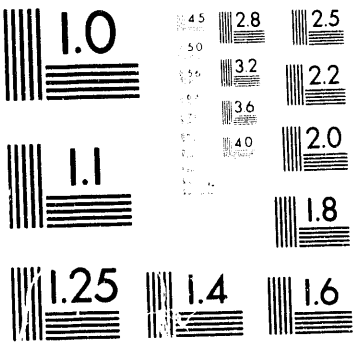
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PROGRAM ON STABILITY AND THE OFFENSE/DEFENSE RELATIONSHIP

Final Report

MILITARY and DIPLOMATIC ROLES and OPTIONS

for Managing and Responding to the Proliferation of Ballistic Missiles and Weapons of Mass Destruction

March 30, 1993
SAIC, McLean VA.

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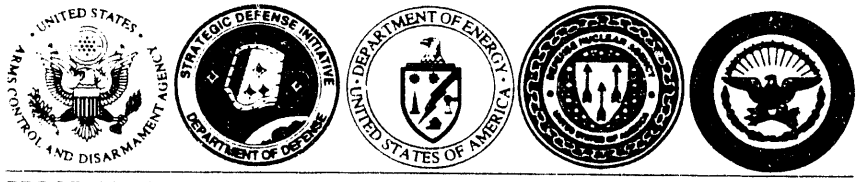

SEMINAR EXECUTIVE SUMMARY

MILITARY AND DIPLOMATIC ROLES AND OPTIONS

SAIC, McLean, VA
March 30, 1993

Introduction: The March seminar, "Military and Diplomatic Roles and Options" for managing and responding to proliferation, featured three presentations: the military and diplomatic implications of preemptive force as a counterproliferation option; an in-depth assessment of the threat posed by biological weapons; and, a new proposed U.S. counterproliferation policy.

Military Options for Countering the Proliferation of Weapons of Mass Destruction are becoming a more important component of the emergent US counterproliferation strategy. The use of preemptive force against WMD targets may have merit if a deliberate decision had been made -- as in Desert Storm -- to accept a large-scale conflict for other purposes, though some participants were less inclined to advocate counterproliferation-only attacks except under extraordinary circumstances. Some believed that pre-emptive attacks might provoke the use of WMD by the attacked party. Unless there was a high probability of successfully eliminating all such weapons and minimizing the negative effects on friends and allies, some participants believed the risks of such an attack were not acceptable. Nevertheless, inaction in the face of WMD intimidation was unsatisfactory to most participants.

Biological Warfare: A Different Kind of Problem: Over the past two decades, technical breakthroughs, coupled with the ready availability of dual-use equipment and a broad range of legitimate commercial applications, have put a BW capability within reach of many countries. In the past two years, Russia and Iraq have admitted to BW programs, and Syria may be unique in the Third World for pursuing both significant BW offensive *and* defensive capabilities. While longer-range delivery systems, either ballistic or cruise missiles, may be increasing the WMD potential and appeal of BW, especially in countries that do not possess a nuclear capability, BW is most efficiently delivered as an aerosol through the use of "line sources," such as a moving vehicle or low flying aircraft.

To address the BW challenge, a "cost-effective" BW regime concentrating on openness, transparency, and increased monitoring is needed. A BW arms control effort should be, however, a component of a larger "BW counterproliferation web" of disincentives and constraints, including: improved intelligence and the judicious sharing of intelligence; an improved defensive posture including better detection, treatment, decontamination, and protective measures; ATBM defenses; better industrial awareness; a declared response policy; enhanced cooperation between the United States and its friends and allies for countering the early signs of BW proliferation. BW counterproliferation efforts need to focus on such things as weaponization, training, field testing, doctrine, force structure, and detection assets, as well as the acquisition of protective and medical assets.

A Proposed U.S. Counterproliferation Strategy would expand DoD's interests beyond countering the spread of weapons of mass destruction and their delivery systems to include the following: the proliferation of advanced conventional and space systems; weapons infrastructure (including R&D, production, logistics, technical information, and expertise); military training and doctrine; common conventional systems; and the economic basis for proliferation programs. This proposed strategy would encompass a wide array of interactive objectives, such as compelling nations to cease WMD efforts and would include a wide variety of methods, including both offensive and defensive military capabilities and a broadly focused diplomatic effort to marshal international enforcement commitments. Improved intelligence is vital for a new policy. Some participants believed that the Nonproliferation Center, while performing a valuable coordination function, was not producing the kind of actionable intelligence required by the policy community for addressing the multi-faceted proliferation threat. Others, however, believed that the policy community had not clearly defined its intelligence requirements. Further, they expressed concern that a broad approach to proliferation might only dilute policy content, impede effective coordination among responsible actors and agencies, and do damage to other important U.S. foreign and domestic interests.

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SEMINAR FINAL REPORT

MILITARY AND DIPLOMATIC ROLES AND OPTIONS FOR MANAGING AND RESPONDING TO THE PROLIFERATION OF BALLISTIC MISSILES AND WEAPONS OF MASS DESTRUCTION

30 MARCH 1993

INTRODUCTION

On March 30, 1993, the second meeting of the seminar series on "Proliferation of Weapons of Mass Destruction and the Implications for Regional Stability" was held at SAIC in McLean, Virginia. The series is part of the Arms Control and Disarmament Agency's ongoing study of key national and international security problems. The March seminar, "Military and Diplomatic Roles and Options" for managing and responding to proliferation, featured three presentations. The first presentation focused on the military and diplomatic implications of preemptive force as a counter-proliferation option. The second presentation provided an in-depth assessment of the threat posed by biological weapons and identified military and diplomatic roles and options for meeting that threat. The third presentation identified a spectrum of potential military and diplomatic requirements related to the new U.S. counterproliferation strategy for weapons of mass destruction (WMD) and WMD infrastructure.

MILITARY OPTIONS FOR COUNTERING THE PROLIFERATION OF WEAPONS OF MASS DESTRUCTION

One presenter believed that military options are becoming a more important component of the emergent U.S. counterproliferation strategy. The presenter then offered a framework for assessing the utility of military force as a means to prevent the acquisition of WMD, the use of WMD, and provide defense against WMD. Other participants questioned whether the presenter was describing preemptive engagements for the purpose of countering proliferation, or as a prelude to offensive military operations for the purpose of achieving objectives more broadly cast than counterproliferation. In general, most believed both possibilities required attention. For example, the preemptive use of military force for counterproliferation purposes only presumed a desire to avoid any widening of the conflict, including retaliation. Thus, whereas a preemptive "counterproliferation" operation might be small, covert, and highly focused in terms of its objective, a substantial back-up force might still be required to deter retaliatory aggression, especially of an escalatory nature.

