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SLOWING THE GENIE'S SPREAD: REVERSING THE PROLIFERATION OF WEAPONS OF MASS DESTRUCTION

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Abstract

The rise of US conventional aerospace capabilities as displayed in Operation DESERT STORM and in all later conventional combat operations combined with the breakup of the USSR has greatly changed the way the US, our allies and potential adversaries view the value of weapons of mass destruction (WMD). Given the great expense and time required to develop, organize, train and equip conventional forces to counter US aerospace capabilities, potential adversaries will likely view WMD capabilities as a viable alternative. US, allied and international efforts to insure national and alliance strategy, arms control efforts, operational planning and fielded capabilities must adapt from Cold War "mindsets" to counter these potential threats.

This paper identifies the theoretical debate on why states chose to possess WMD capabilities and how they chose to control their use. It reviews US and international efforts to identify, track, deter and control the development and deployment of WMD after the demise of the USSR in 1991. A theoretical model of emerging WMD nations is proposed to assist in shaping counter proliferation policy and capabilities. A discussion of US, allied and international organizations obligations and opportunities for preventing further development and deployment of WMD around the world, countering these capabilities before, during and after combat operations is provided. A number of case studies and a theoretical scenario are presented to define potential alternatives available to deter and counter potential adversaries. A counter WMD "toolkit" of policies and

capabilities, which will provide US, allies and international organizations a potential improved ability to deal with these emerging threats are proposed.

Introduction

At the dawn of the 21st Century, the US now faces what could be called a Superpower Paradox. Our unrivaled supremacy in the conventional military arena is prompting adversaries to seek unconventional, asymmetric means to strike what they perceive as our Achilles heel. At least 25 countries possess—or are in the process of acquiring and developing—capabilities to inflict mass casualties and destruction: nuclear, biological and chemical (WMD) weapons or the means to deliver them. –US Secretary of Defense William S. Cohen, *Proliferation: Threat and Response,* January 2001.[1]

We live today in a world much different from that of just ten years ago. The bipolar superpower confrontation that defined so much of the policy and decision making of every nation died with the Union of Soviet Socialists Republics (USSR) and the world seems to be a much more dangerous place. One clear indication is the spread of nuclear, biological and chemical capabilities far beyond the traditional nuclear powers. In NATO, the US and its allies have all but abandoned the reliance on tactical nuclear weapons once considered their best last line of defense against the numerically superior Warsaw Pact forces of the Cold War. With steadily growing superior quality and quantity of conventional military forces demonstrated in US military combat operations since 1990, US military strategy seems to have all but abandoned any warfighting doctrine that includes the use of nuclear weapons. Operations against Iraq and in the Balkans have shown that US and its allies have a wide array of conventional means to punish an aggressor. Viewed from the receiving end of this military might, various states are looking for alternatives. Having watched NATO spend the Warsaw Pact into oblivion, the members of the "countries of concern" club who still seek to meet perceived threats, limit

foreign influence in their regions, expand their own influence and maintain domestic support for their leadership are reaching for relatively low cost alternatives to conventional military capability. In the wake of NATO's Operation Allied Force, even Russia feels the need to reconsider the use of nuclear weapons to stand as a defense to US conventional arms.

To best determine how to effectively deal with this new world, we need to look at the reasons and motivations behind this new security environment. Current theory and policy making have historically differed in their approach to dealing with emerging security issues. This paper will attempt to use both to begin to find new ways to address the most important defense issue of the 21st century: the growing threat of WMD proliferation. By combining available open source information on theory, policy, history, and WMD proliferation, a model of a modern WMD "player" emerges that is far different than the superpower states of the Cold War. This WMD reliant state model can be used to identify successful policies and capabilities to develop in response. With the model and theory in mind, we will review several brief case studies that highlight international non- and counter-proliferation efforts and the challenges that remain. These case studies lead to a suggested "toolkit" of policies and capabilities that restrain reduce and if necessary defend against WMD.

The group of nations that possess or are developing nuclear weapons continues to grow with several having parallel chemical and biological programs. While biological and chemical weapons pose a significant threat given the relative ease of developing them in comparison to nuclear capabilities, nuclear weapon proliferation remains the greatest threat to regional and global security. By reexamining the available approaches to controlling nuclear proliferation, many of these approaches will have direct application to controlling the spread of other forms of

WMD. The US in cooperation with allies and partners should consider these options as necessary tasks in the new security environment of the 21st century.

The New Balance of Terror: Cold War Theory Adapted to New World

> "Over the long term a policy of deterrence threatens to founder on the fact that too few people are sufficiently rational or wise, with respect to either diplomacy or strategy, to make it work." – Bernard Brodie, *Strategy in the Missile Age*

From the time of the first use of atomic weapons against Japan until the demise of the Soviet Union, an important body of work was built to describe the political, military and economic dynamic of our nuclear world. Deterrence theory greatly assisted western politicians and military leaders alike to understand the complex world of competing ideologies that built vast stockpiles of weapons capable of creating the destruction of entire nations just 30 minutes after initial missile launch. Nuclear winter was avoided only to reveal a more complex dynamic of multiple nuclear powers and other states that desired the commensurate respect and power of having the "bomb." But today, many states are seeking to even the balance of power either in their region or on the global stage with the full range of WMD capabilities. The nations in the Middle East, for example, show the depth of the problem in that region (Figure 1).

	Nuclear	Biological	Chemical
Algeria	Research	Research	Development?
Egypt	Research	Development?	Stockpiled Used in 1963-67
Iran	Development	Development	Deployed Used in 1984-88
Iraq	Weaponization	Stockpiled?	Stockpiled? Used in 1983,1987-88
Israel	Deployed	Production capability	Production capability
Libya	Research	Development?	Deployed Used in 1987
Saudi Arabia	None?	None	None?
Sudan	None	None	None?
Syria	Research	Development?	Deployed
Turkey	Research	None	None
US	Deployed	Terminated	Dismantling
Yemen	None	None	None?

Figure 1. Middle East Region Nations WMD Program Status[2]

While an argument can be made that political leaders have rarely relied on theorists to provide the needed policy answers, this paper will attempt to bridge the gap between theory and practice in dealing with WMD proliferation.[3] Leading political scientist Scott D. Sagan believes the logic for acquiring WMD capabilities and making them ready for use can be best explained from three theoretical frameworks: organizational theory, realism, and strategic culture theory.[4] By understanding and building on the current theory, we can determine how to deal with those states that chose to be neither rational nor wise.

Organizational Theory

If a growing number of states are reaching for WMD capabilities[5], we need attempt to understand the mindset toward how and why the nations that already possess these capabilities would use them. Organizational theory holds that a military's plans and doctrine for the use of WMD capabilities would follow a rational approach, seeking to keep procedures simple to understand and as a result be rapidly adaptable to a world of uncertain threats. Additionally,

according to organizational theory, military officers, like members of any organization, would have parachocial interests that insure they will be "concerned with the security of the state they are employed to protect but also with protecting their own organizational strength, autonomy, and prestige."[6] Sagan points out that these interests are no always in line with the best interests of the state and that as a result of these biases military officers tend to chose offensive minded doctrines. The role and influence of the US Strategic Air Command under the leadership of General Curtis LeMay on US military doctrine, weapon procurement, and operational employment is one possible historical example of this theory. According to Sagan, organizational theory predicts five additional features of military doctrine.

Organizational theory predicts that militaries will: 1) desire preventative wars in an effort to retain their national security; 2) prefer civilian non-interference in operational planning in order to prevent inadvertent escalation; 3) "advocate large-scale preemptive strikes, if adequate warning is available and, at a minimum, the development of launch-on-warning options if technically feasible"; 4) prefer counterforce over countervalue targeting (military forces vs civilian populations targets); and 5) are unlikely to develop secure, second-strike forces without direction from the state's leadership.[7] All of these tendencies are typically countered in states that have a tradition of firm civilian control over the military. However, because the military determines doctrine directly in states with little or not direct civilian control, the state's policy is directly determined by this doctrine. But Sagan points out that even in the US where law and tradition require firm civilian control, the highly complex and technical nature of the military's doctrine and how it translates this doctrine into war plans and operations can be beyond the ability or desire of the civilian authorities to fully review and change. If civilians do get a grasp on the militaries concepts, military officers, according to organizational theory, will "likely exert

subtle or unsubtle pressures to maintain their doctrinal preferences", the most common of which is the argument to maintain a doctrine due to military necessity.[8] If organizational theory were all-inclusive as an explanation for how states will act with WMD, why have states limited their use and in some cases worked to eliminate them altogether? Realism, or the idea that a balancing of one state's power against others is another possible explanation.

Realism

According to Sagan, realism sees states as "the principle actors in international politics and that relative power among states is the critical factor that determines differences in their behavior." Realism assumes states and their leadership are rational, will always act in their own interest especially to protect their security. The only check on a state leadership's desire to act is their current military capabilities vis-à-vis other states. One aspect of this theory is the suggestion that a state with a strong desire to change the current situation to its favor, especially a state that is equal or weaker than its enemies would seek out offensive capabilities such as WMD. It also suggests that a stronger state that sees a developing threat from a weaker one acquiring these weapons will likely seek a preventative strike or war to slow or stop their WMD development.[9] If preventative war or even successful first strikes is placed in doubt by the opposing states military capability, states will seek a secure second-strike capability. While this would seem to raise the possible likelihood of war, realism theorists are not united on this concept.

Some realists point out that a "stability/instability paradox" exists for states that develop and deploy weapons as a counter to another state's capabilities. For example, one state may fear another's conventional superiority and develop WMD as a counter only to risk having the enemy state develop WMD as well. Another problem area for realists is determining how states with

both conventional and WMD capabilities will deal with each other. Will they chose to attack conventionally under the threat of WMD attack? Or will they be deterred from attack themselves due to the risk of WMD retaliation? How does this theory play out with multiple players in a region where some are actively engaged in combat and the potential for additional states being brought into the fight?[10]

The US efforts in the Gulf War to keep Israel from responding to Iraq's Scud attacks can be seen as a state's effort to deal with the complexity of multiple WMD capable states interacting while engaged in combat keeping especially when the coalition allied against one state is politically fragile. Realism's "stability/instability paradox" was successful, Sagan points out, in predicting Soviet behavior in relation to their attempts to threaten nuclear attack in the 1958 and 1961 Berlin crises. US pledges to conventionally defend the city were sufficient to get the Soviets to cease using nuclear threats to achieve their desired goals. But this example is from the bipolar days gone by. How do we deal with the multi-sided problem of regional WMD capable states in their balances of power? What would the US leadership decide to do if, a regional war were to break out between two nuclear capable states like India and Pakistan knowing that China has an interest? Choosing sides as two or more WMD capable states saber rattle will clearly be a more complex decision especially for the US than a decade ago.

Strategic Culture

Organizational theory and realism are not fully sufficient to predict how a state will chose to deal with questions of military doctrine. In a third view, strategic culture theorists believe

> "strategic choice is determined by different cultural influences on decision makers and not by the rational pursuit of similar national security or functional organizational interests. Individual leaders act according to what they believe is appropriate behavior, not according to clear and objective interests shared by all leaders. This cultural perspective finds the roots of military doctrine in historical experiences and resulting myths, religious beliefs, and norms, and it suggests that

> different states in similar strategic conditions (or different organizations in similar conditions) would likely develop different military doctrines."[11]

In the Cold War, the US and Soviet military doctrines were different, according to this theory because American and Soviet decision makers came from different cultures. This theory was found to be incomplete after the fall of the Soviet Union due to lack of their ability to explain why doctrine couldn't have developed as they did as a result of organizational or realist theory. Sagan states that declassified evidence from the Cold War shows both states developed a counterforce targeting doctrine and were prepared to engage in a "prolonged nuclear war, and hoped to limit damage even in the event of a major nuclear exchange."

Recent work on this theory points to domestic politics having the greatest influence on military doctrine and moral norms as having the greatest affect on WMD use decisions of state leaders.[12] Some strategic culture theorists argue that state leaders are really politicians who exercise their control over the military in order to keep domestic support or in some cases to insure against a coup. Some states develop nuclear weapons, strategic culture theory predicts, as an affirmation of national pride, of being an advanced or modern society, or of scientific achievement. Other states due to their experience in WWII will likely always reject any WMD capability such as Japan or Germany. This aversion to unconventional weapons can be on a global basis as seen in recent efforts to eliminate chemical weapons but unless all nations see this as the norm, strategic culture theory would predict a lingering potential for their use.[13]

Any additional nation or group aspiring to possess WMD capabilities would likely have visible behaviors that are explained by parts of each of these three theories.[14] For example, Iraq's behavior in attacking Kuwait in 1990 is not fully explained by organizational theory or realism as much as by strategic culture. Saddam saw Kuwait as traditionally belonging to Iraq, calculated his military advantage over any power in the area and believed he could convince his

Arab neighbors of the righteousness of his act. His development of WMD and missile capabilities can be seen as the act of a realist state to possess a counter balance to Israel's displayed military might and undeclared nuclear capability. A rational act that in this case must be seen from Saddam's point of view regardless of the morality of his other actions. Until his invasion of Kuwait, the UN had little moral authority to sanction a sovereign state from acquiring WMD as Iraq did.

Developments on the Indian sub-continent would suggest that India developed nuclear weapons from a strategic culture point of view at first, and then developed their military doctrine well after achieving a nuclear test. Pakistan's acquisition of nuclear capabilities would best be seen as a mix of realism and strategic culture. Part of the nuclear legacy that cannot be denied is the political power and prestige a state gains on the world stage as a result of having nuclear weapons. This desire to be respected can be strong enough to push states to develop capabilities that they have no intention of using in war but nonetheless must be respected by both neighbors and superpowers alike. Permanent membership in the UN Security Council could be argued rests on nuclear capability. Joining the nuclear club or at least the WMD capable club can override a nation's moral beliefs if recognition is desired or a lack of financial resources required for a large conventional capability drives one's politicians. Once a nation has this awesome capability, how does it deal with it? The demise of the Soviet Union has led many nations to be concerned about the security of both Russia's military nuclear capability as well as the portions of their nuclear industry that might be finding new homes elsewhere in the world.

This fear is heightened when one considers the possibility of violent changes in government of any of the nuclear capable states. It also lies at the heart of the debate over deployment of future missile defense systems. If states develop WMD and seek to combine

these weapons with missile technology, the need for such a defense becomes more likely if either an overt and secure command and control capability for all such states is not in place. Without doubt the installation of the "hotline" between Washington and Moscow combined with the assistance given by the US to the former USSR in the establishment of positive control capabilities reduced the likelihood of an inadvertent launch during the Cold War. Newer nuclear capable states may not have the benefit of these controls raising the risk of improper use. The key area that directly bears on both external and internal abilities to deal with WMD can be found in the command and control system each WMD capable nation develops. Any attempt to reduce and eventually eliminate WMD must first assist a WMD reliant nation in securing their arsenal.

Command and Control: How States Deal With Special Weapons

Before an effective set of capabilities to deal with proliferation can be selected. a good understanding of how new members of the WMD capable "club" deal with these weapons from an internal command and control perspective. For any attempt to control another's use of WMD to be taken without first considering their likely reaction. To gauge these reactions, the best available public information is derived from new research based on the work of the Cold War deterrence theorists. As would be expected. little information exists on the internal workings of various nations command and control of WMD in particular nuclear weapons. Even the US has revealed very little of the exact workings of the nations nuclear forces.

The relatively small amount of research or scholarly writing that has been done on how emerging WMD capable nations intend to control these new capabilities is derived from newly available historical records of early US nuclear planning and deployment. One of the leading theorists in this field, Peter Feaver, has ventured to propose a framework for understanding the

likely command and control of emerging WMD capable nations. He believes that command and control of nuclear weapons has been a central topic in the study of US nuclear policy, but has received "only cursory treatment in most proliferation studies."[15] He cites legendary deterrence theorist Kenneth Waltz as leading the spotlight away from this area due to Waltz's belief that all new nuclear states will find a way to build an effective command and control means to secure their arsenals. Given the record over the six decades, a closer study is required.[16]

Feaver's Command and Control Framework

> "New nuclear nations will face special challenges in developing command and control systems, but these hurdles are not radically different from the ones that confronted US policy makers." Peter Feaver, "Command and Control in Emerging Nuclear Nations," International Security 17 (Winter 1992-93)

Feaver's framework for evaluating emerging nuclear states' command and control systems is based on his understanding of the US nuclear command and control system and suggests two possible methods will be used by new nuclear powers: assertive or delegative. Assertive command and control systems are responsive to a desire to retain decision making at the highest level of the state. Delegative systems allow the decision to employ weapons at a much lower level in the chain of command. The US has used both systems at various times and with different nuclear systems. Whether a new nuclear state chooses one system over another depends on their perception of the threat. To those of us who might be the target of these systems one day, this is not a trivial issue. Assertive command and control systems tend to fail in a way that renders the WMD systems "impotent" or incapable of being used. Delegative command and control systems with the ability respond even if the state leadership is unable to participate in the decision to do so would be more likely to "fail deadly" or be used in an unwarranted way either intentional or unintentional.[17] These two systems represent the dilemma states face with nuclear, and one could argue any WMD, of wanting the weapons to be always

available for use but never used accidentally or for the wrong reason or by the wrong people. States want these special weapons and the system leadership will use to control them to be reliable, safe and secure. Both assertive and delegative systems are designed to deal with a specific threat to the states ability to use the weapons.

