested a thermonuclear design in 1998, but asserts it is capable of developing such weapons. Pakistan has no apparent interest in deploying nuclear weapons aboard submarines or other naval vessels. Both India and Pakistan

¹²⁴ Diamond, Howard, "India Releases Nuclear Doctrine, Looks to Emulate P-5 Arsenal," *Arms Control Today*, July/August 1999. Internet: <http://www.armscontrol.org/ACT/julaug99/india99.htm>. July 13, 2000.

¹²⁵ "National Command Authority Established," APP, February 3, 2000. Internet: <http://www.fas.org/news/pakistan/2000/000203-pak-app1.htm>. July 13, 2001.

¹²⁶ U.S. Department of Defense. Office of the Secretary of Defense. (2001) *Proliferation: Threat and Response*. January. Internet: <http://www.defenselink.mil/pubs/ptr20010110.pdf>, June 3, 2001.

¹²⁷ Ibid. See also, Windrem, Robert and Tammy Kuperman, "Pakistan's Nukes Outstrip India's, Official Says," (nd). Internet: <http://www.msnbc.com/news/417106.asp>. June 8, 2000.

¹²⁸ "India: Daily Says Underwater Missile Launcher To Be Tested In September," Foreign Broadcast Information Service (FBIS) Document Number SAP20010528000056, May 28, 2001.

have indicated their willingness to eventually join the CTBT but have taken no concrete steps to do so. Each is restrained only by individually self-imposed moratoria on additional nuclear testing.

4. Nuclear Targeting

As indicated above, little is publicly available on the types of nuclear targeting policies India and Pakistan have considered or may be considering. Commentators generally note that the two sides have not explicitly targeted or attacked population centers in their previous wars with one another. The Indian Draft Nuclear Doctrine does acknowledge that, "An integrated operational plan, or a series of sequential plans, predicated on strategic objectives and a targeting policy shall form part of the [nuclear command and control] system."¹²⁹

5. Nuclear Command and Control (C2)

India's Draft Nuclear Doctrine confirmed what had been believed all along, namely, that "...the authority to release nuclear weapons for use resides in the person of the Prime Minister of India...."¹³⁰ Not much more is known about Indian arrangements for nuclear C2. It is noteworthy, however, that the doctrine also makes mention of unspecified "designated successor(s)" who could authorize nuclear use in the event the prime minister was incapacitated. Because the Indian military has been kept outside the nuclear weapons program, a robust command and control apparatus appears to be lacking. Thus, India's national security adviser, Brajesh Mishra, recently urged the service chiefs to step up their efforts to put better nuclear C2 structures in place, under a project estimated at \$3 billion.¹³¹

Whereas Pakistan lags behind India in publicly articulating a nuclear doctrine, it appears to be further ahead in command and control, having announced its nuclear C2 structure in February 2000. Control over Pakistan's nuclear forces is vested in its National Command Authority (NCA). The NCA, in turn, is composed of two committees, one on nuclear force development, the other on nuclear employment control. The latter committee decides issues associated with readiness and use. Both committees are chaired by the head of the government, presently Gen. Pervez Musharraf, who seized power in a bloodless coup in October, 1999.¹³²

Nuclear use orders would be transmitted from Gen. Musharraf through Pakistan's Joint Chiefs of Staff Committee to the Strategic Commander of Nuclear Forces, a Lieutenant General at Joint Staff Headquarters Operations Center in Rawalpindi. From there, nuclear release orders would be transmitted to the Air Force's nuclear-capable

¹²⁹ *Draft Report of National Security Advisory Board on Indian Nuclear Doctrine, op cit.*

¹³⁰ *Ibid.*

¹³¹ Raghuvanshi, Vivek, "Top Indian Defense Official Urges Better Nuclear Weapon Controls for Military," *Defense News*, June 29, 2001. Internet:

http://www.defensenews.com/pgt.php?htd=i_story_382214.html&tty=topnews.

¹³² "National Command Authority Established," APP, February 3, 2000. Internet: <http://www.fas.org/news/pakistan/2000/000203-pak-app1.htm>. July 13, 2001.

squadrons and the Army's ballistic missiles, now constituted in a Strategic Force Command.¹³³

Both sides are characterized as having politicized intelligence services and poor early warning systems. These shortcomings are seen as decreasing nuclear crisis stability in South Asia.¹³⁴

6. Conclusion

India and Pakistan are the latest emerging case studies in minimal nuclear deterrence. While moving at uneven paces in different areas, each country is beginning to flesh out its interpretation of minimal deterrence, the forces needed to support it, targeting policy, and command and control arrangements. Because the two countries share a common, and actively contested border, have poor intelligence and warning capabilities, and are moving to deploy nuclear-capable missiles, analysts, mainly outside of South Asia, have expressed their concern that minimal deterrence in South Asia may not hold up under the pressure of crisis and conflict.

¹³³ "National Command Authority Established," APP, February 3, 2000. Internet: <http://www.fas.org/news/pakistan/2000/000203-pak-app1.htm>. July 13, 2001. See also, "Pakistan Improves Nuclear Command and Control System," Stratfor, December 7, 2000. Internet: <http://www.stratfor.com/SERVICES/giu2000/120700.asp>. July 13, 2001.

¹³⁴ See, for example, Joeck, Neil, *Maintaining Nuclear Stability in South Asia*, Adelphi Paper 312, International Institute for Strategic Studies, 1997, 32-33.

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