In either case, responses to a widening of the conflict need to be considered as a likely contingency requirement. Participants acknowledged that even a small counterproliferation attack would be viewed by many as an act of war. Thus, they were prepared to consider the use of preemptive force against WMD targets if a deliberate decision had been made -- as in Desert Storm -- to accept a large-scale conflict for other purposes, but were less inclined to advocate counterproliferation-only attacks except under extraordinary circumstances. Further, some participants believed that preemptive attacks -- even as a prelude to a larger conflict -- might only provoke the use of WMD by the attacked party. Thus, unless there was a high probability of successfully eliminating all such weapons, some participants were not inclined to view as acceptable the risks of such attacks.

A discussion of the current proliferation situations in the Middle East, North Asia, and Ukraine ensued. Its specific content remains classified; however, participants did examine the pros and cons, including feasibility and the probability of success, of preemptive attacks (and off-the-shelf covert and overt attack capabilities) as counterproliferation tools. Seminar participants expressed a variety of opinions on this approach. Given the multiplicity of regional actors, they agreed that the United States needed a better understanding of other countries' values and motivations in order to make informed judgments about what U.S. capabilities and declaratory policies might deter them from proliferating, or compel them to desist. An argument was made that some countries will not be deterred from acquiring WMD in any case, and that a militarily proactive policy might only drive the programs of the proliferating states underground. Other participants argued that the existing non-proliferation regime was impeding but not blocking or rolling back the spread of WMD and longer-range missiles. Thus, they argued, time was running out for diplomatic approaches to the problem.

Many participants stressed that a preemptive attack would be tantamount to a declaration of war, and would need to be carefully assessed in terms of its impact on national opinion, the world community, coalitions, and close friends and allies. There might be serious reticence on the part of other nations to follow a U.S. lead, for example, or to permit the use of their facilities, air space, etc. Considerable U.S. hand-holding and security assistance might also be required. Other participants argued that the United States might not be prepared to accept the risk of deploying forces into Third World regions where the use of WMD was a distinct possibility.

Participants agreed that chemical weapons were not likely to pose as great a problem, and some argued that biological weapons were not likely to be a serious concern either. Others considered BW a serious threat, but the discussion focused mainly on the question of nuclear risk.

One participant argued persuasively that biological and nuclear weapons presented great risk, but that the United States needed to appreciate that its military forces were, sooner or later, going to have to accept such risks even in Third World interventions. A number of participants then argued that the alternative -- inaction in the face of WMD intimidation -- was completely unacceptable. All agreed that the United States interagency had a pressing need to think through the military and diplomatic implications of U.S. involvement in Third World conflicts that could, and eventually probably would, escalate across the nuclear threshold.

Because of the sensitivities involved in overt military counter-proliferation operations, several participants argued that more attention should be paid to special operations forces and the counterproliferation potential of covert operations. One participant suggested that if the risk was great enough, current U.S. legal constraints might need to be changed. Participants suggested that more attention needed to be paid to ways in which the United States might be able to encourage responsible parties in a pariah state to replace an irresponsible government.

While criteria for direct engagement were offered, most participants believed that U.S. military involvement will ultimately hinge on U.S. perceptions of vital interests. In this view, participants suggested some proliferation and proliferators may be more acceptable than others. Others believed that consistency was essential to the preservation of nonproliferation norms, and the willingness of the major powers to provide leadership (and military forces, economic sanctions, and other forms of direct pressures).

BIOLOGICAL WARFARE: A DIFFERENT KIND OF PROBLEM

The second presenter argued that, during the 1960's, biological weapons (BW) were unstable, unpredictable, slow acting, and difficult to mass-produce. Over the past two decades, however, technical breakthroughs in aerosols, production capabilities, stabilization, micro-encapsulation, and milling, coupled with the ready availability of dual-use equipment and a broad range of legitimate commercial applications, have made a BW capability much more desirable to an increasing number of countries. Longer-range delivery systems may be actualizing the WMD potential of BW and enhancing its appeal, especially as other non-nuclear weapons may not be particularly effective against strategic targets.

Furthermore, because only a few kilograms of BW agents may be needed to incapacitate or kill large numbers of people, BW programs are extremely difficult to detect and can be created in most well-equipped medical or research laboratories. In the U.S. alone, over 500 facilities can produce significant amounts of the toxins most commonly used in BW. Because of these factors,

BW represents an entirely different kind of WMD problem to U.S. planners and policy makers.

BW is most efficiently delivered as an aerosol spray through the use of "line sources," such as a moving vehicle or low flying aircraft. BW delivered by "point sources," such as a ballistic missile (even with bomblets) is much less efficient. Because BW is greatly affected by meteorological conditions and can be defended against with vaccines and protective garments, it also is most effective as a terror weapon against a large unprepared civilian population. Nevertheless, the proliferation of longer-range ballistic missiles remains a stimulus for BW proliferation in countries that lack a nuclear program. Further, the proliferation of cruise missile technologies portends an increase in Third World interest in BW.

A number of nations have an active BW research program, and a still larger number have the raw capability to produce BW agents, weapons, and delivery systems of varying ranges and sophistication. In 1991, Iraq admitted to a BW research program that consisted entirely of dual-use equipment, and Russia, a year later, conceded that it possessed a large-scale offensive BW program (though its full scope and current status are unclear). While a number of nations may be pursuing offensive BW programs, Syria may be unique in the Third World for pursuing both significant BW offensive *and* defensive capabilities.

To address the BW challenge, one participant argued for a "cost-effective" BW regime that concentrated on openness and transparency and increased monitoring rather than verification measures. This kind of regime would aim to raise the cost of pursuing an offensive BW capability without threatening legitimate research and commercial application. Some participants suggested that these goals might be achieved in a strengthened BWC. However, most agreed that the BW threat will not be met by arms control alone, and rejected an emulation of the CWC. Instead, they argued that BW arms control efforts should be a component of a larger "BW counterproliferation web" of disincentives and constraints.

Participants suggested that this effort might consist of the following components: improved intelligence and the judicious use and sharing of intelligence; an improved defensive posture including better detection, treatment, decontamination, and protective measures; ATBM defenses; better industrial awareness; a declared response policy; better cooperation between the United States and its friends and allies; and a more broadly-based approach to countering the early signs of BW proliferation. As one participant pointed out, BW counter-proliferation efforts need to stop focusing so heavily on the problems associated with detecting the production of agents. Instead, they need to realize that large-scale BW capabilities also require weaponization, training,

field testing, doctrine, force structure, and detection assets, not to mention the acquisition of protective and medical assets that may be suspicious in terms of their characteristics. While there are few if any BW-unique agent-production items, large-scale BW programs such as those in the former Soviet Union, Iraq, and Syria have identifiable signatures. Thus, the question is not whether the United States can ascertain that a BW program exists; rather, it is "what are we and our allies prepared to do about it when it obviously does exist?"

Participants acknowledged the need to devote greater attention to military and diplomatic efforts to counter BW proliferation and use, and also to prepare for its possible use against U.S. and allied forces and populations. The presenter urged strongly that policy makers avail themselves of technical advice available from the scientific community inasmuch as non-experts were often ill-informed.