Threats to Command and Control: Decapitation and Unwanted Use

Both assertive and delegative nuclear command and control systems face distinct threats to their use in a reliable, safe, and secure manner. To develop a system capable of dealing with all potential threats is extremely expensive and likely beyond the means of all but the wealthiest nations.[18] Decapitation is a "successful first strike that renders the defender's arsenal unusable either because the attack destroys the delivery systems (or the weapons themselves), or because the attack so disrupts command and control that retaliation becomes infeasible."[19] Decapitation or the ultimate leadership attack is the principle threat to the assertive control of nuclear weapons. A state that has no credible threat of decapitation or has a higher concern of loss of central control of the weapons is likely to choose an assertive system. Feaver cites the potential that fear of decapitation

> "could induce both the new proliferator and its regional enemies to adopt attack-on-warning postures. Such 'nuclear hair triggers' would greatly exacerbate regional tensions and raise the specter of an accidental nuclear war sparked by false warnings or miscalculation."[20]

Delegation is the primary method to deal with decapitation. The key threat to delegation is the increased possibility of an accident, theft or unauthorized use. Feaver believes the US system has at various time incorporated features of both systems. Delegative orders were given to the US ballistic missile submarine fleets while tactical nuclear weapons in Europe were fitted with Permissive Action Links (PALs) that typically required use of a code that prevented any unauthorized use.[21]

Effective command and control systems use a combination of hardware (PALs, locks, safeties), procedures that require two people working in agreement, personnel monitoring programs to ensure only the most reliable personnel are involved. and redundant communications networks. All of these measures are designed to assure the command and control system works to the satisfaction of state leadership. While these measures can be expensive, emerging states can adopt relatively inexpensive means to control the weapons once they have decided the type of system they desire. For example, India chose to disperse their weapons in a disassembled state.[22] This clearly prevents accidental or undesired use if no one person or unit can get unauthorized access to all of the parts. India seems to have chosen safety over the inability to rapidly respond to an attack.

Feaver believes that one popular argument given to raise concern that emerging WMD states is invalid. The "Primitive Capability" argument posits that third world despots who fear neither death or nuclear threats possess only low tech sophistication and are unable to solve the necessary command and control problems on their own resulting in a fail deadly system. Critiqued by Waltz and Feaver,

> "nuclear nonproliferation studies….ignore(s) the strong incentives that new proliferators will behave responsibly. Nuclear accidents are sufficiently terrifying to sober all but the most irrational of leaders. Moreover, a proliferator could achieve a nuclear capability only at great cost; it would have every incentive to preserve its valuable new asset."[23]

The Primitive Capacity argument

> "overstates the difficulty of crafting assertive command arrangements; in fact, some of the most assertive measures are decidedly 'low tech,' e.g. refraining from assembling nuclear components into a workable weapon…. not predisposed against assertive control, …none is precluded from developing an assertive command and control system."[24]

Another leading theorist, Lewis Dunn, believes that financially constrained states' desire to get the weapons developed and into their arsenal will override the need to develop expensive and

technically complex safety systems.[25] Feaver provides a more sophisticated way to determine what kind of nuclear command and control system a state is likely to develop.

Feaver believes a key factors approach should be used to determine which way a proliferator will develop his C2 system. Two key factors "the pattern of civil-military relations and the "time-urgency" of the arsenal together influence whether the command system will be assertive or delegative."[26] These factors can be applied to any state regardless of its type of government, structure of military, or characterization of the threat it may face. Civil-military relations of the state should be measured on a scale of stability. Feaver states that since a command and control

> "system is likely to reflect the underlying pattern of civil-military relations. Nuclear weapons are added to an existing power structure and must be wielded by existing actors in the political spectrum. Accordingly, the prevailing pattern of civil-military relations, which sets the broad parameters for the brokering of the power in the state, will influence the nature of the command and control system."[27]

He cites the French experience in 1961 where as a nuclear device was being readied for a test in Algeria, DeGaulle faced down four generals who tried to seize the weapon by ordering the rapid completion of the test.[28] This event shows that even so-called western democracies can be subject to instability normally associated with developing or politically volatile states. His first proposition states: "The more stable the civil-military relations, the more delegative the command and control system; the more volatile the civil-military relations, the more assertive the command and control system."[29] Some have argued that states with autocratic rulers who retain control for a lifetime such as in Cuba, Iraq, and North Korea have through various means achieved a certain stability. But is this kind of stability enough to allow the leader to delegate?

Feaver's second proposition on how a command and control system is likely to be designed deals with threat perception: "(t)he greater the time-urgency, the more likely the

command and control system will be delegative."[30] In other words, a state that is directly threatened and equally importantly sees the threat will more likely place the decision and capability to use its nuclear weapons further down the chain of command, most likely at the field level where the weapons are deployed. The dilemma then for an emerging nuclear state is in determining how best to protect both the capability to use the weapons and the state leadership simultaneously. Secrecy is clearly the standard for them to keep their potential enemies off balance. Feaver states this was exactly the problem the US faced after 1945: "how to design a command and control system that balances the always/never problem and minimizes the twin threats of decapitation and unwanted use."[31]

Ensuring all WMD capable nations have sufficient expertise and reliable systems in place to effectively command and control all aspects of their programs and weapons is highly problematic. An emerging WMD capable nation has sought these capabilities for purely national desires. Any external assistance is likely to be highly limited to provide no more than the desired ends. Given the likelihood of accident or other incident, relying solely on the intellectual capital that a nation has or the direct influences of national leadership to gain WMD systems at any cost places the WMD state, its neighbors, and potentially the world community at grave risk. Long acknowledged as a significant global issue, the international community has attempted to control acquisition of WMD. Several nations, most notably the US, have worked to have the ability to deal with an emerging WMD nation as these efforts fail.

International Efforts to Control Proliferation

Since 1991, arms control efforts have broadened from focusing on the balance of strategic nuclear capabilities and conventional arms reductions of NATO and the former Warsaw pact. As nations are reluctant to relinquish the "right" to possess WMD capabilities,

international efforts to control the spread of these capabilities have sought to divide the problem into specific parts. As a result, seven treaties and regimes have been developed. Each is targeted at only one aspect of WMD proliferation and several have fundamental weaknesses that inhibit them from being successful. The US view of these efforts in relation to "countries of concern" can be seen in the chart below (Figure 2). Nuclear and biological restrictions are more readily accepted than chemical or missile limits.

	NPT	CTBT	NSG/ZC	BWC	CWC	AG	MCTR
China	R	S	-/M	R	R	-	*-
India	-	-	-/-	R	R	-	-
Iran	R	S	-/-	R	R	-	-
Iraq	R	-	-/-	R	-	-	-
Libya	R	-	-/-	R	-	-	-
North Korea	R	-	-/-	R	-	-	-
Pakistan	-	-	-/-	R	R	-	-
Russia	R	R	M/M	R	R	-	M
Sudan	R	-	-/-	-	R	-	-
Syria	R	-	-/-	S	-	-	-

*China has agreed to export restrictions for complete missiles but not to the MTCR technical annex that addresses exports of missile technologies

S=Signed M=Member
R=Ratified

NPT =Nuclear Nonproliferation Treaty
CTBT = Comprehensive Nuclear Test Ban Treaty
NSG = Nuclear Suppliers Group
ZC = Zangger Committee
AG = Australia Group
BWC = Biological and Toxin Weapons Convention
CWC = Chemical Weapons Convention
MTCR =Missile Technology Control Regime

Figure 2. Adherence To International Treaties And Regimes For Countries Of Concern[32]

As each aspect of WMD presents unique challenges to the arms controller, one of the keys to achieving success lies in understanding the efforts required to acquire and sustain them. Nuclear, biological, chemical weapons and their associated delivery systems present different

technical difficulties and financial burdens to the host state. Nuclear weapons represent the greatest challenge to any state that desires to develop a true weapons capability. While popular media have tended to emphasize the apparent ease of gaining the needed information on weapon construction from open sources such as the Internet, having such knowledge like any area of endeavor must be supported by experts and sustained funding. While the spread of nuclear technology has been an international concern for decades, the proliferation of biological and chemical capabilities from the former Soviet Union presented an equally daunting problem.

Research has revealed that prior to 1991, the USSR had "over sixty research institutes brimming with the intellect, skills and weapons materials" that produced

> "an entirely new generation of nerve agents, genetically altered strains of anthrax and plague, and explored disease combinations called chimeras. The Soviets produced thousands of tons of anthrax, smallpox, and plague, not to mention at least 40,000 tons of nerve and blister agents."[33]

Initial efforts to contain this stockpile and gainfully employ over 10,500 key chemical and biological experts have been modest at best. One recent research effort indicated that the vast majority of these individuals have chosen to remain in their home country forsaking potential higher incomes for home and family.[34] Given the potential demand for these capabilities and services "off-the-shelf" combined with the desire by both private organizations and government agencies for hard currency in Russia, additional emphasis is clearly needed.

Since the expertise, equipment, natural resources, support infrastructure and processes needed to test a nuclear device are expensive and carry a greater political responsibility than other forms of WMD, some states have chosen to take a more direct approach toward a full weapons capability than betting on their indigenous efforts. Collaboration vice rugged individualism among proliferating states has been the key

feature of these efforts. North Korea has assisted a number of nations with exports of critical missile technology. China, France, and Russia have assisted various countries nuclear power programs that must be assumed to have direct application to any of these assisted states nuclear weapons programs. When faced with an obvious threat, only direct efforts like the 1994 US accord with North Korea and the UN inspections and destructions in Iraq have brought significant results on the nuclear front.

Beyond the known collaboration on a state-to-state level, trafficking in nuclear material has contributed to great concern among nations of the potential for additional states and even terrorist groups gaining entrance into the nuclear club. One study indicated that 18 known attempts to smuggle nuclear materials through Turkey from countries of the former Soviet Union destined allegedly for several countries including Iran and Libya between 1993 and 1999. No actual confirmation of any of the attempts to have involved highly enriched uranium or plutonium and several were clearly scams. However, more are certainly likely, as the Turkish government has not formally acknowledged any of these incidents. Customs officials do not control many of the trade routes throughout the region.[35]

While progress has been made a great deal of work remains to be done. An equally interesting view of these efforts can be seen in which of these treaties and regimes the US has accepted (Figure 3). While not perfect, the US has attempted to lead in reducing WMD.

NPT	CTBT	NSG/ZC	BWC	CWC	AG	MCTR
R	S	M	S	R	M	M

R=Ratified S=Signed M=Member

Figure 3. US Adherence To International Treaties And Regimes[36]

One entire class of weapons, chemical, is now being completely eliminated from the US arsenal while biological weapons have never been fielded. Other nations are attempting to comply with the CWC but are finding the cost of doing so to be greater than their budgets can allow to meet the timetables called for in the agreement. While the size of the US and Russian nuclear stockpiles has reduced to meet the START agreements, each still possesses several orders of magnitude more weapons than the rest of the nuclear nations combined. Some have argued that US behavior in relation to nuclear treaties and regimes, especially if theater or national missile defenses are deployed, will likely lead to other states deciding to sustain their current capabilities (Russia) or continue their modernization programs (China).[37] Many of these treaties or regimes have weak or no inspection provisions that would serve to bring a state's WMD efforts to light. As with efforts by the United Nations in Iraq to enforce the inspection requirements after the Gulf War, even a good effort can be stopped or slowed by the state being investigated. Ultimately any agreement is only successful if the signatories to are willing to comply. Since states including the nuclear powers are likely to protect their national interests over the promise of a better world, progress toward preventing further proliferation of WMD and missile capabilities will likely be limited.

A Model of a WMD Reliant State

"Rogue states are proving more durable than anticipated. They are likely to increase in number as more societies experience globalization's negative effects. This greater number of rogues will be qualitatively more dangerous as the proliferation of WMD accelerates. The problem is aggravated by declining support from the core Western states for US efforts to isolate rogue states and by increasing political and material support from transitional states."

--- Strategic Assessment 1999, Institute for National Strategic Studies, US National Defense University[38]

To the US point of view, most if not all of the states that are either suspected or known to be pursuing nuclear weapons are also among those states termed as "rogue" states. A rogue state designation was a way to categorize those states that did not follow accepted international norms as defined by the US, other "modern democracies," the UN, or other international bodies. Toward the end of the Clinton administration, the US State Department adopted a new policy that has removed the term "rogue state" from their writings and statements. This move was no doubt an attempt to deal with the new realities of most of these nations.[39] Soon after the Bush administration arrived, the rogue label was reapplied indicating a return to a harder line against WMD proliferation. This move reflects the fact that these nations have records of attempting to develop and field WMD as well as supporting terrorism that may involve use of these weapons (Figure 4).

State Supporters of Terrorism	Nuclear Program	Chemical Program	Biological Program
Cuba	None	None	Confirmed
Iraq	Confirmed	Confirmed	Confirmed
Iran	Confirmed	Confirmed	Confirmed
Libya	Confirmed	Confirmed	Confirmed
North Korea	Confirmed	Confirmed	Confirmed
Sudan	None	Confirmed	Confirmed
Syria	None	Confirmed	Confirmed

Figure 4. State Supporters of Terrorism and WMD Programs[40]

While no one state is identical to another, a number of characteristics common to all of the current and emerging nuclear states can be presented to serve as a model to evaluate the potential success of various efforts to deal with them. A great deal has been written on the role of nuclear weapons in the power of a state and its relationship to other nations. To most nations, nuclear weapons are more of an extension of a nation's political might rather than another capability to be used on the battlefield. However, if a state and its leadership are new to the "nuclear thought process," are faced with a regional threat, and possess limited financial means, development of a any weapon that can have a dramatic and immediate effect on the balance of power on a future battlefield will likely be viewed as a rational choice. Drawing on the theoretical discussion above, states that desire to possess nuclear weapons or that need to address shortfalls in current military capability with that of a potential enemy can be said to have similar characteristics. By defining what these characteristics are, a model that describes the conditions and likely behavior of these states can be proposed.

Characteristics Common to WMD Reliant States

The characteristics are common to those states that have or are attempting to possess a WMD capability can be derived from the political, military, economic and scientific abilities each possess. All of these abilities interact to drive each state to determine their nuclear and other WMD requirements and ultimately capabilities. Each has a distinct impact on how long it will take a state to acquire a nuclear arsenal. Once acquired each drives the deployment, sustainment, command and control and ultimately the decision to use these weapons. While this model is not likely to be seen as new when viewed from a Cold War prospective of measuring the US and the Soviet Union, what is different the need to view these states both status quo nuclear powers and emerging nuclear states on their own terms in a potentially nuclear multipolar world. All forms of WMD are troubling in their own right however the history, policies, and intellectual capital already invested in how to deal with nuclear weapons offers the best baseline for developing an overarching model of a nation that will turn to WMD.

Political Characteristics

The political characteristics that drive a state to possess a nuclear capability are key to the reasoning for the effort. A state's leadership will desire to be influential in regional and international politics. This influence will naturally affect their ability to support their overall political, economic and military goals. This influence can over time lead to legitimacy for their regime both domestically and abroad. Many of the world's nations strive to be a part of one or more "clubs" such as military, economic or political organizations. Membership give a nation a seat in these for a where decisions are made that the hope to influence. No club is more exclusive than the nuclear one. By becoming one of the "big boys," a state can no longer be ignored. North Korea's cyclical nature of crisis "warnings" and overtly belligerent acts is but

one example of a state seeking the international spotlight even if for only assistance with their domestic problems and not major power status. One of the clubs that is directly related to nuclear capability is the UN Security Council, as each of the permanent members possesses nuclear weapons.[41] Obviously other factors have varying impact on each state's influence in world events but the UNSC's increasing influence in the post Soviet world has served to reinforce the connection between national nuclear capability and international political strength.