A NEW COUNTERPROLIFERATION STRATEGY

Building on the notion of a multifaceted approach to BW counterproliferation, the third presenter outlined elements of a possible new counterproliferation strategy. This strategy, he suggested, would expand DoD's interests beyond countering the spread of weapons of mass destruction and their delivery systems. The new strategy would also attempt to counter the proliferation of advanced conventional and space systems; weapons infrastructure to include R&D, production, logistics, technical information, and expertise; military training and doctrine; common conventional systems; and the economic basis for proliferation programs. In addition to a broader scope, the proposed strategy would encompass a wide array of interactive objectives, including: encouraging nations to abandon WMD programs; limiting capabilities to initiate or expand programs; deterring initiation or expansion of programs; and, in the necessary cases, compelling nations to cease WMD efforts.

To achieve these objectives, a wide variety of methods would be used, including: international information-sharing; verifiable counterproliferation regimes; credible military deterrence; both offensive and defensive capabilities; and a broadly focused diplomatic effort to marshal international enforcement commitments. The presenter argued that U.S. counterproliferation policy needed to be broadly focused, fully committed to the objective of preventing proliferation, declared boldly, and made credible through strong responses to all proliferation activities.

One participant argued that the current government enforcement process was not designed for this kind of counterproliferation policy. Some believed that the Nonproliferation Center, while

performing a valuable coordination function, was not producing the kind of actionable intelligence required by the policy community for addressing the multi-faceted and expanded proliferation threat. On the other hand, others believed that the policy community has not clearly defined its intelligence requirements. Further, it was argued that a broad approach to proliferation might only dilute policy content, impede effective coordination among responsible actors and agencies, and do damage to other important U.S. foreign and domestic interests.

As a way to address these issues, one participant suggested the formation of a new, integrated, and multi-agency government "counterproliferation guild." Leadership for this "guild" might be in the form of a small group working between the NSC and newly created NEC. While drawing the interest of the seminar, some participants cautioned that any new policy, especially one dealing with organizational changes, would have be scrutinized by and possibly rejected by Congress. Others doubted that such an arrangement would be a panacea for anything. What was needed in their opinion was a country-by-country appraisal of the costs and risks of particular courses of action leading to highly focused U.S. counterproliferation country strategies. The problem in their estimation was lack of consensus with regard to the tradeoffs involved in options for countering proliferation in the Third World and former Soviet Union.

CONCLUSIONS

Participants agreed that current counterproliferation efforts should be expanded. Military planning should become an integral part of the counterproliferation strategy. Important issues regarding the priorities given competing U.S. interests, when and what kind of military forces might be used, the role and changed nature of deterrence, and where the military options might fit in with other counterproliferation tools available to U.S. policy makers, were recommended for further study. Participants were also clear that BW was a potential weapon of mass destruction by virtue of its lethal capacity and ease of manufacture and use. Countering the BW threat would, in their estimation, require a diverse array of measures, many of which were outlined both in the BW presentation and in the new counterproliferation policy. Others felt that the key issues all dealt with the diplomatic management of international norms and the readiness of responsible nations to bear the probable costs and risks of aggressive counterproliferation policies.

Further, participants stressed the role of intelligence throughout the seminar. It was generally agreed that intelligence efforts needed to be expanded, and the intelligence products needed to be more actionable. This might require not only enhancements to the responsiveness of the intelligence community, but also leadership within the policy community to better define intelligence requirements.

SEMINAR SUMMARY REPORT

MILITARY AND DIPLOMATIC ROLES AND OPTIONS FOR MANAGING AND RESPONDING TO THE PROLIFERATION OF BALLISITIC MISSILES AND WEAPONS OF MASS DESTRUCTION

SAIC, McLean, VA
March 30, 1993

Sponsored by:
The Arms Control and Disarmament Agency
The Defense Nuclear Agency
The Department of Energy
The Strategic Defense Initiative Organization
The Office of the Secretary of Defense -- ISP

Introduction

On March 30, 1993, the second meeting of the seminar series on "Proliferation of Ballistic Missiles and Weapons of Mass Destruction and the Implications for Regional Stability" was held at SAIC in McLean, Virginia. The March seminar, "Military and Diplomatic Roles and Options" for managing and responding to proliferation, featured three presentations: the military and diplomatic implications of preemptive force as a counter-proliferation option; an in-depth assessment of the threat posed by biological weapons; and, a new U.S. strategy for countering the proliferation of Weapons of Mass Destruction (WMD).

Military Options for Countering the Proliferation of Weapons of Mass Destruction

The first presenter argued that military options are becoming a more important component of the emergent US counterproliferation strategy. He offered a framework for assessing the utility of military force as a means both to prevent the acquisition and use of WMD, and to provide defenses against WMD. Participants saw merit in the use of preemptive force against WMD targets if a deliberate decision had been made -- as in Desert Storm -- to accept a large-scale conflict for other purposes. They were less inclined to advocate counterproliferation-only attacks except under extraordinary circumstances. Further, some participants believed that preemptive attacks -- even as a prelude to a larger conflict -- might provoke the use of WMD, particularly nuclear weapons, by the attacked party. Unless there was a high probability of successfully eliminating all such weapons and minimizing the negative effects on friends and allies, these participants were not inclined (in most cases) to view as acceptable the risks of such an attack. Nevertheless, the alternative -- immobility in the face of WMD intimidation -- was unacceptable to most participants. Some participants concluded that more attention needs to be paid to special operations forces and covert operations.

Biological Warfare: A Different Kind of Problem

The second presenter reviewed the changes that were occurring in the efficacy of BW as a WMD threat. During the 1960's, biological weapons (BW) were generally considered unstable, unpredictable, slow acting, and difficult to mass-produce. Over the past two decades, however, technical breakthroughs, coupled with the ready availability of dual-use equipment and a broad range of legitimate commercial applications, have put a BW capability within reach of many countries. In 1991, Iraq admitted to a BW research program that consisted entirely of dual-use equipment, and Russia, conceded a year later that it possessed a large-scale offensive BW

program (though its full scope and current status are unclear). While a number of nations may be pursuing offensive BW programs, Syria may be unique in the Third World for pursuing both significant BW offensive *and* defensive capabilities.

Longer-range delivery systems, either ballistic or cruise missiles, may be increasing the WMD potential and appeal of BW, especially in countries that do not possess a nuclear capability. Still, BW is most efficiently delivered as an aerosol through the use of "line sources," such as a moving vehicle or low flying aircraft. BW delivered by "point sources," such as a ballistic missile (even with bomblets) is much less efficient. Because it is greatly affected by meteorological conditions and can be defended against with vaccines and protective garments, BW is most effective as a terror weapon against a large unprepared civilian population. Nevertheless, because only kilograms of BW agents are needed to incapacitate or kill large numbers of people, BW agent programs are extremely difficult to detect and can be created in most well-equipped medical or research laboratories.