Political leaders will attempt to be seen as legitimate domestically as well. The ancient warrior-philosopher, Sun Tzu believed that national unity was "an essential requirement of victorious war."[42] In an effort to gain and maintain the support (or at least non-interference) of their people, state leaders will typically define any significant threats in clear terms. This "clear and present danger" will allow the leadership to justify their decisions to acquire capabilities to deal with the threat. Some nations select economic or political means to lessen the threat. States that chose a military route do so often for reasons that are tied to historical justifications or the perception that a stronger enemy would accept any treaty as long as it left open the possibility of attack. For example, India and Pakistan's long period of hostility over Kashmir combined with India's nuclear program likely pressed Pakistan to acquire nuclear weapons. Pakistan no doubt felt that they had no other choice politically. Political situations where national survival or respect are in play are clearly tied to a state's military capability. State leaders must continually determine whether they possess sufficient military strength to support their agenda. If the nation is found lacking in conventional strength, leadership must determine which one of three paths they will take: negotiate, increase conventional strength or seek out weapons that give them a deterrent over their enemies.

Military Characteristics

Determining the defense requirements of a nation is a daunting task for even the wealthiest of nations. One legacy of the Cold War is the vast numbers of military equipment that virtually all of the world's nations came to possess from one or more sides of the conflict. One often quoted example of the impact of arms sales during this period is the relative strength of the Iraqi army that invaded Kuwait, estimated to be the fourth largest in the world in 1990. But this capability was unable to succeed over the US led coalition or the Iranian army it fought for eight years before invading Kuwait. Effective military capability rests on many factors including highly trained and motivated personnel, superior quantity and quality of equipment and supplies, appropriate doctrine, effective and efficient command and control over these forces, good intelligence and appropriate logistics to name a few. How well a state's military can project power, sustain itself during the battle and achieve its objectives are important issues leadership must consider. Each of these issues must be weighed in comparison to the potential threat the military will face. None of these concepts have changed greatly in since ancient times. What has changed is quantity versus quality equation in conventional warfare.

Two lessons have apparently emerged since the demise of the Soviet Union. One is the overwhelming value of modern, state-of-the-art conventional warfare capabilities in particular those possessed by the US in Operation Desert Storm greatly impressed the world of the impact of a modern air attack. Few if any Iraqi military personnel felt safe near a vehicle during combat. The relative speed at which the actual combat was concluded is a testament to the massive expenditures toward the end of the Cold War on US and allied conventional capability. This compression of the time needed to achieve the stated objectives in the battle space place was repeated in Kosovo in 1999. Any state that valued its infrastructure realized from Iraq and

later Serbia's experiences that only a robust, modern air defense, the ability to threaten retaliation or negotiation could hold off modern aerospace power once combat started.

A state can select a military doctrine that fits the circumstances but must equally consider what kind of force is required to make that doctrine work. In the European theater during the Cold War, as the Warsaw Pact was thought to possess an overwhelming amount of conventional capability that NATO could only slow but not stop or repel without resorting to the use of tactical or battlefield nuclear weapons. By succeeding in conventional combat with both Iraq and Serbia, the US and its allies have achieved what the Warsaw Pact might have done. The key to these successes from a balance of force point of view lies in the fact that neither Iraq nor Serbia had the advantage of planning or using tactical nuclear weapons. Iraq may have contemplated use of biological or chemical warheads but chose not to do so.

One can argue the relative success of the political aspects of these conflicts but the evidence clearly points to the need for states to engage in combat that does not involve the US or find new means to negate their conventional superiority. The other message from warfare after the Soviet Union: a state's military should be organized. trained and equipped to fight in such a way as to achieve their leaders objectives and keep the US and its allies out of the war. The Indian Military, for example, decided to take the lesson of relying on nuclear weapons and the Revolution in Military Affairs from Iraq's experience in the Gulf War.[43] The problem then for any state that has a requirement for a robust defense and certainly for any state that contemplates future offensive action lies in deciding what to acquire. With the relative importance and power of the US and its allies as a potential opponent, the options may be quickly determined. Even if the leadership determines the US is not likely to be a part of the combat (as Iraq must have thought in 1990), the presence of any state in one's region possessing nuclear weapons would be

incentive to do so as well. Once a state determines they have the political will and military requirement, the issue of affordability must be considered.

Economic Characteristics

No state can hope to realize any plans for possessing any significant military capability without having sufficient economic resources to commit to the development, acquisition, deployment and sustainment. Nuclear weapons are clearly no exception to this rule. With or without on the level of external assistance in their efforts, a state will likely not attempt to recreate the US Manhattan Project as they travel down the nuclear road. Nuclear weapons and their associated delivery systems are expensive but can be affordable in comparison to the cost of a conventional force. If an emerging state desires to indigenously produce their capabilities, sufficient natural resources must be found and processed. Significant electrical power and specialized industrial capacity must be in place or constructed. As discussed earlier, strict controls for all aspects of the nuclear project must be provided. If a state lacks the capability to develop any part of this effort, they must have the ability to trade for needed resources or expertise.

The key limiter for any state is the overall robustness of the economy. Military procurement would likely follow a domestic economy. As many nations dedicate from 1 percent to 5 percent of their gross domestic product (GDP) to their defense needs per year. Sustaining any military procurement program while the population is neglected can become a source of negative political will toward the state's leaders. Having an economy that is pre-industrial, heavily oil export oriented. driven to support a relatively youthful population or unsustainable due to poor economic policies can drive leadership to seek economic solutions that favor their military efforts. Leadership may chose to dedicate significant economic resources to their

military as a means of generating income through foreign sales which in turn can fund their own development efforts. Many nations do not possess the specialized tooling, mining expertise, or nuclear research information or capacity required to produce nuclear weapons. Trade of conventional weapons, missile technology, and natural resources like oil is another means of support for a nuclear effort.

Scientific Characteristics

Given the highly complex, scientific nature of nuclear weapons research, testing and construction, even a state with the political will, military necessity and the financial resources to acquire a capability may fall short. While the popular belief that all the necessary information to construct a nuclear device is readily accessible may be true, knowledge and actual "hands-on" experience are crucial to any successful endeavor. Even the US program relied on scientists who were not natives. With the demise of the Soviet Union and over five decades of experience in other nuclear states, an emerging nuclear state can and will likely seek to hire the needed assistance. Obviously, some of the nuclear scientific community would likely resist departing their home for employment by another nation where they may not be free to depart once becoming a critical part of a sensitive program. With the amount of active nuclear programs rising in the past decade, one can conclude that for certain efforts sufficient expertise is being acquired. As discussed under economic characteristics, any capable nuclear effort must have sophisticated facilities for the basic and applied science to be conduced. Many of these can be under the auspices of the academic community within the nation, which in turn supports a long-term goal of independence of the program.

The key characteristics of the model emerging nuclear state can be summarized in the chart below (Figure 5).

WMD Reliant State Model

Political Characteristics

- **Stated desire to be respected regionally/internationally**
- **Need for domestic legitimacy**
- **Use of external threat to solidify support for military buildup**
- **Desire to counter balance conventional and/or nuclear/biological/chemical (WMD) threat**
- **Regional or international competitor/enemy**
- **High percent of GDP dedicated to defense**

Military Characteristics

- **Doctrine that indicates willingness to use all available means to defend the state**
- **Imbalance of conventional military capabilities vis-à-vis threats**
- **Lack of sufficient WMD capability**
- **Support of weapon sales**

Economic Characteristics

- **Gross Domestic Product sufficient to support military**
- **Economic conditions that place leadership in a defend nation versus feed people dilemma**
- **Amount of economic growth insufficient to sustain desire to be independent**
- **Foreign assistance required to sustain basic services**
- **Amount and type of trade insufficient to assist all aspects of society/economy**
- **Natural resources to support economy being traded for short term monetary gain**
- **Availability of natural resources for nuclear weapons production**

Scientific Characteristics

Figure 5. WMD Reliant State Model

Sizing Up the Problem: Five Case Studies

To best place in context the available theory for dealing with the new nuclear situation of the post-Soviet world, the following case studies will attempt to assist in determining what efforts to control or if control fails to contain them should be explored by the US and other concerned states.[44] As stated earlier, many of the emerging states are seeking a more economic alternative to matching the conventional capabilities displayed by NATO in their Kosovo air campaign. The current status quo nuclear states are also reviewing their defense needs based the success of conventional airpower as well. The Russians and Chinese were outspoken in their condemnation of the operation for political reasons but their public and private responses to this "overmatch" of conventional capability have tended point to a renew emphasis on nuclear forces. While Russia and China are clearly not emerging nuclear states, the need to assess any change in either nation's stated doctrine and military posture in a new way is clear. Additionally, this paper proposes that concern over several states reliance on WMD and nuclear capability in particular is best focused on understanding the fundamental reasons for this trend. Each current or emerging nuclear state has its own particular circumstances that could and should be studied on its own, the case studies (Russia, China, Iran, Iraq and North Korea) provided in this paper represent the five distinct challenges that are of greatest concern.[45]

Russia: Will Nuclear Modernization Become Their Best Bang for The Ruble?

In a short ten years since the fall of the communist state, Russia has been reduced to a nuclear-armed shadow of the former leader of the Warsaw Pact. Political change has altered how the country operates but the loss of outlying states and resources combined with incomplete transition from state control to a more free market economy has resulted in a dramatic collapse of

Russian military might (see Figure 6). While having been categorized as one of the original nuclear weapon states in the nuclear Non-Proliferation Treaty, the argument that Russia is no longer a superpower gives rise to questions about the role of the remaining nuclear forces as well as other WMD capabilities in political and military thought. Equally concerning is knowledge that technology and expertise of the former Soviet WMD programs may have been sold or exported to those nations that seek them including the "rogue" states. From this new perspective, one can argue that as Russia continues to evolve from the Communist era so will their views of WMD's role in the new state. From a Russian perspective, faced with the inability to afford the force structure that remained from the former Soviet Union, observing two significant demonstrations of US conventional might, and twice going into combat within its borders with less than satisfactory results, military reform including a re-evaluation on the role of nuclear weapons was critically needed.

	USSR	**RF**
Active Military	<4 million	1,159,000
Defense Budget	Equal to US	2 percent of US DOD Budget
GDP	50 percent of US	7 percent of US
Strategic Nuclear Warheads	10,000	5,000
Tactical Nuclear Warheads	30,000	>2,000
Defense Output	100 percent	5-10 percent of USSR

Figure 6. Key Military and Economic Characteristics of the Russian Federation[46]

NATO's 1999 air operations in Serbia were a watershed for Russian political and military leaders. After nearly a decade of inability to find an issue to rally needed support for reform of the military and its doctrine, the NATO intervention provided both the political and military

example to spur change. On 21 April 2000, Vladimir Putin, the Russian Federation (RF) President approved a new Russian Federation Military Doctrine that reassessed the world and stated the new nation's military thought for "a transitional period." The doctrine described this time as "the period of the formation of democratic statehood and a mixed economy, the transformation of the state's military organization, and the dynamic transformation of the system of international relations."[47] Focusing on defining the new set of threats Russia faces and dealing with having only one other state as its partner, Belarus, one key element of the doctrine is the statement that the

> "Russian Federation reserves the right to use nuclear weapons in response to the use of nuclear and other types of weapons of mass destruction against it (or) its allies, as well as in response to large-scale aggression utilizing conventional weapons in situations critical to the national security of the Russian Federation."

This statement of a "first use" policy reinforces the 1993 Doctrine that broke away from decades of stated policy of withholding use of nuclear weapons except in response to a nuclear attack.[48] Going even further the doctrine states Russia

> "…will not use nuclear weapons against states party to the Nonproliferation Treaty that do not possess nuclear weapons except in the event of an attack on the Russian Federation, the Russian Federation Armed Forces or other troops, its allies, or a state to which it has security commitments that is carried out or supported by a state without nuclear weapons jointly or in context of allied commitments with a state with nuclear weapons."[49]

After a dramatic decline in military advantage from the height of the Cold War, the Russia found itself outnumbered and outclassed in both conventional and nuclear forces with the nations of NATO growing (Figure 7).

Superiority	Warsaw Pact Vs NATO	NATO Vs Russia (2000-2010)
Conventional	3:1	2:1 to 3:1
Tactical Nuclear	2:1	>1:1
Strategic Nuclear	1:1	1:1

Figure 7. Numerical Superiority of Forces[50]

Operation Allied Force served to solidify Russian desires to address their loss of geopolitical parity with the west. One key member of the Russian Duma believes that NATO's action

> "…marked the end of the post–Cold War phase of international affairs—a period of world history that Russian President Mikhail Gorbachev had initiated some 10 years earlier. The US–led action in Kosovo also deeply undermined the emerging framework of international security. This new security system was allegedly based on an enhanced role for the United Nations (UN) and the Organization for Security and Cooperation in Europe (OSCE). It assumed strict conformity with the UN Charter; compliance with international law; respect for existing agreements between Russia and the West (especially the NATO–Russia Founding Act of 1997), and a partnership between Russia and NATO, to include joint conflict–management and peacekeeping operations, as well as comprehensive arms control and disarmament regimes. Kosovo reversed these trends." [51]

Following public reaction of "an unprecedented surge of anti–American and anti–Western sentiments," Russia stopped work on completion of several important arms control treaties and initiatives as well as raising questions about the implementation of previously ratified treaties and unilateral decisions including reduction of tactical nuclear weapons and de-targeting of strategic nuclear missiles. Probably the greatest concern is the rebirth of the notion that the main enemy of Russia is once again NATO. [52]

Given the potential for renewed confrontation, a political realist would see this reaction as natural; however, looking to the emerging (or in the case of Russia transforming) nuclear state

model allows a more specific explanation. From a political point of view, much of the Russian political structure has changed by law but the social aspects of Russian society and culture are in many ways unchanged. Russians have a long history of fearing external powers and for good reason. NATO's expansion in recent years serves to add to this fear. Seeking to capture the spirit of western politicians, members of the Russian Duma can readily trade on this fear in an effort to restore Russia to its rightful place in world affairs. Advocates of the strategic culture school would see these actions as in line with their expectations.

Economic circumstances reinforce this shift in Russian political and military policy. The policy to "enhance (Russia's) nuclear forces to deter not just nuclear, but also, large-scale conventional attacks of the type demonstrated in the Balkans" makes economic sense. Considering the impact of the decline of the Russian economy to near collapse since the fall of communism, few options to develop an entirely new and different conventional force exist. With sufficient legacy scientific infrastructure remaining, modernization of Russian nuclear forces would be relatively simple to accomplish from a technology and technical knowledge standpoint and economically appealing.

The single most limiting factor on a nuclear renaissance in Russia would be the various treaties and agreements that remain in place from the Soviet days. Foremost among these agreements would be the Anti-Ballistic Missile (ABM) Treaty, which limits deployment of missile defenses and the follow-on agreements to the Treaty on the Reduction and Limitation of Strategic Offensive Arms (START). The US and Russia including those states that were once a part of the Soviet Union have complied well ahead of schedule and with deeper reductions in terms of missile launchers and heavy bombers than was called for in START I. In terms of ballistic missile and total accountable warheads, both are making adequate progress toward the

December 2001 final limits (set at 4900 and 6000 respectively).[53] Each nation must now confront two issues in regards to their nuclear forces: modernization and sufficiency to deal with threat perceptions of a new era. While treaties are still important to Russia, many of the indicators that the national leaders and their public see may be leading them to decide to rebuild their military might behind a nuclear shield. Reaching out to other nations that may feel the same way may be another way to help them reach their new goal. Any policy that the US or to a lesser extent NATO decides to pursue that is perceived as a threat to Russia will only serve to heighten calls to restore their nuclear forces. The most likely strategic partner in their effort is a former enemy: the People's Republic of China.

China: Continuing the Upward Struggle for Modernization

The People's Republic of China (PRC) has been at work for over 50 years to sustain Mao's revolution and pursue modernization for their nation. With the world's largest population, getting the balance between the needs of the people and the needs of the state has proved difficult. In recent years, the need to modernize their economy through the establishment of economic zones that allow limited free enterprise has forced the political leadership to relinquish a degree of control over the state. The result has not altered the leadership's long-term goal of attaining their desired level of leadership in their region. Modernization of all aspects of society is the method chosen to achieve this goal.