To address the BW challenge, one participant argued for a "cost-effective" BW regime that concentrated on openness and transparency and on increased monitoring rather than verification measures. These goals might be achieved in a strengthened BWC. However, the BW threat will not be met by arms control alone. BW arms control efforts should be a component of a larger "BW counterproliferation web" of disincentives and constraints, including: improved intelligence and the judicious sharing of intelligence; an improved defensive posture including better detection, treatment, decontamination, and protective measures; ATBM defenses; better industrial awareness; a declared response policy; better cooperation between the United States and its friends and allies for countering the early signs of BW proliferation. BW counter-proliferation efforts need to focus on such things as weaponization, training, field testing, doctrine, force structure, and detection assets, as well as the acquisition of protective and medical assets.

A New Counterproliferation Strategy

The third presenter predicted that the new U.S. counterproliferation strategy would expand DoD's interests beyond countering the spread of weapons of mass destruction and their delivery systems. In his view, DoD would also be required monitor the following: the proliferation of advanced conventional and space systems; weapons infrastructure (including R&D, production, logistics, technical information, and expertise); military training and doctrine; common conventional systems; and the economic basis for proliferation programs. In addition to a broader scope, his proposed strategy would encompass a wide array of interactive objectives, including compelling nations to cease WMD efforts. A wide variety of methods would be used, including both offensive and defensive military capabilities and a broadly focused diplomatic effort to marshal international enforcement commitments.

Some believed that the Nonproliferation Center, while performing a valuable coordination function, was not producing the kind of actionable intelligence required by the policy community for addressing the multi-faceted proliferation threat. On the other hand, others believed that the policy community had not clearly defined its intelligence requirements. Further, they expressed concern that a broad approach to proliferation might only dilute policy content, impede effective coordination among responsible actors and agencies, and do damage to other important U.S. foreign and domestic interests.

Some participants cautioned that any new policy, especially one dealing with organizational changes, would have to be scrutinized by Congress, and doubted that such changes would be a panacea for anything. Instead, they argued for a country-by-country appraisal of the costs and risks of particular courses of action, leading to highly focused U.S. counterproliferation country strategies. The current lack of consensus with regard to the tradeoffs involved in options for countering proliferation was apparent to all.

THE GLOBAL PROLIFERATION THREAT: A SUMMARY

by Ralph A. Hallenbeck

I. Nuclear Proliferation

In addition to the five recognized nuclear weapon states (the United States, Russia, China, France, and Great Britain), Israel, India, and Pakistan are each believed to already possess nuclear weapon capabilities. All three have active nuclear weapon research and development programs; India and Pakistan are believed to have produced significant amounts of plutonium (India) and highly enriched uranium (Pakistan); India has tested a nuclear device; and Israel is believed to already have a rather substantial nuclear arsenal (perhaps as many as two hundred weapons). None of these states has admitted unambiguously that it possesses such weapons. Thus, they often are referred to as "Unacknowledged Nuclear Weapon States."

A second group of states, termed the "Potential Inheritors," is comprised of Ukraine, Kazakhstan, and Belarus. Several thousand nuclear warheads previously belonging to the USSR remain deployed on their territories under the control of military commanders from the Russian-dominated Commonwealth of Independent States (CIS). Control over the weapons remains at issue between Russia and the other former republics, especially Ukraine.

As a means both to end the custody dispute and to finalize the START Treaty, Ukraine, Kazakhstan, and Belarus each agreed during the May 1992 NATO summit in Lisbon to eliminate all of the nuclear weapons from their territories. Further, they committed to achieve this outcome by the end of the seven-year START-Treaty reduction period, and to join the Non-Proliferation Treaty (NPT) as non-nuclear weapons states in the "shortest possible time." Of the three, only Belarus has begun to meet its commitments.

Some analysts believe that Ukraine will eventually renege on its pledges, seize control of the roughly 1760 warheads currently

located on Ukrainian territory, and declare itself a nuclear successor state to the former USSR. If this were to occur, many believe that Kazakhstan would follow suit. The future of the NPT might be threatened, and Germany, Turkey, Bulgaria, and Poland, among others, would undoubtedly feel compelled to reassess their non-nuclear status. Thus, the Potential Inheritors will remain a proliferation concern until the Lisbon protocols are implemented.

Third, there are the so called "Threshold Nuclear Weapon States:" Iraq and North Korea. These states are (or, in the case of Iraq, were) probably no more than a few years away from producing an operational nuclear device. Under growing pressure from China, Japan, and the West, North Korea did agree finally to accept safeguard inspections by the International Atomic Energy Agency (IAEA); however, it has since announced its intent to withdraw from the NPT. Iraq, on the other hand, is being forced by the United Nations to eliminate its nuclear weapon program and all related research and development (R&D) infrastructure.

Iraq was close to producing a weapon prior to the Gulf War, and North Korea may still be on the threshold. Most other Third World countries, however, remain focussed on developing nuclear research facilities, acquiring a knowledge of nuclear technology, and creating a cadre of nuclear scientists and technicians. The "Other Aspiring Proliferators" currently include Algeria, Iran, Libya, and Syria; however, others could emerge. The success or failure of counter-proliferation efforts vis-a-vis the Aspirant states could, for example, determine the future nuclear status of nearby Egypt and Turkey. Also, Taiwan and South Korea, which were once interested in acquiring nuclear weapons, could someday reactivate their programs.

It is generally agreed that the four aspiring Middle Eastern states have a long way to go before they might be able to produce a nuclear device. In gross terms, a decade or more of research, development, and infrastructure acquisition would probably be

required. That length of time might be cut somewhat through additional investment or (as discussed below) a high degree of access to outside expertise and technology. On the other hand, of the four Aspirant states, only Iran has an extensive scientific and technological base (which it acquired in the 1970s), and an apparent intent to invest heavily in military weapon programs.

Because both Taiwan and South Korea already possess the requisite scientific expertise and technological infrastructure, either of these states could -- if they chose to do so -- produce a crude first generation nuclear weapon much more quickly than Iran or any of the other Aspirant states. On the other hand, unless these countries were compelled by extraordinary circumstances to seek such weapons, neither seems inclined to provoke the stiff international sanctions that would probably accompany such a move. Egypt and Turkey are less capable, and also currently disinclined to bear the probable political cost.

Finally, there are the "Nuclear Rollback Cases." The three outstanding members of this group, Brazil, Argentina, and South Africa, have agreed to terminate their nuclear weapons programs. Each has signed an agreement to put all of its nuclear facilities under IAEA safeguards, South Africa has joined the NPT, and the two Latin American countries have agreed to bring the Treaty of Tlatelolco (which bans nuclear weapons from the region) into effect for themselves.

Brazil has not ratified an agreement with the IAEA, however, and neither Brazil nor Argentina have brought the Treaty of Tlatelolco into force. Further, there is concern that the recent leadership change in Brazil and the resulting uncertainty in Argentina could lead to policy reversals in both countries. Were either one of these Rollback states to resume its nuclear weapon acquisition effort, the other would almost certainly follow. Both are believed capable of fielding a crude nuclear device by the turn of the century.