Every national program has required a long-term approach to be successful. Their nuclear program has reflected the realities of their political, military, economic and scientific situation. During the Cold War, China saw an obvious need to pursue a nuclear capability. Unlike the four other major nuclear powers, the PRC strategic nuclear force is limited to just 20 ICBMs and a single SLBM capable submarine. This force has led to their acceptance as an important regional

and international force. However, in the case of China, having a nuclear force in being and a large military does not translate to "sufficient national strength to permanently change the regional security equation."[54] With a cultural heritage of taking an extremely long-term approach to any problem, a similar method in determining policy that deals with China is required.

The evidence seems to indicate that China has evolved from her early Communist dominated state to one in which the power of the political leadership has weakened in relation to the economic engine. A recent RAND study concluded that the economic reforms instituted by Deng Xiaoping in the late 1970s combined with a more comfortable view of potential external threats has allowed China to develop a

> "security policy that could focus on the long-overdue modernization of Chinese agriculture, industry, and science and technology. This focus enabled Beijing to lay the foundations for acquiring comprehensive national strength as opposed to embarking on a "quick and dirty" program of accelerated military modernization which, however much of it increased China's coercive power in the short run, would eventually undercut its ability to become a true great power and reestablish the geopolitical centrality and respect it believes to be its due."[55]

This strategy known as "calculative" has three key features according to RAND. The features are:

> "First, overall, a highly pragmatic, non-ideological policy approach keyed to market-led economic growth and the maintenance of amicable international political relations with all states, and especially with the major powers. Second, a general restraint in the use of force, whether toward the periphery or against other more distant powers, combined with efforts to modernize and streamline the Chinese military, albeit at a relatively modest pace. Third, an expanded involvement in regional and global interstate politics and various international, multilateral for a, with an emphasis, through such interactions, on attaining asymmetric gains whenever possible."[56]

As the political leadership, which in China's case includes military leaders, views the strategy in terms of objectives in the near term defined as the next 15 years, they will seek to minimize vulnerabilities while developing military capabilities to give them the ability to have greater impact on political and diplomatic issues. Experts place the size of the Chinese nuclear inventory

at 450 warheads that support the ICBM, SLBM and tactical forces. This is an equivalent size force to France and the United Kingdom forces. Sufficient to serve as a deterrent to any of the major nuclear powers, the Chinese are working to modernize this force not so much in terms of numbers as in capabilities that reduce vulnerability of the force to preemptive strikes.

According to RAND, the Chinese nuclear modernization effort includes development of three "new land-based, solid-fueled, road-mobile missiles," new warheads that are smaller allowing better "targeting flexibility and launcher mobility," a new SLBM, a small fleet of SLBM capable submarines and a new bomber. RAND acknowledges an additional possible explanation for the relatively slow pace of Chinese acquisition efforts beyond increased survivability to nuclear attack. According to RAND,

> "Beijing has recently decided to enhance significantly its theater nuclear weapons capability as its only effective means of deterring the threat or use by the US of highly effective long-range precision-guided, and stealthy conventional weaponry."[57]

China seems to have drawn similar lessons from NATO's Kosovo campaign to those Russia has.

China's strategy including modernization of their nuclear capability is clearly dependent on the health and sustainment of the nation's economy. The paradox that the US has faced in developing an effective policy has been in balancing the need to control the level of Chinese military spending especially on nuclear and missile capabilities that can and in the case of missiles have been exported with the concept that free trade and prosperity will likely bring about a more democratic society. With Chinese acceptance of the MCTR in principle, if not in fact, indicates a willingness on Beijing's part to forsake some weapons exports for increased trade overall. When this situation is combined with the fact that of all of the defense budgets in the Asia-Pacific region only China's is increasing, if their economy remains strong, they may be

able to field forces equivalent in sophistication to that of the US in the 1990s closing the gap between them and other forces in the region.

When considering their scientific ability, the history China's nuclear weapon development is one of initial assistance for a short time followed by slow but steady indigenous progress. After the total withdrawal of Soviet assistance in 1960,

> "China still detonated its first fission weapon in October 1964, only eight years after beginning construction of its first research reactor. Perhaps even more impressively, China's first thermonuclear test took place just two-and-a-half years later, in June 1967. And, unlike the first US hydrogen bomb, the Chinese device was not the size of a railroad tank car; it was an air-dropped bomb."[58]

China also has shown significant successful capabilities in ballistic missile, cruise missile and surface-to-air missile technology development and deployment. One of the world's space faring nations, China is seeking to exploit both commercial and military uses of space. Their success has not been as evident in other strategic systems with difficulties found in submarine and aircraft power plants but several projects have been able to go forward with the use of foreign designs.[59] Having possessed a nuclear capability for almost 40 years, China reflects a nuclear state that continues to develop its capability to serve the state's needs. Key questions of how these weapons play in their emerging grand strategy remain to be answered include: the Taiwan issue, any US missile defense development and deployment, and regional nuclear powers including Russia, India and Pakistan. Any agreements from trade to controlling arms trade must consider these issues.

While the size of China's nuclear arsenal is several orders of magnitude smaller that those of the US and Russia, the very fact that this credible deterrent force exists gives China reason to request seating at any table where their interests are discussed. China clearly falls into the second tier of nuclear nations but has a record of seeking partnerships that are to her advantage by offering other nations Chinese technology that would be useful to an emerging

nuclear nation. This fact remains key to any attempt to seriously deal with proliferation of WMD globally. SW Asia is one region where China has been active in assistance in the last ten years and is home to two enemies who each are seeking nuclear status: Iraq and Iran.

SW Asia's Slow but Steady Proliferation

The Iran/Iraq war of 1980-89 caused a great deal of death and destruction on both participants and was arguably the most significant use of ballistic missiles and chemical attacks since the end of WWII. Population centers were attacked with short and medium range missiles. Battlefield formations were attacked with chemical weapons. Each nation already had an on-going nuclear research program ostensibly to enable a defensive capability but also allowing the potential for offensive use. The emerging nuclear programs in the region have been a source of conflict and remained high on the target lists when combat ensued.

Both Iraq and Iran suffered attacks on their primary reactor facilities during the 1980's. Iraq's reactor at Osirak was hit by Israel in a daring air strike in 1981. Iraq attacked Iran's nuclear facilities at various times in their war.[60] The UN Coalition in Operation Desert Storm made a concerted effort to locate and negate Iraq's various WMD programs and followed up on these military efforts with a pervasive inspection program after the war. Having successfully ejected the UN Inspections in 1998, Iraq has been free to pursue Saddam's WMD ambitions with only the UN embargo slowing the effort. Iran has relied on various nations as well as indigenous efforts to work toward a basic nuclear capability. Both Iraq and Iran have some fundamental differences in national leadership, economics, and demographics but each can be favorably compared to the emerging nuclear nation model. Understanding why these enemies have continued their efforts goes beyond a simple case of counterbalancing the other's capabilities.

Iraq: Following Through on Saddam's Vision

Despite ten years of dealing with the dual problems of repairing their war damaged infrastructure and surviving an extensive UN sanctioned embargo, Saddam Hussein's Iraq continues to work for the goal of regional power. As was the situation before the "second" gulf war, clear insights into the operation of Iraq's national leadership, the impact of political, economic, military and social decisions, as well as solid information on the WMD programs are difficult to obtain. Several defections of senior Iraqi leaders along with continuing access to Iraq by both the press and various international groups can be used to develop a limited but useful view of Iraq.

Politically, little has changed in Iraq since Saddam Hussein took power over three decades ago. Saddam is the central leader of the nation with all Iraqi policy either determined by him or his inner circle. He has reinforced his desire to control all aspects of Iraqi life with elimination of even close advisors who do not carry out his decisions. His vision is one of Iraq being the leader of the Arab world both politically and socially. Saddam has successfully balanced military rule of the domestic population with identifying himself as the champion of the Iraqi people. He has used external threats as a target of any negative feeling the Iraqi population might manifest. His efforts have remained successful despite the loss of two significant military campaigns. No organized opposition has been able to mount any significant challenge to his rule. Given the extent of Iraq's programs to develop and field chemical and missile capabilities as well as significant progress on nuclear and biological warfare efforts, Saddam has clearly decided the possession of these arms is central to his power. Estimates place Iraqi expenditures on defense at 7.3 percent of their $52.3 billion GDP, one of the highest percentages in the world, which sustains an active force of 429,000.[61]

Iraq's military doctrine has long been a mix of legacy traditions but now has likely adapted to allow for the losses experienced in both gulf wars. Even if one accepts that Iraq's military is conventionally a shadow of the force that invaded Kuwait, Saddam most likely has adopted the view that conventional forces are less likely to be useful for his defense problem. Given that one enemy of Saddam's pan-Arab leadership desires likely has a significant nuclear capability to back up the region's most capable air force, Israel provides Iraq with a continuing target of domestic angst as well as a justification to develop weapons capable of either offensive use or at a minimum providing a deterrent. As Israel is not likely to forget Iraqi missile attacks from 1991, by continuing to develop missile systems capable of carrying any of the WMD trio, Iraq achieves the potential military might to back up their political rhetoric. This desire is obviously reinforced by the likelihood that the world's fourth largest army before 1991 no longer possesses the strength it had even at the end of the Iran-Iraq war in 1989. This conventional imbalance vis-à-vis Iran provides further reinforcement for the strategic requirement that any Iraqi WMD programs fulfill.

Given a choice between feeding his nation beyond subsistence and retaining his position of power, Saddam would rationally if not morally chose to dedicate sufficient or even excessive financial resources to his military and in particular those systems that defend the nation and his leadership. As the chief architect of all aspects of Iraqi life, Saddam has been successful in receiving assistance from the UN approved "Food for Oil" program, increasing international relief efforts and continuing UN sanctions busting imports/exports across the vast frontiers of Iraq.[62] While the national economy is not strong, Iraq does possess significant oil reserves that the world is not likely to ignore as energy needs continue to grow.[63]

While the quality of indigenous scientific infrastructure and trained scientists and technicians may be suspect, results from the earlier UN inspections show a respectable level of capability.[64] If one understands extensive and diverse amount of facilities UNSCOM did find, Iraq will likely use their ability to export oil overtly or covertly to fund reconstitution of a useable strategic WMD capability. Key to understanding Iraq's desire is the knowledge that Iraq was a member in good standing with the Nuclear Non-proliferation Treaty (NPT) organization. Interestingly, the US assumes that Iraq's neighbor Iran to be on a similar path.[65] Whether this would include a workable nuclear component is likely a matter not of "if" but of "when." Iraq will likely have hidden sufficient technical data and would be actively seeking assistance for any favorable source to rebuild their WMD programs. Without adequate inspections and international controls, Saddam would logically be expected to succeed in reviving his strategic reach and fist.

Iran: The Difficult Pursuit of Ancient Ideology and Modern Technology

Iran like Iraq has a number of logical reasons for developing and deploying a range of WMD options including a continuing effort to achieve a nuclear deterrent. First, Iran continues to be a direct challenge to Saddam's desire to lead the region. This has been a constant reinforced by the Iran-Iraq war of 1980-1988 and subsequent border skirmishes between the two foes. The other main reasons for developing their unconventional weapons lie in the constant desire to remove the US military forces from the region and a stated desire to eliminate Israel. While the target may be in question, Iran like other emerging nuclear states sees the great value in attaining a credible nuclear force.[66]

Iran's pursuit of nuclear weapons dates back to before the fall of the Shah in 1979. While the Islamic Revolution consumed a great deal of the Shah's legacy, the Iranian nuclear program

has continued with some progress toward having an actual nuclear capability. Most sources predict Iran to be anywhere from five to fifteen years from reaching that goal. To achieve nuclear capable status, Iran will continue their long tradition of attempting to gain foreign assistance. Following the UN discoveries in Iraq after Desert Storm, international export restrictions in response have hindered Iran's efforts. However, the record of Iran's use of the military to defend the nation is one of using all means available.

Largely in response to Iraqi use of chemical, nerve agent and conventionally armed unguided and ballistic missiles during the 1980-88 Iran-Iraq War, Iran allegedly responded in kind first using Iraqi weapons and later employing indigenous chemical warfare weapons against Iraqi troops. These attacks were carried out despite public pronouncements from Iranian leaders that they would not do so. Conventionally armed missile and air attacks on military targets, civilian populations and nuclear power facilities occurred on both sides of the war. As neither side possessed a nuclear weapon during this war, one can only speculate if either would have used such a device. In Iran's case, use of weapons of mass destruction seems to be selected only in retaliation for use of similar capabilities by Iraq.[67] Given the willingness of either side to employ any means to achieve their objectives combined with the more recent experience of Iraqi missile attacks during the second Gulf War, serious attempts to control proliferation beyond the current capable nations seem best focused in this region.

Politically, Iran has begun to slowly evolve beyond the hard-line, fundamentalist controlled regime that went to war with Iraq over 20 years ago. The election of President Mohammad Khatami, a moderate Shiite Muslim cleric in May 1997 with 70 percent of the popular vote, was followed by continuing electoral success of moderates in subsequent years. Despite frequent clashes between moderates and hardliners following these elections, in March

2000, the US acknowledged the favorable moderate trend by removing some trade sanctions imposed earlier.[68] Both Iraq and Iran have had a population rapid growth since 1980 with each having over 40 percent of their population less than 15 years of age.[69] As Iran gives the public more voice in political affairs and the access to external sources of culture and information, leadership will be increasingly sensitive to this part of the population to retain their legitimacy. Sufficient memory of Iraqi aggression and US support of the Shah of more than 20 years ago exists. However, keeping the population focused on vilifying these potential threats may be increasingly difficult in the face the potential growth of their young people's desire to open up to the world. To meet their defense needs, Iran currently spends 2.9 percent of their $347.6 billion GDP to sustain an active military of 540,000 troops.[70] As Iran continues to look for support to remain strong in the region, the Revolutionary Council has turned to Russia and China for assistance.

Militarily, Iran continues to rely on ground forces with a mixture of indigenous and foreign technology for defense. A great deal of the expertise and leadership that existed before the revolution in the Imperial Iranian forces has been replaced over time in the Islamic Revolutionary forces but overall capability is assessed as no better than that available at the start of the Iran-Iraq War. Their doctrine is believed to be focused on defense of the Iranian population centers and oil fields in the Gulf region while having sufficient internal security forces to deal with externally funded opposition groups that have mounted attacks on Iranian institutions.[71] Given the memory of the "mother's revolt" that occurred during the Iran-Iraq war, the current Iranian leadership would not easily commit to a potential protracted conflict that exposes the nation's youth again. The other major influence on Iranian military doctrine and planning has to be the outcome of 1991 Gulf War. Seeing one of the world's largest armies and

their enemy destroyed must have given Iranian leaders very mixed emotions. No doubt they saw both the power of the US-led coalition's conventional capabilities and Iraq's use of missiles as a political weapon. This front row seat to modern war surely reinforced the requirement for capabilities beyond the traditional forces Iran had in the past. As a result of these two wars, Iranian military doctrine and planning most likely would now are the need for modern defenses to negate a conventional attack and the requirement for a sufficient strategic deterrent. While not addressing the need for counter-terrorism to combat insurgent groups, nuclear weapons to complement their chemical and missile programs would serve both ends.

In order to fulfill their defense needs, Iran has had an active program to import military capabilities in trade for their oil. Russia, North Korea and China have been among the leading partners in these efforts. The famous 1996 saga of US attempts to track a ship carrying a cargo of North Korean missiles to Iran is indicative of Iranian desires and the difficulty of attempting to limit such trades.[72] While not a significant portion of their economy, trade for military capabilities allows Iran access to both hardware and expertise they have been unable to grow at home.

Despite US led efforts to restrict foreign companies from investing in Iran as a curb on suspected support for terrorism, oil revenues continue to power the growing economy. Iran remains one of the world's leading exporters of oil and currently has almost 30 percent of their exports split evenly between their two leading partners: Japan and the US.[73] This situation is a two edged sword giving all partners a means to influence the other. As long as the two wealthiest nations continue to provide support to Iran's economy, direct pressure to limit Teheran's efforts to gain nuclear status will be muted.

Iran has a number of important scientific capabilities to support their nuclear goals but these are insufficient to allow success for the foreseeable future without significant external assistance. According to one expert, Iran has pursued the two main avenues to a nuclear weapon: production plutonium and highly enriched uranium. Iran continues to lack specific technical expertise to make either effort succeed. Russia and China are their most likely sources for the needed help. If Iraq had a program of some 10,000 scientists, it is reasonable to believe that Iran could have an even larger effort. Both nations may be reconsidering the wisdom of doing so.[74]

One recent paper suggests that Iran is continuing to develop a nuclear capability first and will likely consider development of a coherent nuclear deterrent strategy later. Winning the 1996 US Chairman of the Joint Chiefs of Staff Strategy Essay Competition, Lt Col Frederick R. Strain believes that Iran is following a rational approach to decision making both in overall policy making and toward nuclear weapons development. He indicates their eventual strategy is likely to adopt counter value targeting of US led coalition states in the region, placing their emphasis on survivable, mobile long-range ballistic missiles. Strain sees this as fitting in well with traditional arms control efforts of the US and other nations should Iran achieve its nuclear goal.[75]

North Korea: Willing to Fight to the End for One Korea?