Unlike Brazil and Argentina, South Africa has joined the NPT and submitted to IAEA inspections. However, there is concern that prior to joining, South Africa may have had more highly enriched uranium (HEU) than it admitted in the IAEA. South Africa's on-going effort to develop an intermediate-range ballistic missile similar to Israel's Jericho II is also a source of concern.

The last concern is that the break-up of the former Soviet Union (and -- as at least some analysts speculate -- the possible disintegration of China) will provide proliferators access to nuclear-weapon technologies and scientific knowhow (or access to a whole nuclear weapon). A variety of steps have been taken by the successors to the USSR, and by the West, to preclude such a possibility (e.g., tight security measures have been imposed on the most sensitive items, and attractive forms of alternative employment are being created for nuclear experts). A general lack of effective export controls in the former Soviet republics is apparent, however, as indicated by large-scale non-nuclear smuggling and blackmarket activities. Physical security and accountability at nuclear weapon sites is another concern.

II. Proliferation of Other Weapons of Mass Destruction

Many of the states listed above as Unacknowledged nuclear weapon states, Potential Inheritors, Threshold states, Aspiring states, or nuclear Rollback cases, are engaged in the acquisition or production of ballistic missiles. Such missiles are only as damaging as the warheads they carry, however, and (as discussed above) nuclear warheads seemingly remain out of reach for all but a very few states.

Conventional warheads are incapable of "mass destruction" (i.e., of producing casualty levels on the order of 100,000 or more in a single attack), and less capable in many respects than chemical or biological weapons. Chemical weapons (CW) can be substantially more destructive than conventional ones, especially

if the target population has not been issued protective garments and masks. Although they too are incapable of mass destruction, chemical weapons are very effective as a means to terrorize an unprotected population.

Biological and toxin weapons (BW), on the other hand, if properly employed against a heavily populated area, are more than capable of producing 100,000 or more casualties in a single attack. Further, modest quantities (e.g., 50 gallons) of a BW agent can achieve such results; hence, weight and volumetric restrictions are less challenging that they are for CW weapons. Finally, BW agents are more difficult to defend against than CW.

The problem is that BW delivery must be very precise and efficient in order to achieve optimum results. If ballistic missiles are used to deliver an agent, submunitions capable of dispensing the living biological organisms must be released at exactly the right altitude, in a manner to achieve precisely the desired dispersal pattern on the ground. Also, the submunitions have to be capable of withstanding impact with the ground, and of then dispensing an even spray of agent into the air. Finally, the biological organisms need to be very robust in order to survive the entire delivery sequence (while also retaining a high level of virulence and pathogenicity). At present, Third World countries (with the possible exception of Israel) are unable to meet these demanding delivery requirements.

Also, although crude but lethal biological agents are easy to produce, the production of more sophisticated agents (like microencapsulated or freeze-dried organisms and toxins) can be more difficult and expensive. Finally, biological weapons have often been viewed skeptically by military planners due to the high degree of uncertainty associated with their employment. The risk of self-infection, either through mishap or reprisal, has also been a major military disincentive.

The states suspected of developing biological weapons (BW) include Russia, China, Syria, Iraq, Iran, Libya, North Korea, Israel, Egypt, Cuba, Taiwan, Romania, Bulgaria, and South Africa. Russia has renounced such weapons; however, it is far from clear that Russia's BW program has actually been terminated. Except for whatever residual BW capability remains in the former Soviet Union (FSU), however, Syria is the only state that appears committed to the large scale development and production of such weapons at this time.

Syrian leaders may view BW as the only affordable deterrent against Israeli (or, in the future, other Middle Eastern) nuclear weapons. The "Unacknowledged" and "Potential Inheritor" states, on the other hand, may view BW as unnecessary because of their possession or potential access to nuclear weapons. North Korea probably chose to husband its very limited resources in order to maximize the development of nuclear weapons, for example, and the "Aspiring" nuclear proliferators may view BW as impractical, or less desirable than CW in the absence of effective longer-range ballistic missile delivery systems. Further, lack of defenses against possible BW reprisals may also color their thinking.

Although cruise missiles are potentially just as effective for BW delivery as ballistic ones, they must be able to "terrain navigate" at roughly 50 feet or less above the ground, along a precise route, while dispensing agent evenly and only during the correct portion of the flight path. On-board computers, contour sensors, and precise navigational systems are required. Also, they must be powerful enough to transport the bulk agent and an on-board aerosolization device. At present, such cruise missiles are available only in the West, perhaps in Israel, and in the former Soviet Union.

Near-term CW and BW options cannot be ruled out. Over the longer-term, BW proliferation may be almost as big a threat as nuclear proliferation. Current Third World delivery systems may

lack the wherewithal to inflict mass casualties; however, if armed with BW or CW munitions, even current types of missiles might be effective enough to produce panic among an unprotected population. As discussed next, several Third World states appear to be on the verge of acquiring more capable missiles.

C. The Proliferation of Missile Delivery Systems

The United States, Russia, France, China, and the United Kingdom do, of course, possess large quantities of sophisticated cruise and ballistic missiles. Further, to one extent or another, most if not all of these states have contributed to the spread of missiles and missile technologies to Third World countries.

In addition to technology-sharing with Allies, the United States provided Nike Hercules air defense missiles to South Korea -- which the South Koreans promptly converted into surface-to-surface missiles. Russia has exported large numbers of short-range FROG and SS21 missiles to many countries, and has sold 300 km range SCUD missiles to a variety of others (including Syria, Iraq, Egypt, and Libya). Russia is now also prepared to export powerful rocket motors to India.

The 600 km range Israeli Jericho missile benefitted from considerable French assistance. And the French Exocet and Chinese Silkworm cruise missiles have been marketed widely. Further, North Korea has reverse-engineered, and is now producing improved SCUD-C missiles and exporting them to Iran and Syria. In 1988, the Chinese sold perhaps fifty 2,700 km range CSS-2 intermediate-range ballistic missiles to Saudi Arabia. They now are reportedly seeking to sell two solid fuel missiles, the 600 km M-9 and the 300 km M-11, to a variety of countries, including Syria. Most importantly, Iran may soon obtain M-class missile-manufacturing capabilities of its own, probably with Chinese assistance.

Because both of the Chinese M-class missiles are expected to be much more accurate than the SCUD, the West is attempting to convince Bejing to halt both its missile sales and its transfer of M-class production facilities. Despite the fact that China agreed to comply with the Missile Technology Control Regime (MTCR), the Chinese have thus far resisted the Western pressure. Similarly, despite a Russian pledge to respect the MTCR, Moscow has refused to halt its sale of rocket motors to India. And, inasmuch as none of the other former Soviet republics has agreed to abide by the MTCR restrictions, the transfer of missiles and technologies from the FSU is a growing concern. In fact, Ukraine has made clear its intent to become a major supplier of space-launch vehicles and components.