Creating an impossible situation, the leadership of the world's most inaccessible nation is nearly a perfect fit for the WMD reliant model described earlier. North Korea (DPRK) is probably the easiest to describe and understand of the WMD reliant states and at the same time the most difficult to resolve. North Korea's situation has been best described by Stephen Bradner, the Special Advisor to the Commander in Chief of the UN Command in Korea:

> "Internationally unpopular, with a broken infrastructure, a nutritionally deprived population, a stunted younger generation, and no evident means of economic regeneration, North Korea, a half century after its foundation, exhibits an unprecedented condition for a modern, industrialized society with expanding weapons of mass destruction (WMD) and long-range missile capabilities."[76]

Expressing his personal opinion in a speech to a recent conference on developing trends in international security, Bradner stated that North Korea is poorly understood but clearly has little options but to continue its efforts to sustain the current Sung "family regime" at all costs. Their ultimate goal is the reunification of Korea under the North's rule. The key to their strategy is to seek the withdrawal of the UN and particularly US forces from the peninsula. The key misunderstanding policymakers make according to Bradner is the fact that the North sees no alternative to their goal. Any concession to allowing an opening up of their society to correct the economic situation would lead to their losing control of the information their population receives. This control is necessary to perpetuate the entire myth of the legitimacy and "divine" right to rule of the leadership. Bradner believes all facets of the North's society revolve around this fact. If true, then the ability to slowly change the DPRK regime or the possibility for a gradual reunification or merging of the two governments is unlikely.[77] While this view does not seem to allow for a great deal of reason to change the status quo in Korea, the US, Japan and the Koreas have attempted to limit the extent of the North's nuclear program with the 1994 Agreed Framework.

The 1994 Agreed Framework signed by the US and North Korea marked a significant step toward placing the Korean Peninsula in a nuclear-free state.[78] At the core of the agreement were the shutdown of three nuclear reactors that were used for the production of weapons grade plutonium while replacing these reactors with light water reactors (LWRs) that will produce much needed electricity for the North's economy by 2003. Despite concerns for the success of

the project given the mercurial political landscape surrounding it, the executive director of the Korean Peninsula Energy Development Organization (KEDO), which is building the new power plants, stated that as of March 2001, "we have not lost a day on the critical path" to completion.[79] Additional parts of the agreement included providing DPRK with 500,000 tons of heavy oil for electricity production until the reactors come on line, continuing IAEA monitoring of DPRK nuclear sites, initiatives to improve trade and lead to normalization of relations between the DPRK and the US, as well as jointly work together for peace and security on the peninsula and for strengthening the international nuclear non proliferation regime.[80] While the DPRK motives behind this effort may be suspect, any effort to restrain and control nuclear weapons in this way is an important achievement.

In comparison to the WMD reliant state model, North Korea is clearly a good fit. Politically, the DPRK leadership has stated their desire to be respected both regionally and internationally. The ability to be seen both internally and externally as important, which the Agreed Framework has done, directly strengthens the hold on leadership of Kim Jong Il.[81] The North has consistently used the military situation on the peninsula as a justification for having one of the largest militaries in the world and has sought all means to achieve the ability to overwhelm the defenses of the South if a war broke out. While obviously not the strongest military power in the region, the DPRK leadership continues to divert an incredible 25% to 33% of their GDP to field a one million-man force.[82]

The DPRK military is solely devoted to being capable of invading across the DMZ and securing the peninsula. Whether or not WMD would be needed can be debated but possession of sizeable chemical and biological weapons in combination with delivery by artillery, aircraft and missile both on the peninsula and potentially beyond dramatically complicates the defense

planning of the US and South Korea. Possession of nuclear weapons would likely further limit defensive options.[83] The long pursuit of nuclear arms that the 1994 Agreed Framework sought to stop is still believed to be in progress hidden somewhere below ground in the DPRK.[84]

North Korea's economic state has made repeated worldwide headlines in the past decade. With seemingly little means of indigenous support, the continued reliance on failed economic ideas of the communist era can explain why the DPRK has resorted to barter of requesting low or no interest loans for aid with mixed success. Basic services are well below that of any industrial state given the amount of expenditures dedicated to defense. Natural resources are scarce to non-existent especially in the energy sector, which led the DPRK to first seek assistance from the Former Soviet Union (FSU) to build a nuclear reactor and later divert it to produce nuclear material for weapons. Despite this seemingly impossible situation, South Korea believes the north has stockpiled sufficient weapons, fuel and food supplies to sustain a four month assault.

From a scientific perspective, all of the available infrastructure and expertise within the DPRK was derived from assistance programs in the FSU and the PRC. DPRK officials have been actively seeking to renew Russian assistance to rebuild many of their facilities that were constructed in the 1950's and 60's. This effort does not seem likely to bear fruit as long as the new Russian economy and its businesses continue to develop as a free market economy.[85]

Other States Can be Evaluated As Well

Several countries that have or are likely pursuing nuclear weapons programs can be measured against this emerging nuclear nation model. India and Pakistan have exploded nuclear devices, developed missile systems and are believed to have a growing number of weapons. Each has declared themselves to be nuclear powers. Their political, economic, military and scientific capabilities will likely continue to align for the foreseeable future to support their

efforts with the primary motivation being each other's program. Libya, while a member in good standing of the NPT according to the IAEA, has long desired acquisition of the needed infrastructure for a nuclear weapons program.[86] Only a lack of foreign support has stopped their desires from being fulfilled. The model does not require all of the elements to be fulfilled. as, for example, in the political dimension, several of the emerging nuclear powers have a democratic form of government. By placing all potential emerging nuclear nations in the "rogue" category, policy makers would be limited in how to deal with all of these nations. Key to the model is its potential use to identify the motivation behind those nations that would be likely to attempt to acquire nuclear weapons. The next step is to develop existing or new diplomatic means, economic options and as needed military capabilities to stem additional proliferation and reduce or if possible eliminate where possible existing nuclear programs. There can be no single approach to success but many existing means will need to be adapted and new programs considered to deal effectively with nuclear proliferation. Policy and theory can be used together to achieve success.

Nonproliferation and Counter-proliferation: Efforts, Capabilities, Shortfalls and Successes

For several decades, a great deal of effort to control the spread of weapons of mass destruction has yielded an international non-proliferation regime. The purpose of these efforts is to check the spread of nuclear, chemical and biological weapons with the ultimate goal of elimination of all WMD capabilities. Consisting of interlocking agreements, verification tools and controls on production of WMD, the non-proliferation regime has seen both success and failure. After pursuing various WMD programs for national interests, Brazil, South Africa, and

Argentina have been persuaded by these agreements and the associated international pressure to eliminate their respective programs.

Other nations have rejected these agreements either in part or total lessening the opportunities to make further progress. Some nations have for various reasons either openly or clandestinely developed, tested, deployed and, as in the case of Iraq and Iran, used their WMD. The case of Iraq is without doubt the best known example of a nation doing all it could to gain a full compliment of WMD, prepare, deploy and employ them in combat while maintaining a public position of the opposite.[87] Their example is not likely unique. Most experts agree that only with the full and continuing support of the five nuclear weapon states (US, UK, France, Russia and China) named in the NPT (known as P-5) will other nations curb and eventually eliminate their WMD programs. While only limited success has been made, with continuing verification efforts and a willingness of the nation being inspected to fully comply with the spirit and intent of the various agreements, actual WMD disarmament can occur. Even the P-5 would eventually have to submit for the goal of WMD disarmament to be reached. As long as any of these nations see a potential or actual threat that can be deterred by the possession of nuclear or other WMD, reductions will be difficult to achieve. Some experts have even begun to see the continuing utility of nuclear weapons as a deterrent not only to similar weapons but also the use of chemical and biological weapons citing Iraq's restraint from using chemical or biological warheads on their SCUDs in the Gulf War of 1991.[88]

Would the US have used nuclear weapons to retaliate on Iraq? Fortunately, the question was not answered at the time. The problem still lies in the age-old issue of national interest being held up as superior to world security. With the addition of both declared and undeclared nuclear states since the NPT was signed, the calculus for continuing disarmament under the

original "rules" becomes increasingly complicated. Reviewing the status of three of the major arms control efforts (START, NPT, and CWC) can give a better view of some of the needed work to further non-proliferation while suggesting counter-proliferation capabilities that are required for responding if necessary to actual WMD threats or attacks.

Stalled START: Moving Down to Everybody Else's Level?

The on-going effort to reduce the two largest strategic nuclear inventories now embodied in the START treaties has achieved great progress since the height of the Cold War. The US has reduced their deployed strategic nuclear warheads from 10,563 in September 1990 to 7,519 in July 2000 in compliance with START I protocols. Russia has made similar strides a reduction from 10,271 to 6,464 warheads in the same period. The 1997 Helsinki summit saw both nations agree to pursue further reductions in line with START III levels of 2,000-2,500 deployed strategic warheads. Whether or not this will be reached is in question, as the Russian government has proposed further reductions to 1,500 warheads, which the US has not accepted. Seeing a different world after the Cold War, the other major nuclear states whose strategic warhead inventories are well below even the Russian Proposal, China (about 300 strategic warheads), France (less than 500), and the United Kingdom (less than 200) continue to re-evaluate the role nuclear weapons play in their defense strategies.[89] Progress certainly but elimination of nuclear weapons by any of the original five is still too distant to see. With a series of events on the world stage, increasing diplomatic tensions between the US, China and Russia, little progress toward the START III levels can be expected which in turn can only serve to reinforce other nations desire to retain a nuclear deterrent and give emerging nations reason to continue their efforts.[90]

The potential exists for a multi-national effort to develop mutually acceptable avenues to reduce and eliminate nuclear weapons as the NPT envisions but recent events have clouded any prospects. As far as Russian-US bilateral agreements, the NATO campaign against Serbia derailed any near-term hopes for START II. Continuing disagreements on the impact of the stated desire of the US to deploy a national missile defense system (NMD) has also raised questions of the viability of the ABM treaty as well. China remains unwilling to enter any nuclear arms talks until the US and Russia agree to cut their arsenals to a level below 500 warheads or roughly equivalent to their capability. Continued US efforts to field NMD or to provide even a Theater Missile Defense (TMD) for Taiwan would push China into building a larger nuclear force. France and Britain have recently settled with limited nuclear options and are likely to delay any direct debate on nuclear issues until discussions on European defense integration mature.[91]

NPT: Still Relevant After 1998?

Following the dual pronouncements of India and Pakistan to be nuclear powers in 1998, many believed the non-proliferation effort was mortally wounded just as efforts elsewhere were bearing fruit. Algeria formally acceded to the NPT after placing their nuclear reactor under IAEA controls in the early 1990's. By 1990, Argentina and Brazil ended their nuclear quests, championed the nuclear-weapons-free-zone for Latin America established in the Treaty of Tlateloco, and joined the NPT. The former Soviet states of Belarus, Kazakhstan and Ukraine have completed transfer of all nuclear warheads on their soil to Russia and have acceded to the NPT. South Africa ended both apartheid and their nuclear program in 1990, joined the NPT in 1991, and received an IAEA declaration of being nuclear-weapons-free in 1994. Each of these

nations had different reasons for developing nuclear weapons, but in the end, each rejected them.[92] The key to assisting other nations to do so may lie in their example.

Despite these successes, the NPT has not deterred further nuclear proliferation. Iraq was thought to be a member of good standing in the NPT before the Gulf War of 1991. Iran still is today. The example of Iraq clearly shows the limits of the NPT. The US believes Iran is following the Iraqi example.[93] Libya has had nuclear ambitions for a number of years and recently discussed the possibility of modernizing the Tajura nuclear research center and its reactor.[94] Proponents of the NPT maintain that even these efforts can be stopped if the five major nuclear nations agree to cooperate and, in turn, gain the cooperation of India, Pakistan, and Israel to prevent the transfer of nuclear weapons related technology and materials.

The real danger of dealing with emerging nuclear states may lie in the lack of indigenous thinking on the related issues. One observer in Karachi recently noted,

> "There is almost a complete absence of qualified people with knowledge of arms control and disarmament, particularly in the nuclear field. To overcome this inadequacy, the (Pakistani) government should establish at the earliest, in addition to any official resources, nuclear technology and weapons study departments with appropriate syllabi in Karachi and Islamabad universities, where access to nuclear facilities and expertise is easier. The study of arms control and disarmament should be encouraged at the master's and doctorate level in different universities."[95]

One could argue that an entire generation that built the WMD of today will not be available to pass on the intellectual capital necessary to understand and restrain the use of those weapons. The example of sharing command and control methods between the US and the USSR over three decades ago is an example no less relevant to those emerging nuclear states today but if no effort is made to assist them ignorance could lead to disaster. By providing the knowledge and understanding of nuclear strategy and weapons safety, those "mature" nuclear states would be lowering the potential for miscues leading to disaster. These efforts should be transparent to the

international community with the intent of achieving the goals of the NPT. Without full participation or oversight of at least the P-5, further proliferation could be accused by any excluded nation.

CWC: Difficulties From Size and Scope of Chemical Weapons Problem

An ambitious and widely accepted effort to eliminate chemical weapons as a means to wage war, the Chemical Weapons Convention (CWC) has over 140 signatories including all of the permanent members of the UN Security Council. Specifically, the CWC "bans:

- Developing, producing, acquiring, stockpiling, or retaining chemical weapons.
- The direct or indirect transfer of chemical weapons.
- Chemical weapons use or military preparation for use.
- Assisting, encouraging, or inducing other states to engage in CWC-prohibited activity.
- The use of riot control agents "as a method of warfare."

> The CWC requires states-parties to declare in writing to the OPCW their chemical weapons stockpiles, chemical weapons production facilities, relevant chemical industry facilities, and plans for destroying weapons and facilities. They must also declare all transfers or receipts of chemical weapons or chemical weapons-production equipment since January 1, 1946 and all riot control agents in their possession."[96]

Similar in concept to the NPT, the CWC has only begun to achieve even limited results.

Despite being the most comprehensive chemical ban since the 1925 Geneva accord, the CWC suffers from two problems. First, chemicals developed for use in WMD can be made in the very same factories that produce chemicals for peaceful purposes. In fact, many of these "weapons" chemicals are used for peaceful purposes. This problem also affects efforts to identify and eliminate biological weapons. The well-publicized attempt by Iraq to portray a suspected chemical/biological weapons site as a "baby milk factory" is one case in point. The issue was again highlighted after the 1998 US cruise missile attack on a site in Sudan thought to

be used to make WMD but may have been a pharmaceutical plant. Willingness of some of the parties to support the CWC directly impacts its success. The other nagging problem limiting the CWC's success is the absence of signatures from "Iraq, Libya, North Korea, and Syria, all of which CIA Director George Tenet identified in March 2000 as countries that 'now either possess or are actively pursuing' chemical weapons capabilities."[97]

As with any treaty limiting weapons, the key to the CWC lies in its enforcement. The CWC has a robust inspection regime but international funding for the operation has been falling below that needed to accomplish the task. As of March 2001, over 930 inspections have been conducted in 49 countries but the José Bustani, Director-General of the Organization for the Prohibition of Chemical Weapons (OPCW), the CWC's implementing organization believes several facilities that the treaty covers have not been declared. In an attempt to solicit better support for the OPCW, "Bustani warned that financial problems were reducing the frequency of industry inspections to a level that makes them 'almost irrelevant.' He also cited multiple obstacles OPCW inspectors were facing during industry inspections and cautioned that the gap between the CWC negotiators' intent and actual CWC implementation is growing."[98]

Banning any class of weapons is difficult unless all nations cooperate and a full inspections program is allowed to work. Progress on the CWC seems at least promising when compared to the Biological and Toxin Weapons Convention (BWC), which bans development, production, stockpiling, retention, or acquisition of biological agents, or toxins that have no justification for peaceful purposes. This treaty is in force but has no verification or monitoring mechanisms.[99] As long as diplomatic efforts to control nations from developing WMD capabilities fall short of their goals, a mix of policy and capability based on both theory and lessons from past practices is required.