Other sources of supply are also proliferating. The North Koreans, for example, have provided Iran facilities to produce 600 km range SCUD-C missiles. Israel appears to have allowed South Africa to produce a missile similar to its Jericho II, and copies of Israel's Gabriel anti-ship cruise missile are being produced by both South Africa and Taiwan. Cruise missiles also are under development in Brazil and Argentina, although Argentina has terminated its Condor ballistic missile program.

All of these missile-producing countries are endeavoring to improve the quality of their products. For example, Pyongyang is now developing a 1000 km missile, the No Dong-I; the Israelis are developing the 1500 km Jericho II missile; the Pakistanis are developing the 650 km Hatf III missile; Iraq has demonstrated its ability to product-improve the SCUD missile in order to give it 600-900 km range; India is developing the 2,500 km range Agni missile; Libya is developing its own 1000 km range missile; and Brazil has been developing space-launch missiles and sounding rockets for some time. Moreover, many Third World states now have an ability to produce drones and remotely-piloted vehicles similar to cruise missiles.

In short, the so-called industrialized countries no longer have a monopoly on missiles. Indeed, despite the prohibitive expense of engaging in indigenous missile production, the number of Third World states developing, product-improving, and/or manufacturing missiles and high-performance aircraft (where the necessary skills and technologies are often comparable) is growing. There also is an apparent effort on the part of some Third World missile producers to thwart the MTCR by engaging in cooperative development programs among themselves.

Although Third World missiles currently lack the most sophisticated propellants, structural composites, guidance sets, flight instruments, control systems, on-board computers, reentry vehicles, fusing mechanisms, avionics, and the like, Third World states are likely to achieve significant advances in the decade ahead. Some range and accuracy improvements seem virtually certain to occur. The U.S. Global Positioning System (GPS), for example, should permit a dramatic improvement in the accuracy of all cruise missiles. This, in turn, might enable Third World cruise missiles to deliver BW very effectively indeed.

MILITARY AND DIPLOMATIC ROLES AND OPTIONS:
A READ-AHEAD FOR THE 30 MARCH SEMINAR

by Ralph A. Hallenbeck

As the opening of the 1995 Nuclear Non-Proliferation Treaty (NPT) Extension Conference approaches, the ability of the United States to sustain international support for an indefinite or prolonged extension of the NPT, and for collectively countering the proliferation of ballistic missiles and nuclear, biological, and chemical (NBC) weapons, is becoming increasingly problematic. Three challenges are likely to be particularly burdensome:

o First, North Korea's announced intent to withdraw from the NPT could be a serious blow to prospects for a long-term treaty extension. The possibility of nuclear weapons in North Korean hands is now a very pressing security concern for Asian states, especially South Korea and Japan. Their willingness to support an NPT extension could depend on the international response to Pyongyang's actions. Moreover, the entire world is watching to see what, if anything, will happen to North Korea; Ukraine and Kazakhstan are especially likely to be watching closely.

o Second, if Ukraine and/or Kazakhstan renege on commitments to join the NPT, that could also be a serious blow to the treaty. Nuclear weapons in the hands of these states are perceived by some to pose serious threats to Central Europe and Asia; and also to risk armed conflict between Russia and Ukraine, and Russia and Kazakhstan. Moreover, even if Russia accepts Ukrainian and Kazakh weapons as a fait accompli, India, Pakistan, and Israel might view this as a basis for demanding international acceptance of their weapon capabilities as well; which would doom the NPT.

o Third, apart from the nuclear weapon custody dispute between Russia, Ukraine, and Kazakhstan, the on-going political turmoil in the former Soviet Union (FSU) could result in loss of control over some nuclear weapon technologies and expertise, or even over

whole weapons. The break-up of Russia into several independent states (which some experts now predict will occur within the year) would obviously exacerbate this problem. If NBC weapons or important technologies were to fall into the hands of Third World aggressor states or terrorist organizations, the NPT, BWC, and CWC might collapse. Third World proliferators, such as Iran and North Korea, would probably redouble their efforts to acquire nuclear weapons, especially if technology transfer barriers began to fall. And Iraq will in any case continue its effort to evade the UN-enforced ban on Iraqi NBC-weapon programs.

The implications of all three scenarios extend to states not normally included on lists of known or suspected proliferators. Japan, Taiwan, South Korea, Germany, Poland, Turkey, and Greece, for example, could feel sufficiently threatened to leave the NPT, and to seek nuclear weapons of their own. Brazil and Argentina, which have indicated willingness to roll back their nuclear weapon programs, could reconsider their options. And Third World states that lack the capacity to produce nuclear weapons could seek to acquire chemical or biological ones instead. Under such circumstances, the demand for Ballistic missiles would surely grow, and China, North Korea, and Ukraine would probably vie to satisfy this new demand.

If so, it is unlikely that the predominately Western export control regimes -- the Missile Technology Control Regime (MTCR), COCOM, the Australia Group, the Nuclear Suppliers Group, and the Zangger Committee -- would continue to function effectively. The "mother of all arms races" could ensue, not only in troubled regions like the Middle East, the Korean Peninsula, and Central Asia, but also in Europe and the Americas. Indeed, in a rapidly proliferating world even the existing nuclear powers -- including the United States and Russia -- might be compelled to reassess their nuclear and non-nuclear (and their offensive as well as defensive) options, weapons requirements, and collective security commitments.

As this grim review of possible developments shows, U.S. diplomacy could be facing a task of herculean proportion in the year or two immediately ahead. Further, should diplomacy fail, even in part, U.S. military forces might be confronted with a security environment substantially more threatening than that which exists today. Thus, it is none too soon to explore today's seminar topic: "Diplomatic and Military Roles and Options for Responding to the Proliferation of Ballistic Missiles and Weapons of Mass Destruction."

I. Containing the Potential Damage

As the North Korean situation so amply demonstrates, there are parts of the world where direct U.S. diplomatic leverage is lacking, and where limited indirect leverage -- through the Japanese, Chinese, South Koreans, Russians, and others -- may be all that the United States can muster. Even Japanese economic pressure has been ineffective against North Korea, however; and, without active Chinese support, the impact of a trade embargo would probably be limited as well. South Korea would probably be chary about the possible consequences of military pressure on the North, especially if Seoul believed that Pyongyang had one or more nuclear weapons. And Russia and China would probably oppose any U.S. proposal to use military force preemptively in any case, even under the auspices of the United Nations. In short, a strong, coherent international response to the problem of North Korean nuclear proliferation might be very difficult to generate and manage diplomatically or militarily.

Some hard choices will be required, and the selection of an efficacious U.S. strategy could be one of most difficult. For example, Moscow might offer to follow a U.S. lead with regard to North Korean proliferation if Washington would agree to do the same for Russian military action against Ukraine and Kazakhstan. This might not be in the U.S. interest. On the other hand, short of actually destroying North Korean, Kazakh, and/or Ukrainian

nuclear weapons and/or weapon-development facilities (e.g., with precision strikes or commando raids), there are few if any promising near-term prospects for reversing or blocking nuclear proliferation in these states. Especially with regard to Ukraine and Kazakhstan, however, military options would entail enormous political costs and military risks for the United States.