Dealing with the Genie: Developing a New Toolkit

If one accepts the idea that the display of US and allied conventional capability in the 1991 Gulf War against Iraq and the 1999 NATO campaign against Serbia has dramatically altered the perceptions of many nations toward the need for a strategic deterrent, then the international community must begin to develop a range of capabilities or "tools" to stem any renewed efforts to develop and field WMD capabilities. Using the WMD reliant state model as a framework, specific tools can be designed to have impact on political, economic, military, and scientific characteristics the model identifies. Such tools can act on each characteristic individually, across several and even all within the states targeted and will likely engage the international community as well. The key to any of the tools' success is that it be matched to the task presented. The concepts provided here are not an exhaustive list of possibilities nor they necessarily dependent on other tools for nonproliferation success. This "toolkit" is offered as starting point for improving national, regional, and international non-proliferation and counterproliferation efforts.

Political Tools: Furthering and Expanding the Non-Proliferation Regime

Despite worthy efforts on the part of the international community to reverse the spread of WMD, the number of states that have continued to rely on or seek these capabilities has continued to grow. Finding acceptable political solutions to this problem is obviously a complex and enormous undertaking but not without possibilities. By focusing on means to reducing the emerging states' desire to possess WMD, international efforts can bear fruit. One possible template is the 1994 Agreed Framework to halt North Korea's nuclear program. By direct negotiation and offering to "buy out" a nascent nuclear program, this effort sets a useful precedent for other emerging WMD situations. Key to this agreement was the understanding of

the need of the North Korean leadership to be respected on the world stage, gain a level of equivalence with South Korea, and find a means to provide assistance to their poor economy. The ultimate success of the program lies with the DPRK's compliance with the framework, which included a provision that acknowledged their responsibility to live up to the NPT.

At the other end of the WMD ownership spectrum, the success of the US sponsored Nunn-Lugar Program cannot be understated. Begun by the US legislature in 1991 as a means to assist newly created states of the former Soviet Union to become nuclear weapons free, Nunn-Lugar has spent more that $2.7 billion (or less than one-third of one percent of the annual US defense budget) removing more than 5,000 strategic warheads from service.[100] The program successfully prevented three new nations from becoming nuclear powers in their own right risking potential military conflict with Russia.

Eliminating the nuclear weapons of Ukraine, Kazakhstan, and Belarus who were the third, fourth, and eighth largest nuclear powers respectively after the breakup of the Soviet Union, the decade long work of the Nunn-Lugar program resulted in a reduction of nuclear arsenals that were greater in numbers than those of Great Britain, France and China combined. Nunn-Lugar efforts have also been underway in Russia as well including the dismantling of numerous ballistic missile capable submarines.[101] While the US political will to continue the program in Russia has recently been questioned as relations between the two largest nuclear nations became strained, the obvious benefits of the program by reducing the level of potential nuclear proliferation cannot be overstated. The initiation of international efforts modeled on Nunn-Lugar for nuclear, biological, chemical and missile program elimination would seem an obvious next step in reversing the tide of proliferation.

To best encourage weapons elimination programs, adoption, enhancement and enforcement of inspection regimes within the existing agreements of the non-proliferation regime are paramount. The example of the UN mission in Iraq shows the necessity of exposing even part of an emerging WMD states programs in order to eliminate them. In conjunction with inspections, international media can serve to reinforce inspection findings as well as provide a platform for exposing clandestine efforts to obtain WMD leading to further efforts to identify, inspect and eliminate them. The media has a unique role in keeping WMD proliferation and arms control efforts on the international agenda. Ultimately, governments respond to public pressure to take action and quite often the "CNN factor" can fuel the political engine to move.

To fill the gaps in the various non-proliferation agreements, states can adopt regulations to promote governmental and non-governmental compliance with the spirit and intent of the non-proliferation regime. The ability to control the sale and transfer of WMD technology has been shown both in the reported slowing of various nuclear efforts and the increase in awareness and enforcement of appropriate export/import restrictions. Governments can identify and adopt both national and international interagency means to assist in the identification of proliferation. These same efforts can be used to promote efforts to respond to accidents, incidents or even to deal with the effects of an attack. This is especially important in response to chemical and biological emergencies.

As the leading international political body, the UN can be a more influential forum for reducing the desire to acquire WMD. Serious study should be done to consider changes to the structure of the UN Security Council, which would serve to decouple permanent member status from nuclear weapon ownership. One of the possible political reasons for acquiring nuclear weapons is related to the level of prestige and influence accorded to the permanent members of

the UNSC. While relinquishment of permanent status or extension to emerging nuclear nations is not a near-term reality, universal acceptance of any UN backed non-proliferation or WMD elimination program or agreement can be enhanced by altering the perception that owning nuclear weapons leads to a permanent seat at the UNSC. In line with this study, serious consideration should be given to UN sponsored development of effective, instantaneous communication means between WMD capable states (declared or not) similar in concept to the US-USSR nuclear hotline that could also allow UNSC visibility and crisis management assistance.

Given the likely lack of sophistication of emerging WMD capable states' command and control systems, any effort improve these systems can serve to avert compromise of their weapons, their actual use based on false attack intelligence, and deter opposing forces attempts to decapitate them. Improving emerging WMD nations' command and control capabilities can also serve to provide increased transparency of the WMD programs of the nations involved. While serving initially to reduce the potential for open conflict involving WMD, this transparency improves the potential for dialog leading to reductions and elimination of the programs with international sponsorship. The experiences shared by the US and Russia in the Cold War and during the Nunn-Lugar program needs to be actively shared internationally.

Economic Tools: Tying Trade and Prosperity to Nonproliferation

Growth of international trade has been widely credited with modernizing the economies of many nations and can act as a means to reduce the requirement for WMD. As the WMD reliant state model indicates, many of the emerging nuclear states have serious economic difficulties that drive their desire to seek WMD capabilities as a "cheaper" alternative to conventional forces. These states are typically dependent on foreign trade for a sizeable portion

of their hard currency needs. Considerable progress could be made on reversing proliferation if trade agreements and international financial aid where required to be structured to include language that make the deal contingent on compliance with existing arms control efforts. This can and should include direct offers of assistance targeted for WMD reduction and where possible elimination of WMD programs. Non-government contractors did some 85 percent of the work performed on the Nunn-Lugar projects with significant amounts of direct employment being generated in the host countries.[102] In conjunction with international aid, targeted development projects should be aimed at resolving the underlying economic issues that support a regime's decision to defend the nation with WMD. The Cold War arms trading behavior still exists as a source of profit and hard currency for many nations including the US. By improving support of the non-proliferation regime, other areas of economic development can replace arms trading as a source of prosperity for the affected nations.

One area of promise for conversion of national desires and military systems to commercial use is in space lift and access to space. Today, space lift is truly an international endeavor with both government and commercial programs demonstrating the ability and willingness to orbit any satellite if the owner can afford the cost. As the record of the MCTR indicates, keeping separate track of systems needed for spacelift and those systems that can be employed as military ballistic missiles is problematic. While access to space is not legally exclusive to those nations that possess the capability, providing access to space through launch assistance can reduce attempts to develop missiles for military purposes under the guise of national space efforts. In an effort to halt North Korean No Dong missile tests and encourage regional stability, for example, the US is considering a DPRK offer to have another nation launch DPRK satellites.[103] Commercial space is a growth industry that can be a means for

enabling positive impacts to a states' economy while attempting to limit the number of states that possess intercontinental range missiles.

Military Efforts to Limit WMD Threats

From a military perspective, controlling the spread of WMD requires a broad range of efforts that ultimately have two purposes: preparing defenses against an WMD attack and developing offensive capabilities to both deter and respond to threats. NATO's recent effort to re-evaluate its nuclear posture has yielded a parallel effort to address regional non-proliferation and if necessary counter-proliferation efforts. NATO's goals include:

- Build consensus on the NBC threat, need for defense and counterforce measures,
- Embed counterproliferation as an organizing principle in every facet of NATO defense activity,
- Adapt NATO's deterrence posture to new threats,
- Reduce potential Alliance vulnerabilities and safeguard the ability of NATO forces, to accomplish missions despite NBC threat or attack,
- Reorient NATO toward power projection through defense planning; and
- Provide a venue for France to participate in defense policy planning discussions.[104]

Even long time militarily independent, NATO member France has seen great benefit in working closely within the alliance to deal with potential WMD threats especially on NATO's southern flank.[105] In other regions beyond Europe, defensive efforts should work within established regional security organizations and where possible engage other nations in dialog on WMD as well as other security measures. NATO's Partnership for Peace, an associate organization to the alliance, which involves virtually all European nations in defense discussions, could be used as a template for regional security forums. Discussion of non-proliferation of WMD can and should be among the key issues continuously discussed and acted upon in these organizations.

Clearly, as the one nation most likely to lead any effort to restrain WMD proliferation, the US should retain and continue to develop improvements to its credible deterrent capabilities. Each of the four main aspects of WMD (nuclear, biological, chemical, and missile systems) requires a range of military defenses to be countered. For over 55 years, the US WMD deterrent was built on the foundation of nuclear forces. As the US has found new concepts and conventional capabilities, nuclear forces have faded from the front rank of both defense considerations as well as the conscious of policymakers and the US public. Whether or not US conventional capabilities have reached the point of replacement for the nuclear arsenal is one of debate. Advances in US conventional capabilities obviously serve a wider range of military objectives in all points along a spectrum from peace to war than nuclear weapons. However, until US conventional capabilities can clearly replace the deterrent effect that nuclear weapons have on potential enemies, the US requirement for a nuclear force remains. Only its size and appropriate modernization programs need to be addressed. As argued earlier, the importance of neither side of this equation, conventional nor nuclear power, is lost on those nations that believe they are or could be adversaries of the US. Nuclear reliant or emerging nations could easily justify their WMD programs as a defense against either. In recent years, the US has specifically amended its nuclear arms strategy to permit responding to an enemy NBC attack but not without a great deal of debate on the potential disproportional effect such a response would have.[106]

The deterrent capability of any US force would best be measured by the response of potential adversaries. The use of nuclear weapons has always been best seen as a political act, which would have long-term impacts on international relations far beyond the military effects. The fact that nuclear weapons were only used in anger twice is no insurance for a future aggressor. The key to any decision to retain or modernize the US nuclear force should be

balanced against a realistic assessment of their future utility. For the foreseeable future, a credible, reliable, and redundant nuclear force is still a US requirement. The continuing spread of WMD programs serves to sustain it.

Conventional US capabilities that compliment nuclear forces in deterring the use of an aggressor nation's conventional and WMD forces are logical and appropriate. A wide range of US DOD of counter-proliferation programs have been proposed and several have been developed and fielded including weapons specifically designed to destroy chemical and biological weapons. Key elements required for successful employment of these weapons include accurate intelligence on potential targets, matching the right weapon to the right target, accurate assessments of potential collateral or direct damage to include possible release of NBC agents into the environment of the targeted state or its neighbors. Given the current difficulty of limiting these effects, further advancements are likely required before use of these capabilities can be widely accepted for use.[107] Seeking an appropriate and robust mix of conventional and nuclear forces is appropriate until international acceptance of and compliance with the non-proliferation regime is achieved. The current US DoD's Counterproliferation policy has three major objectives:

- Support overall U. S. Government efforts to prevent the acquisition of NBC weapons and their associated delivery systems;
- Support overall U. S. Government efforts to roll back proliferation where it has occurred;
- Deter and prevent the effective use of NBC/ M against the U. S., its allies, and U. S. and allied forces; and
- Adapt U. S. military forces, and their associated planning, doctrine, and training, to operate effectively when confronted with the presence, threatened use, or actual use of NBC/ M.[108]

The April 2000 report to Congress of the US DoD Counterproliferation Program Review Committee (CPRC), which oversees all US military counterproliferation efforts, identifies some 43 projects in its review of the top 14 DoD areas for capability enhancements priorities list. These areas include the traditional military tasks of NBC defenses, NBC threat identification and targeting as well as efforts to support the US Department of Energy and the intelligence communities in export control activities and inspections and monitoring of arms control agreements.[109]

One element of any defensive measures should include development of an international WMD rapid response team that can provide warning, crisis response planning and response management to nuclear, biological, or chemical accidents that may be beyond the host nation's capability to manage. Several nations have various teams with a range of capability but an international team would likely provide access to a wider range of capabilities and knowledge than a single nation could gather. This team could serve the dual purpose of disaster response and equally importantly crisis avoidance. The joint US-Russian center established for dealing with the potential Y2K induced false missile launch warnings in both nations strategic warning systems is an example of successful joint cooperation and transparency just such an international WMD rapid response team could achieve.[110] National teams may not be granted needed access to deal with a crisis in time.

Another needed international program to lower the risk of WMD use where the US can take the lead is in assisting emerging WMD states, especially those who have nuclear weapons, is in providing expertise in developing and deploying a effective command and control systems. As Peter Feaver's work suggests his framework for considering the likely command and control systems of emerging nuclear states could serve as a "framework to evaluate proposals for

managing nuclear proliferation and cautions against any policy that ignores the need for balance in new nuclear command and control systems."[111] Feaver suggests proliferators be assisted to develop assertive system (one with sufficient controls that retain decision making on their use at the national leadership level) because inadvertent use of these weapons is more likely than decapitation (hard to do practically). By using a variety of confidence building measures including hot lines, agreements to notify participating nations of military exercises planed in their region and where possible provisions for observers in the exercises, both emerging WMD states and established world powers can establish a lower level of WMD threat.[112] Feaver believes:

> "Accordingly, it may make sense to share some command and control information with those proliferators who, despite our best efforts and fervent wishes, successfully cross the nuclear threshold but fail to develop adequately assertive command and control systems."[113]

Certainly, this effort will not be accomplished without stirring some debate on its purpose and value. As in the US-USSR effort four decades ago, the additional security gained from a more sophisticated and assertive command and control system outweighs any political or economic cost. The best avenue to approach acceptance of this concept initially is the international scientific community.

Scientific and Academic Opportunities to Foster WMD Limits

Efforts in the scientific arena should seek to foster international academic forums to enhance international understanding of WMD issues. From adapting current curricula to adding specific programs at universities designed to widen understanding of the complex nature of policy and strategy related to security studies in general and WMD issues specifically. Offering courses that include such topics as nuclear arms history, arms control policy, deterrence theory

and strategy can serve to assist governments in dealing with legacy WMD capabilities as well as potentially resisting efforts to acquire WMD. Cooperative research efforts with international sponsorship should be encouraged and funded. Academic institutions including international think tanks should promote curricula, conferences, papers, and studies that focus on understanding the evolving international security environment with a focus on controlling, reducing and working toward elimination of WMD.

One avenue might be to engage leading experts from international peace movements, academia (particularly those in states with diplomatic relations with WMD reliant states), and defense establishments in a series of conferences to explore the new strategic landscape that multi-state WMD possession poses. As arms control is ultimately an expensive undertaking in any venue, international cooperation to provide needed education is essential. Some nations will obviously be unwilling to send students to universities in states with which they do not have good relations. Others may not accept students from states they consider hostile. If the effort is internationally sponsored (potentially under UN auspices), a common academic effort could be offered initially to a number of universities worldwide with fellowships being granted to students from less capable nations.

If the model described in this paper holds, nations seeking new WMD capabilities would likely lack these resources or desire to divert funding from their WMD programs. Some WMD reliant state leaders may even want to limit increased understanding out of fear for their position, from the desire to limit exposure to external ideology, or simply from a mistrust of foreign assistance. The future leaders in these states are exactly the target audience for understanding the new "world" their nations have entered by considering or gaining WMD capability especially nuclear arms. Even the existing nuclear nations need to consider the impact of the likely

diminishing pool of strategic arms experts both within and outside of their governments. Any successful effort to directly address the mindset that perceives acquisition of WMD as a counter to conventional military capabilities must start with education of WMD reliant states, both leadership and scientists. The US and its partners (potentially all of the P-5) are uniquely capable of developing programs that deal with nonproliferation failures and effectively address the continuing global need to reduce the threat of WMD use.

Conclusion

The rise of the US conventional superiority as demonstrated in Iraq and Serbia can be linked to states that have actively sought to acquire WMD and missile technology as a deterrent to both the US and regional enemies. While other reasons can contribute to the desire to possess these capabilities such as national prestige or increased influence in international forums, these WMD reliant states perceive the advantage of placing concern that these weapons might be used in the minds of the publics and leadership of their enemies. The drive to acquire these "equalizers" creates a more dangerous world than that of a decade ago. By understanding the underlying contributing factors that motivate these states to develop WMD, policy makers can seek opportunities to leverage 55 years of experience with nuclear arms in the development of counter-proliferation and non-proliferation policies, programs, and capabilities.