In any case, it will be important to devise a strategy for the longer-haul -- one that is not likely to raise unattainable expectations. At the same time, the choice of ways and means should satisfy other important objectives; e.g., convincing South Korea and Japan that they should continue to rely on the U.S. nuclear umbrella, and convincing Ukraine and Kazakhstan that they would be very ill advised to renege on their NPT commitments. These objectives might demand very high-profile U.S. diplomatic overtures. They also might necessitate the use of economic pressure and military threats. And, they could demand costly additional investments in air- and ballistic missile-defenses, NBC protective measures, and post-attack recovery capabilities, not only for ourselves but also for friendly and allied states with which we have shared security interests and/or commitments.

The political as well as dollar costs of maintaining such a strategy could be very high. The cost of doing nothing, however, would probably be higher still. It might be impossible, for example, to sustain international support for the UN counter-proliferation measures in Iraq if the Security Council failed to demonstrate its commitment to also countering proliferation in Asia. The existence of both Iraqi and North Korean weapons might make it even more difficult to counter proliferation in Ukraine, Kazakhstan, India, Pakistan, Israel, and elsewhere. And an era of unbridled arms races and regional instabilities could follow.

A tough UN response to North Korean proliferation, coming on top of the UN's decisive military intervention to roll-back Iraqi proliferation and aggression, could be precedent-setting. The

United States might welcome such a precedent; however, Washington might be very uncomfortable if the precedent implied a commitment to respond militarily to Ukrainian or Kazakh proliferation. Such a precedent could result in political as well as military problems for U.S. foreign policy. For example, a heavy-handed approach to Ukrainian proliferation might make it very difficult for the United States to continue tolerating the unacknowledged Israeli, Indian, and Pakistani nuclear weapon capabilities.

Suffice it to say, U.S. diplomacy will be hard-pressed over the year ahead to maintain international support for countering nuclear and other forms of proliferation collectively. Without such support, however, diplomatic demarches, trade embargoes, economic sanctions (e.g., seizing or freezing assets in foreign countries), technology-transfer controls, information sharing, pressures from international institutions (e.g., the IMF and World Bank), military demonstrations, and other forms of pressure are unlikely to function effectively or even to be attainable.

In the emerging international environment, the foremost U.S. diplomatic objective will be to build international support for responses to proliferation problems that are consistent with U.S. interests. In this regard, the United States should probably encourage other nations to treat North Korea as a special case, a pariah state whose nuclear program can be contained and reversed eventually, but probably not immediately. The most important near-term objectives of U.S. diplomacy should also include policy continuity in Japan and South Korea, non-proliferation in Ukraine and Kazakhstan, and extension of the Nuclear Non-Proliferation Treaty in 1995.

To these ends, the United States might have to bear the costs and risks of a longer-term, resource-intensive, relatively high-profile containment strategy. Other options do exist, however; one of which is a preemptive strike and state of war or quasi-war (conceivably using the 1950 UN authorization for the

use of force against North Korean aggression) in order to block any North Korean attempt to produce or use a nuclear weapon. Alternatively, the United States could make clear its intention to rely on South Korea, Japan, and China to resolve the problem diplomatically. These possibilities and others will be raised for discussion when we meet on 30 March.

II. Functioning in a Proliferated Security Environment

Although U.S. military forces had been trained to fight a war in Europe that was expected to include nuclear, biological, and/or chemical (NBC) attacks, the Gulf War brought home a new appreciation for the challenges involved in NBC defenses and response options. It underscored the equipment and training shortcomings that somehow had managed to survive even in the Reagan years of increased military spending. And, it raised for serious consideration a host of politico-military problems that would need to be addressed in the event of any future requirement to actually operate in an NBC environment.

Military shortcomings highlighted by the Gulf War included an inability to defend against biological weapons (BW), detect and diagnose the agents involved, treat the casualties, and clean up contaminated areas. Other serious shortcomings included inadequate defenses against ballistic missiles, an inability to locate and attack mobile delivery systems, and an inability to disperse rear-area forces and supply depots to minimize their vulnerability to chemically- or biologically-armed missiles and other area-attack weapons. Indeed, had Iraq used NBC weapons early in the war, it might have been able to block or seriously disrupt the introduction of Coalition forces into Saudi Arabia.

Throughout the Gulf War, even as our combat forces were routing the enemy, our supply bases and rear-areas remained vulnerable. So did our naval forces in the Persian Gulf and in other confined areas. Also, there was considerable uncertainty with regard to chemical defensive measures, field decontamination

requirements, medical evacuation and treatment procedures, etc. For example, soldiers were initially required to remain in their protective garments despite temperatures well in excess of a hundred degrees. At such temperatures, light-weight clothing would have provided adequate protection due to the high rate of agent evaporation. Further, no attention had ever been given to decontamination in an arid environment.

An even more serious shortcoming was the ill-preparedness of non-NATO Coalition forces for combat in an NBC environment of any kind. Non-NATO forces generally lacked gas masks and protective garments; they were not equipped to treat CW/BW casualties or to conduct surveys of contaminated areas, and they demonstrated a significant lack of training readiness for such requirements. U.S. training teams and liaison cadres, and considerable military assistance, were provided in an effort to correct these problems.

Civilian populations nevertheless remained unprotected; and -- as became apparent during the SCUD attacks against Israel -- panic might have become a serious possibility in the wake of any really large-scale chemical or biological attack. There also was speculation about Israeli nuclear reprisals for any attack that produced more than a few thousand Israeli casualties; moreover, this possibility was never dismissed entirely. On the other hand, non-NATO forces were completely unprepared for any kind of operation on a nuclear battlefield. It is entirely possible that NATO forces would not have fared well either.

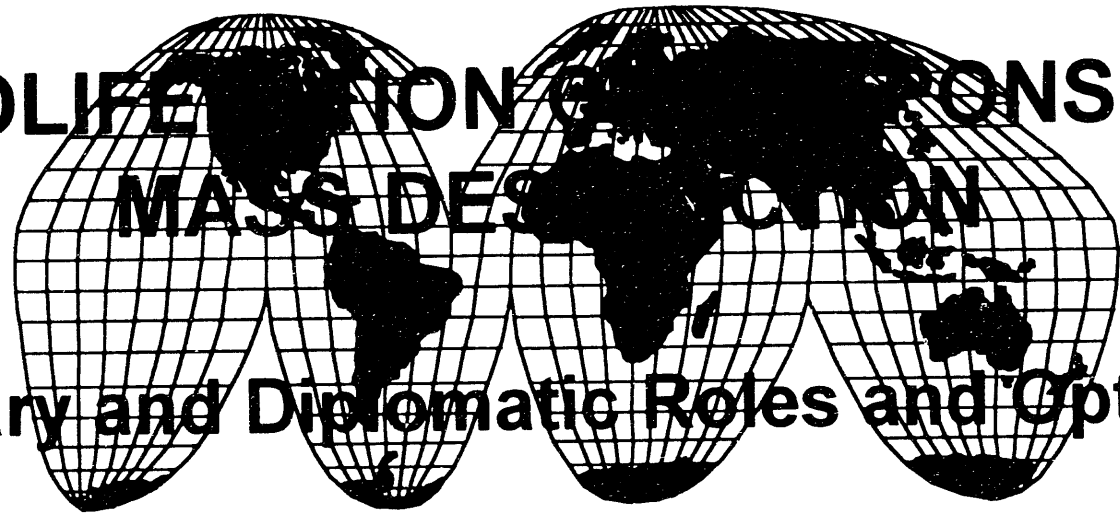
Had Iraq been in possession of nuclear weapons, for example, the U.S. bases in Saudi Arabia, like the naval forces afloat in the Persian Gulf, would have been vulnerable. Moreover, even a "friendly" Israeli nuclear detonation on enemy targets might have disabled a considerable portion of the sophisticated electronic equipment that the United States relied on for target acquisition and other critical battlefield functions. The probable adverse