Reversing the late 20th century trend toward additional proliferation while ensuring adequate deterrence for their own populations is a key 21st century problem for the US and NATO. Successful strategies to achieve progress will include a mix of political, military, economic and scientific efforts both from individual nations and more importantly the combined efforts of the international community. The non-proliferation regime has had some limited success but must be strengthened to achieve the desired goals especially in the area of biological

weapons where no inspection protocols are yet established. For the US, continued reliance on nuclear weapons as the foundation of deterrence of WMD use is recommended as are continued advances in conventional capabilities. The US should take the initiative to lead the international community to develop consensus on limiting WMD proliferation, reversing proliferation where it exists and creating the means to safely control and eventually eliminate existing WMD stockpiles as has been successfully demonstrated by the Nunn-Lugar program. One former US Air Force general has been a leader in reversing the proliferation of the Cold War that has begun to multiply in the 21st century:

> "General (ret'd.) George Lee Butler, former C-in-C of the United States Strategic Command, who was one of a very few nuclear war planners to evaluate the entirety of the 12,500 targets in the U.S.' single integrated operational plan (SIOP) for using nuclear weapons and reduced it down to 3,000 targets, concluded: "I long ago took to heart the words of Omar Bradley, spoken virtually a half century ago, when he observed, having seen the aftermath of the bombs on Hiroshima and Nagasaki, thus: 'We live in an age of nuclear giants and ethical infants. We live in a world that has achieved brilliance without wisdom, power without conscience. We've unlocked the mysteries of the atom and forgotten the lessons of the Sermon on the Mount. We know more about war than we know about peace, more about killing than we know about living'."[114]

The increased complexity of today's international security environment requires a reassessment of our approaches to dealing with the threats of WMD proliferation. We must address the need for effective international efforts to keep the unthinkable from happening.

GLOSSARY

ABM **–** Anti-Ballistic Missile

AG – Australia Group

BWC **–** Biological Weapons Convention

C2 **–** command and control

CTBT – Comprehensive Test Ban Treaty

CWC – Chemical Weapons Convention

DOD – Department of Defense

DPRK- Democratic People's Republic of Korea

GDP – Gross Domestic Product

IAEA- International Atomic Energy Agency

ICBM- Intercontinental Ballistic Missile

MTCR- Missile Technology Control Regime

NATO-North Atlantic Treaty Organization

NBC- nuclear, biological, chemical

NMD-National Missile Defense

NPT- Nonproliferation Treaty

NSG- Nuclear Suppliers Group

OPCW- Organization for the Prohibition of Chemical Weapons

OSCE-Organization for Cooperation and Security in Europe

PAL-Positive Action Lock

PRC-People's Republic of China

RAND- a contraction of the term research and development. The RAND Corporation is a US nonprofit institution that helps improve policy and decision making through research and analysis.

RF- Russian Federation (Russia)

SCUD- a NATO designation for a ballistic missile first deployed by the Soviets in the mid-1960s. The missile was originally designed to carry a 100-kiloton nuclear warhead or a 2,000-pound conventional warhead, with ranges from 100 to 180 miles. Its principal threat was its warhead potential to hold chemical or biological agents.

SLBM – Submarine Launched Ballistic Missile

SSBN- Sub-Surface Ballistic missile Nuclear--Military designation for nuclear SLBM capable submarines

START- Strategic Arms Reduction Treaty or officially the Treaty on the Reduction and Limitation of Strategic Offensive Arms

TMD-Theater Missile Defense

UAV-Uninhabited Air Vehicle

UN-United Nations

UNSC-United Nations Security

UNSCOM-United Nations Special Commission

US-United States

USSR-Union of Soviet Socialist Republics

WMD-Weapons of Mass Destruction/Disruption

WWII-World War II

Y2K-Year 2000 computer limitation

NOTES

[1] US Department of Defense, Proliferation: Threat and Response, (Washington, DC: US Department of Defense, 2001), p. i.

[2] "Weapons of Mass Destruction Capabilities in the Middle East", Center for Nonproliferation Studies Website, Monterey Institute for International Studies, WMD Middle East Project, 8 June 2000, (http://cns.miis.edu/research/wmdme/capable.htm).

[3] Peter D. Feaver, "The Theory-Policy Debate in Political Science and Nuclear Proliferation," National Strategic Studies Quarterly, (Summer 1999): pp. 69-82.

[4] Scott D. Sagan, "The Origins of Military Doctrine and Command and Control Systems," Planning The Unthinkable: How New Powers will use Nuclear, Biological, and Chemical Weapons, eds. Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, (Ithaca, NY and London: Cornell University Press, 2000), p. 16.

[5] According to the US Department of Defense, "Threats from the proliferation of nuclear, biological and chemical (WMD) weapons and missiles come from states and non-state group, such as terrorists. Key states of proliferation concern are continuing to try to acquire and develop these dangerous weapons, while some terrorist groups are showing increasing interest in them. The growing availability of WMD- and missile-related technologies and expertise and the sophistication of some of these technologies highlight the threat. In addition, WMD increasingly are viewed as asymmetric means to counter the West's superior conventional military capabilities." US Department of Defense, Proliferation: Threat and Response, p. 3.

[6] Sagan, Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons, p. 18.

[7] Ibid, pp. 19-22.

[8] Ibid, pp. 22-23. Sagan quotes General Lyman Lemnitzer advising President Kennedy that to carry out the 1962 Single Integrated Operational Plan (SIOP-62) required the US not to hold back any portion of the planned nuclear attack. Two readings on the early US efforts to struggle with this issue as well as the problem of dealing with conflict below the nuclear threshold that were influential on me several years ago: Lawrence Freedman, "The First Two Generations of Nuclear Strategists" and Michael Carver, "Conventional Warfare in the Nuclear Age", in Makers of Modern Strategy from Machiavelli to the Nuclear Age, ed. Peter Paret, (Princeton, NJ: Princeton University Press, 1986), pp. 735-778 and pp. 779-814 respectively. While the focus of the military and political leadership of the US after World War II was on how the US would maintain nuclear superiority, having the "bomb" was clearly not sufficient to deal with all military needs of the nation such as Korea and Vietnam. Having nuclear capability did deter neither China nor the North Vietnamese from carrying out their military and political strategies.

[9] This would fit Israel's attack on the Iraqi Nuclear Reactor complex at Osirak in 1981. Some have argued that this act pushed Saddam Hussein to move all of his WMD activities underground making these facilities much more difficult to attack. Saddam, ever the desired leader of Pan-Arabia spoke of this attack as Israel attempting to use its capabilities to keep a technological edge over the Arab world and to maintain the ability for "nuclear blackmail." As the UN inspections after the Gulf War discovered. Saddam continued to work for a full offensive WMD capability. See Timothy V. McCarthy and Jonathan B. Tucker, "Saddam's Toxic Arsenal:

Chemical and Biological Weapons in the Gulf Wars," in Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons, p. 57.

[10] Ibid, p. 29.

[11] Ibid, p. 30.

[12] Ibid, p. 31.

[13] Ibid, pp. 31-35.

[14] To date, the US, Russia, UK, France, China, India, and Pakistan have tested nuclear devices. All are known to have fielded or are likely to field nuclear weapons and associated delivery platforms. China, India and Pakistan are developing SLBM capable submarines while the UK now solely relies on SLBMs for its nuclear force. Israel is believed to possess over 100 nuclear weapons. Iran, Iraq, and North Korea are actively pursuing true intercontinental missile capability, have significant chemical programs and are thought to be seeking biological and nuclear weapons. Iraq was found to have weaponized biological agents during the 1991 Gulf War. North Korea's nuclear program was halted in 1994 but several sources believe that they have sufficient means to have developed at least one nuclear device. More than 25 nations have or are actively developing WMD capabilities. See US Department of Defense, Proliferation: Threat and Response, (Washington, DC: US Department of Defense, 2001), Strategic Assessment 1999, ed. Hans Binnendijk (Washington, DC: Institute for National Strategic Studies, US National Defense University, 1999), CNN report, "Pakistan to deploy SLBM sub," CNN, February 22, 2001, http://www.cnn.com/2001/world/asiapcf/south/02/22/pakistan.nuclear/.

[15] Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," International Security 17 (Winter 1992-93) Harvard pp. 161-187.

[16] Ibid, p. 162. Feaver believes this is naïve and cites Sagan's 1993 work Organizations, Accidents, and Nuclear Weapons (Princeton: Princeton University Press), also Shaun Gregory, The Hidden Cost of Deterrence: Nuclear Weapons Accidents (London: Brassey's, 1990).

[17] Ibid, pp. 162-163.

[18] Ibid,p. 167 see footnote 17. Feaver points to Bruce Blair, Strategic Command and Control: Redefining the Nuclear Threat (Washington: Brookings, 1985), p. 282. Blair believes even the US system had sever vulnerabilities throughout most of the Cold War.

[19] Ibid, p. 164. Cites John D. Steinbruner, "Nuclear Decapitation," Foreign Policy, No. 45 (Winter 1981-82), pp. 16-28.

[20] Ibid, p. 165.

[21] Ibid, p. 170. Feaver describes the US examples of assertive and delegative command systems. US Submarine Launched Ballistic Missile force (SSBN captains) had *delegative* authority, no PALs, only legal/procedural restrictions on use, a positive control system that protects against decapitation and preemption. Problem is the tendency to fail deadly. The 1997 movie *Crimson Tide* deals with the issue of loss of communications between the National Command Authority and just such a submarine. The captain receives part of a nuclear launch message before communications are lost. The movie plot deals with the choice to launch the weapons or not. US decided to have an *assertive* system by equipping US European based nukes with PALs starting in 1962. Soviets had delivery systems in Ground Soviet AF and warheads in KGB control. A *delegative* system relies "on restrictive measures and physical use control devices provides higher assurance the weapons will not be used in an unintended fashion." One of the concerns of various groups and states is the transformation of the former Soviet system after the demise of

the KGB. US is believed to currently have a system that goes from assertive to delegative as war nears according to Feaver.

[22] Most sources believe that the Indian nuclear weapons are kept disassembled and disbursed but could be ready within one week. US DOD believes the Indians are in the early stages of developing a nuclear doctrine. See Proliferation: Threat and Response, p.23. The Federation of Atomic Scientists places the number at 60. See FAS Factsheet on India's Nuclear Weapons at http://www.fas.org/nuke/guide/india/nuke/index.html.

[23] Feaver, "Command and Control in Emerging Nuclear Nations," p. 172.

[24] Ibid.

[25] Lewis Dunn, Containing Nuclear Proliferation, Adelphi Paper No. 263 (London: International Institute for Strategic Studies, 1991), p. 20.

[26] Feaver, "Command and Control in Emerging Nuclear Nations," p. 174.

[27] Ibid, p. 177.

[28] Ibid, p. 177. From Leonard Spector, Going Nuclear: The Spread of Nuclear Weapons 1986-1987 (Cambridge, Mass: Ballinger, 1987), pp. 28-32.

[29] Ibid, p. 178.

[30] Ibid, p. 180.

[31] Ibid, pp. 181-182.

[32] Annex B, Proliferation: Threat and Response, pp 117-118. Chart acronyms are: Nuclear Nonproliferation Treaty (**NPT**) Nonnuclear weapon member states forswear the right to manufacture or acquire nuclear weapons. Exporting nuclear materials to nonnuclear weapon states is prohibited unless the material is safeguarded. Nonnuclear weapon states that are NPT members agree to International Atomic Energy Agency safeguards at all nuclear sites. Comprehensive Nuclear Test Ban Treaty (**CTBT**) (has not entered into the force) Signatories undertake not to carry out any nuclear weapons test explosion or other nuclear explosion. Nuclear Suppliers Group (**NSG**) Members agree informally to control exports of nuclear materials and to establish tight controls on enrichment and reprocessing technologies. Zangger Committee (**ZC**) developed list of safeguarded trigger items that NPT members will export only to facilities under IAEA safeguards. Australia Group (**AG**) is an informal group whose members have adopted export controls on specific chemical precursors, microorganisms, and related production equipment with chemical and biological weapons applications. Biological and Toxin Weapons Convention (**BWC**) bans development, production, stockpiling, retention, or acquisition of biological agents or toxins that have no justification for peaceful purposes. Treaty in force but has no verification or monitoring mechanisms. Chemical Weapons Convention (**CWC**) bans chemical weapons development, production, stockpiling, transfer and use. Requires adherents to declare and destroy stockpiles and production plants within 10 years. Entered into force in April 1997. Missile Technology Control Regime (**MTCR**) is a voluntary regime with 32 members states; no control over nonmembers; no enforcement authority. Main goal is to halt or slow the spread of missiles and Uninhabited Air Vehicles (UAVs) that can deliver a 500-kilogram or larger payload to 300 or more kilometers. Members agreed to control two categories of exports related to missile development, production, and operation: Category I: whole missiles and UAVs with 500 kilometer/300 kilometer payload/range; and complete subsystems such as guidance and engines. Category II: equipment and technology related to warheads and re-entry vehicles, missile engines, guidance technology, propellants and missile and UAVs with a 300km range but less than a 300 kilometer payload.

[33] Amy E. Smithson, "Toxic Archipelago: Preventing Proliferation from the Former Soviet Chemical and Biological Weapons Complexes," Henry L. Stimson Center Report No. 32, (Washington, DC: The Henry L. Stimpson Center, December 1999), p. 105.

[34] Ibid. Smithson advocated additional funding to provide research grants to Russian academic institutions to allow these scientists to work in areas that are suited to their education and experience. She reports that some 10,500 of these scientists that pose a proliferation risk are only receiving approximately a small portion of the US funds allocated for stemming the nuclear, missile, biological and chemical technician "brain drain". Between 1994 and 1998, only $26

million of a combined total $310.3 million went to chemical and biological grants. But despite the poor funding, these individuals are choosing to remain in Russia.

[35] Sandi Arnold and Michael Barletta, "Factsheet on Reported Nuclear Trafficking Incidents Involving Turkey, 1993-1999," Center for Nonproliferation Studies Website, Monterey Institute of International Studies, July 1999. http://cns.miis.edu/research/wmdme/flow/turkey/index.htm.

[36] US Department of State, and Arms Control Today websites, (http://www.state.us.gov/ and http://www.aca.org).

[37] Joseph Cirincione, "Assessing the Assessment: The 1999 National Intelligence Estimate of the Ballistic Missile Threat," The Nonproliferation Review, Spring 2000, Vol. 7, http://cns.miis.edu.

[38] Peter Wilson, "Global Arms Control and Disarmament: Cloudy Prospects," in Strategic Assessment 1999: Priorities for a Turbulent World, ed. Hans Binnendijk (Washington, DC: Institute for National Strategic Studies, US National Defense University, 1999), p. 219.

[39] The original list of rogues included those states that supported terrorism, sought proliferation of WMD, had poor domestic human rights records and governments that were for various reasons generally hostile to US interests. The list of "usual suspects" include Cuba, Iraq, Iran, Libya, North Korea, Sudan, and Syria.

[40] John F. Reichart, "Strategic Forces and Deterrence: New Realities, New Roles?" in Strategic Assessment 1999, ed. Hans Binnendijk (Washington, DC: Institute for National Strategic Studies, US National Defense University, 1999), p. 279. Original Sources: US Department of State, 1997 Patterns of Global Terrorism Report, April 1998. Except for Cuba and Sudan, assessments are based on US Arms Control and Disarmament Agency, Adherence to and Compliance with Arms Control Agreements, 1997, and US Office of the Secretary of Defense, Proliferation: Threat and Response, November 1997. Note: Status has not changed according to the 2001 edition of the US OSD Report, Proliferation: Threat and Response.

[41] UNSC Permanent Members include US, UK, France, Russia, and China. The other members rotate among the members of the General Assembly. In recent years, many states have argued for a number of changes to the makeup of the permanent members but no significant changes have yet to be adopted.

[42] Samuel B. Griffith, Sun Tzu, The Art of War, (London: Oxford University Press, 1963), p. 39.

[43] Thomas G. Mahnken and Timothy D. Hoyt, "Indian Views of the Emerging Revolution in Military Affairs," National Security Studies Quarterly, Summer 2000, p. 55.

[44] It should be pointed out that Israel has not publicly declared a stated nuclear capability but this ambiguity is necessary for them for several reasons including a de facto deterrence against WMD attacks, insurance of continued US financial support. However, when states that consider Israel a threat measure their own defense needs this "ambiguous" nuclear force clearly would drive their decisions to acquire like capabilities. Obviously, the US does not consider Israel (or UK and France) a threat so little if any US statements regarding arms control requirements especially in the Middle East region are aimed at Israel. For an overview of Israel's current status, see Michael Barletta and Erik Jorgensen, "Israel Weapons of Mass Destruction Capabilities and Programs," Center for Nonproliferation Studies website, Monterey Institute of International Studies, May 1998 and

Michael Barletta and Christina Ellington, "Israel's Nuclear Posture Review," Center for Nonproliferation Studies website, Monterey Institute of International Studies, December 1998, http://cns.miis.edu/research/wmdme/index.htm.

[45] Israel, India, and Pakistan have not been selected for this paper but would serve as excellent follow-on case studies for comparison to the model.

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[46] Ibid, pp. 4-5.

[47] Alexei G. Arbatov, "The Transformation of Russian Military Doctrine: Lessons Learned from Kosovo and Chechnya," The Marshall Center Papers, No. 2, (20 July, 2000), p. 33 Dr. Arbatov, has been a member of the Russian State Duma (Parliament) since 1994. He is deputy chair of the Duma Defense Committee, where he is responsible for the defense budget and processing of arms control treaties. He also serves as Director of the Center for Political and Military Forecasts at the Institute of World Economy and International Relations (IMEMO) of the Russian Academy of Sciences.

[48] Ibid, p. 16. Arbatov states: "During these times of economic, political, ideological, and military weakness and uncertainty, a combat ready (in contrast to de-alerted) nuclear arsenal is perceived by the majority of the new Russian political elite as the only legacy of its former status and influence in the world."

[49] Ibid, p. 36.

[50] Ibid, p. 5.

[51] Ibid, p. 1.

[52] Ibid, p. 2. Dr. Arbatov states "Moscow initiated a desperate search for other foreign partners and renewed its efforts to build up a defense capability against the US (US) and its allies. The war in Yugoslavia did away with the remaining hopes for a genuine security partnership and military cooperation between Russia and NATO. Once again, Russia perceives NATO as its primary defense concern for the foreseeable future. As a result, a number of crucial treaties, that had been signed, planned, and/or finalized were "frozen" without ratification: Strategic Arms Reduction Treaty–III (START–III); Comprehensive Test Ban Treaty (CTBT); the Open Skies Treaty; and the adaptation of the Treaty on Conventional Armed Forces in Europe (CFE). (START–II, however, was ratified by Russia on April 14, 2000. The State Duma [Parliament] approved the CTBT on April 21, 2000.) Still worse, the implementation of previously ratified treaties and/or unilateral agreements was placed in doubt: START–I (which is undermined as well by renewed American plans for a strategic defense program); CFE; Intermediate–Range Nuclear Forces and Shorter–Range Missiles (INF–SRM); Chemical Weapons Convention (CWC); parallel reduction of tactical nuclear arms; and de–targeting of strategic missiles. NATO's decisive and efficient military action against Yugoslavia served as an example to Russia and provided Russia a powerful push toward a new military campaign in Chechnya. Western employment of large–scale forces in the Balkans lifted the taboo against the use of military force as an instrument for resolving ethnic problems and conflicts that had been in place since the end of the first Chechen war of 1994–1996."

[53] Binnendijk, Strategic Assessment 1999, pp. 279 and 282.

[54] Ibid, p 129.

[55] Michael D. Swaine and Ashley J. Tellis, Interpreting China's Grand Strategy (Santa Monica, CA: RAND, 2000), p. 111.

[56] Ibid, pp. 113-114.

[57] Ibid, p. 123.

[58] Zalmay M. Khalizad, Abram N. Shulsky, Daniel L. Byman, Roger Cliff, David T. Orletsky, David Shlapak, and Ashley J. Tellis, The US and a Rising China: Strategic and Military Implications, (Santa Monica, CA: RAND, 1999), p. 54.

[59] Ibid, pp. 53-59. An excellent summary of current Chinese military modernization efforts.

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[60] Andrew Koch and Jeanette Wolf, "Iran's Nuclear Facilities: a Profile," Center for Nonproliferation Studies website, Monterey Institute of International Studies, 1998, (http://cns.miis.edu/pubs/reports/pdfs/iranrpt.pdf), p.1.

[61] William A. McGeveren, Jr., The World Almanac and Book of Facts, 2001 (Mahwah, New Jersey: World Almanac Books, 2001), p. 799.

[62] "Significant rises in Syrian oil reserves are again raising questions over 'illegal' Iraqi exports to Damascus," Reuters, January 31, 2001.

[63] According to the US Department of Energy, "Iraq contains 112 billion barrels of proven oil reserves, the second largest in the world (behind Saudi Arabia) along with roughly 215 billion barrels of probable and possible resources. Iraq's true resource potential may be understated, as deeper oil-bearing formations located mainly in the Western Desert region could yield additional resources, but have not been explored." Excerpt taken from the website of the DOE's Energy Information Agency, "Iraq," September 2000, http://www.eia.doe.gov/emeu/cabs/iraq.html.

[64] For one of various texts on UN's discoveries in Iraq, see Richard Butler, "Inspecting Iraq," in ed. Joseph Cirincione, Repairing the Regime, (New York: Routledge, 2000), pp. 175-184. The sheer amount and variety of declared weapons that were discovered is staggering. The amount that cannot be verified as destroyed gives rise to the belief that significant amounts of both materials and weapons still exist. Given Iraq's track record of misinformation, the US believes the threat still exists and as taken the much publicized step of inoculating all military personnel who serve in SW Asia with an anthrax vaccine.

[65] Iran is today a member in good standing with the NPT. US believes that Iran is pursuing a nuclear capability as Iraq did before the 1991 Gulf War. The unexpected discovery after the 1991 Gulf War by the International Atomic Energy Agency of a nuclear program in Iraq that employed 10,000 scientists and 50 kilograms of weapons grade uranium. Despite eight years of UN inspections and continuing periodic inspections by IAEA to verify the dismantling of Iraq's nuclear program, most experts believe that Iraq will continue their attempts to gain nuclear weapons and certainly other weapons of mass destruction. See the Arms Control Association web site, press release titled "The State of Nuclear Proliferation 2001," Jan 2001, http://www.aca.org/

[66] Proliferation: Threat and Response, p. 34-38.

[67] Michael Barletta and Erik Jorgensen, "Missiles, WMD, and Conflict in the Middle East: An Annotated Chronology," Center for Nonproliferation Studies Web Site, Monterey Institute of International Studies, May 1999, (http://www.miis.org/cns/).

[68] The World Almanac and Book of Facts, 2001, p. 799.

[69] Ibid.

[70] Ibid and "Iran," CIA Factbook 2000, on-line version, (Washington, DC: US Central Intelligence Agency, 1 January 2000), (http://www.cia.gov/cia/publications/factbook/geos/ir.html#Military).

[71] "Tehran explosions kill 1, injure 5," CNN Report, Feb 5, 2000, (http://www.cnn.com/2000/WORLD/meast/02/05/iran.blast.04/index.html).

[72] The long and varied history of North Korea's missile program is detailed in "North Korea's Ballistic Missile Program," Center for Nonproliferation Studies Web Site, Monterey Institute of International Studies, 1999, (http://cns.miis.edu/research/korea/index.htm). When viewed in total, the evidence of their effort to continue producing longer range and more

effective missiles is clear. Other nations like Iran and Syria have been more than willing to participate as well.

[73] The World Almanac and Book of Facts, 2001, p. 799.

[74] Andrew Koch and Jeanette Wolf, "Iran's Nuclear Facilities: a Profile,"

[75] Frederick R. Strain, "Iran's Nuclear Strategy: Discerning Motivations, Strategic Culture, and Rationality," in Essays on Strategy XIV, ed. Mary A. Summerville (Washington, DC: National Defense University Press, 1997), p. 14. (Taken from http://www.ndu.edu/inss/books/essa/essacont.html.)

[76] Stephen Bradner, "North Korea's Strategy," Third NPEC/Institute for National Security Studies/Army War College Workshop on Competitive Strategies, (Arlington, Virginia: NPEC/INSS/AWC, 1 August 2000), p. 2. See http://www.wizard.net/~npec/papers/bradner.htm.

[77] Ibid, pp. 2-4.

[78] "Agreed Framework Between The United States Of America And The Democratic People's Republic Of Korea

Geneva, October 21, 1994," Korean Peninsula Energy Development Organization's (KEDO) Website,

http://www.kedo.org/Agreements/agreedframework.htm.

[79] Desaix Anderson, "Myths of KEDO," an open letter to the Georgetown-Pacific Century Institute, Washington, DC, 25 March 2001.

[80] "Agreed Framework Between The United States Of America And The Democratic People's Republic Of Korea

Geneva, October 21, 1994."

[81] The DPRK Report, No. 26, Center for Nonproliferation Studies Web Site, Monterey Institute of International Studies, September-October 2000, http://cns.miis.edu/research/korea/index.htm.

[82] "Korea, North," CIA Factbook 2000, on-line version, (Washington, DC: US Central Intelligence Agency, 1 January 2000).

[83] "Doctrine- North Korea," Federation of American Scientists Website, http://www.fas.org/nuke/guide/dprk/doctrine/

FAS experts believe "It is likely that chemical weapons would be used early in the conflict, rather than held in strategic reserve. Virtually every stage of US military operations would be made more complicated by the requirement to operate after the use of chemical weapons, beginning with deploying through vulnerable ports and staging facilities. Far from being weapons of last resort, chemical weapons may be a weapon of first resort.

The introduction of chemical weapons in a conflict would have profound political consequences, raising the possible use of nuclear weapons in response. US nuclear weapons might play only a limited role in deterring North Korean chemical weapons use against military targets in the South. While a nuclear response may be seen as credible in retaliation for use of nuclear or biological weapons against urban populations, such a response could be seen as less credible against the use of chemical weapons on the battlefield, since it could be perceived as totally disproportionate.

The perceived value of nuclear weapons for North Korea is reflected in the often cited statement attributed to former Indian Army Chief of Staff Sundarji: "one principal lesson of the Gulf War is that, if a state intends to fight the United States, it should avoid doing so until and unless it possesses nuclear weapons." In the face of a credible threat of use of nuclear weapons,

the United States and its coalition partners could be forced to change the way the US would conduct operations. North Korea may see the threat of use of nuclear weapons against US coalition partners or allies as a powerful tool in undermining US options for coalition warfare, or in seeking through coercion to undermine US basing or other support for operations. North Korea must also perceive enormous value threatening Japan in order to deny the United States access to key ports and airfields in the south. ***Nuclear weapons would also serve to coerce and deter the United States from responding to a North Korean attack on the South by launching a counter-offensive aimed at, for instance, seizing Pyongyang (emphasis added)***."

[84] **Linda D. Kozaryn, "Despite Progress, North Korea Poses Major Threat,"American Forces Press Service, April 3, 2001.**

[85] The DPRK Report, No. 26.

[86] Proliferation: Threat and Response, p. 45-49.

[87] Butler, "Inspecting Iraq," in Repairing the Regime, pp. 175-184.

[88] See Oliver Thranert, "Nuclear Weapons: A Deterrent to Biological Warfare?" in ed. David G. Haglund, Pondering NATO's Nuclear Options: Gambits for a Post-Westphalian World, (Kingston, Canada: Queen's Quarterly, 1999), pp. 81-104. The author argues that the US must retain nuclear weapons as an option against biological weapons lest other states see US nuclear disarmament as an opportunity to possess biological weapons as a deterrent alternative to nuclear weapons.

[89] For a complete discussion of France, UK and European nuclear issues, specifically for France, Chapter 7, Pascal Boniface, "France and the Dubious Charms of a Post-Nuclear World," and for UK, Chapter 8, Stephen Pullinger, "The Future of Britain's Nuclear Deterrent," in Pondering NATO's Nuclear Options: Gambits for a Post-Westphalian World, pp. 151-185.

[90] The continuing strain of US-Sino relations due to the accidental bombing of the Chinese Embassy in Belgrade, the collision of a US surveillance plane and a Chinese fighter, statements by President Bush identifying China as a "strategic competitor" vice the previous Clinton view of China as a "strategic partner" makes any effort that involves China problematic. The on-going cooling of US-Russian relations that began with NATO's campaign against Serbia, continues with US statements against Russian military actions in Chechnya, the US policy of fielding a "National Missile Defense" have all served to make the likelihood of serious continuance of talks to reduce nuclear or other arms. The NMD issue has caused China to state that they would consider developing additional nuclear arms that would counter TMD or NMD.

[91] Iqbal F. Quadir, "Pakistan and Global Nuclear Issues, " Dawn, October 22, 2000, see http://www.dawn.com/2000/10/22/op.htm#1.

[92]

[93] US Department of Defense, Proliferation: Threat and Response, pp. 34-36.

[94] Ibid, p. 46.

[95] Quadir, "Pakistan and Global Nuclear Issues, " Dawn, October 22, 2000.

[96] Seth Brugger, "Understanding the Chemical Weapons Convention," Arms Control Association Factsheet, March 2001, Arms Control Association Web Site, http://www.aca.org/.

[97] Brugger, "Understanding the Chemical Weapons Convention," Arms Control Association Factsheet, March 2001.

[98] Seth Brugger, "Chemical Weapons Convention Implementation," Arms Control Association Factsheet, March 2001, Arms Control Association Web Site, http://www.aca.org/.

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[99] Annex B, US Department of Defense, Proliferation: Threat and Response, pp 117-118.

[100] "Nunn-Lugar to Destroy Crown-Jewel of Russian Nuclear Navy: Lugar Highest-Ranking American to see Typhoon Nuclear Sub," 20 August 1999 and "Nunn-Lugar Closes Most Important Soviet Era Nuclear Test Site," 31July 2000, Press Releases from Senator Richard G. Lugar's website, http://lugar.senate.gov/press.htm.

[101] Ibid.

[102] Ibid.

[103] US Department of Defense, Proliferation: Threat and Response, p. 15.

[104] Jeffrey A. Larsen, "NATO Counterproliferation Policy: A Case Study in Alliance Politics, US Air Force Academy Institute for National Security Studies Occassional Paper #17,November 1997, p. 58.

[105] Ibid, p. 41.

[106] US Air War College, The Origin of US Counterproliferation Policy, (Maxwell Air Force Base, Alabama: Air War College, 1998), p. 3. See http://www.au.af.mil/au/awc/awcgate/xon/definition.htm#top.

[107] This is not a new problem. Concerns over nuclear fallout, for example, were central to the debate in the past over the utility of nuclear weapons. Even today, use of nuclear weapons would still mean the potential for a dramatic environmental impact, not to mention a potential unacceptable loss of life, in nations not directly involved in the conflict in question. Consider how the use any weapon that could have similar aftereffects to that of the Chernobyl nuclear fire in 1986. If, for example, an anti-biological weapon was ineffective in destroying the intended target but was successful in releasing the toxin into the environment, the unintended consequences of a plague could be more devastating than even the possessor of the bio-weapon desired. Under consideration in this new world of counter-proliferation, weapons are such weapon systems as conventionally armed ICBMs or even small yield nuclear warheads. See Stephen M. Younger, "Nuclear Weapons in the Twenty-First Century," Los Alamos National Laboratory, June 27, 2000, http://lib-www.lanl.gov/la-pubs/00393603.pdf .

[108] US Department of Defense Counterproliferation Program Review Committee, Report to Congress, Chapter 5, pp 1-2. See http://www.au.af.mil/au/awc/awcgate/cprc97/cprc9705.pdf.

[109] US Department of Defense, "Executive Summary," Report on Activities and Programs for Countering Proliferation and NBC Terrorism, (Washington, DC: US Government Printing Office, April 2000), p. 11. See http://www.acq.osd.mil/cp/cprc00xsm.pdf

[110] Martin Butcher, "US, Russia Y2K Monitoring Lays Ground For Shared Early Warning Measures,"
British American Security Information Council (BASIC) Reports No. 73, January 17, 2000.
http://www.nyu.edu/globalbeat/nuclear/BASIC011700.html

[111] Feaver, "Command and Control in Emerging Nuclear Nations, p. 186.

[112] Ibid.

[113] Ibid, p. 187.

[114] Tariq Rauf, "Successes of the Nuclear Non-Proliferation Regime," Center for Nonproliferation Studies website, Monterey Institute of International Studies, 8 October 1999. Paper presented for on the topic of Curbing The Spread Of Nuclear Weapons, A Panel Discussion Organized By The International Atomic Energy Agency And The Provisional Technical Secretariat Of The Comprehensive Test Ban Treaty Organization, http://cns.miis.edu/cns/projects/ionp/iaea.htm.