effects on world opinion and Coalition solidarity could have been crippling as well.

Whereas Germany and other NATO Allies have seemed to grasp the costs and risks that NBC warfare on their territories might entail, our non-NATO Coalition partners in the Gulf War were intellectually unprepared for such possibilities. A lot of diplomatic hand-holding (as well as American military assistance) was essential to ensuring the continued viability of the Gulf War Coalition. It is far from clear, for example, that Saudi Arabia would have agreed to serve as host to Coalition forces if Iraqi forces had possessed nuclear weapons. It is also far from clear that Egypt, Syria, or our NATO Allies would have contributed forces under such conditions. And, under these circumstances, it is even uncertain whether the United States would have involved U.S. forces in a military response to Iraqi aggression against Kuwait. At a minimum, thought, the conduct of the military campaign would probably have been much different, and much more demanding militarily and diplomatically.

In the aftermath of the Gulf War, and as the former Soviet Union has continued its decline toward chaos, opinion leaders in the United States may have once again become complacent about the implications of NBC proliferation. To be sure, there has been much hand-wringing over the possible diversion of a nuclear weapon or nuclear technologies from the FSU to the Third World. But there has been no apparent appreciation in the White House, Congress, or the bureaucracy that proliferation of nuclear, biological, and even chemical weapons, and ballistic missiles, could be transforming the security environment. Moreover, no thought appears to have been given to the ways in which such a transformation could limit severely the ability of the United States, its friends, and allies to function militarily and politically in that environment. These problems will be grist for further discussion when we meet on 30 March.

PROLIFERATION CONSEQUENCES OF MASS DESTRUCTION



Military and Diplomatic Roles and Options

by

Dr. Ralph A. Hallenbeck

30 March 1993

Science Applications International Corporation
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CONTEMPORARY CONCERNS

- NUCLEAR
  - North Korea's withdrawal from the NPT, Ukraine's indecision over NPT and START commitments, and the situation in Russia, threaten to unravel international support for an indefinite or prolonged extension of the NPT
  - Ukrainian decision could undermine START, lead to conflict with Russia
- BIOLOGICAL
  - Russian and Syrian BW programs remain a concern
  - BW's potential, in conjunction with long-range missiles, a bigger concern
- CHEMICAL
  - Long-range CW attacks against populated areas a growing concern
  - CW not a WMD; but often viewed as a counter to nuclear weapons
- BALLISTIC MISSILES
  - China and North Korea selling 300-1000 km missiles, and manufacturing facilities; Ukraine and Russia likely to become major suppliers as well
  - Missiles could make BW/CW a "strategic" threat to many countries

ASSESSING THE RISKS

- Int'l response to North Korea may be very important for:
  - Convincing Ukraine & Kazakhstan to meet their respective commitments
  - Convincing ROK and Japan to continue relying on U.S. nuclear umbrella
  - Demonstrating depth of international opposition to nuclear proliferation
  - Preventing a second Korean conflict, and advancing re-unification

- Whereas DPRK can be treated as a pariah state, Ukrainian retention of nuclear weapons could:
  - Increase risk that India, Pakistan, and/or Israel will acknowledge their nuclear weapon capabilities, further undercutting NPT
  - Undercut UN Resolution 687 in Iraq, and opposition to Iran's efforts to acquire a power reactor
  - Undermine START and CWC
  - Cause enormous consternation in Germany, Turkey, Hungary, etc., and lead potentially to conflict with Russia and/or Russian revanchism (and heightened risk of nuclear weapon loss or accident)

IMPLICATIONS

- "Mother of all Arms Races"
  - Breakdown of NPT could also create pressures on Japan, South Korea, Germany, Turkey, and others to seek nuclear weapons of their own
  - Break-up of Russia could lead to loss of control over nuclear weapons, WMD technologies, and expertise; leakage into 3d World or to terrorists
  - States that lack ability to produce nuclear weapons could become more actively engaged in producing BW/CW; plus conventional arms races
  - China, DPRK, and Ukraine could undercut MTCR
  - COCOM, Australia Group, Nuclear Supplier Group, & Zangger Committee could become much less effective
  - Regional Arms build-ups could require reconsideration of U.S. / Russian arms reduction agreements and unilateral measures
- Increased risk of war and/or terrorism involving WMD

CONTAINING THE NPT PROBLEM

- **Priority Objectives**
  - Contain damage caused by DPRK to NPT & non-proliferation norms
  - Convince Ukraine that it should not renege on its Lisbon commitments
  - Eventually, convince DPRK to rejoin NPT and submit to IAEA inspections

- **Options**
  - Rely on South Korea, Japan, China, and Russia to resolve the problem in the DPRK diplomatically; work with European allies to convince Ukraine
  - Prosecute an aggressive international (UN) program to apply diplomatic* pressure on the DPRK; make clear that the same might apply to Ukraine
  - Use UN Coalition military force as necessary to prevent proliferation, and enhance credibility of comparable military threat to Ukraine
  - Other (e.g., to deal with break-up of Russian Federation or PRC) ?

* Diplomatic pressure includes demarches, trade embargoes, economic sanctions (e.g., seizing or freezing assets), technology transfer constraints, pressures from international institutions (the IMF, World Bank, etc.), military demonstrations, etc.

DIPLOMATIC CONSIDERATIONS

- **DPRK difficult to coerce or to induce**
  - DPRK already estranged from rest of world; economy already in chaos
  - Japanese and South Koreans already engaged; doesn't seem to work
  - Chinese currently unwilling to apply serious pressure
- **Must demonstrate determination to prevail**
  - Without use of force, can't expect quick results
  - Can't afford to let other states (e.g., Ukraine, Kazakhstan, India, Israel, Pakistan, etc.) take encouragement from an ambiguous situation
  - Can't afford to let South Korea and Japan loose faith in U.S. commitment
- **Broad international support for strategy essential; however:**
  - South Koreans may be uneasy about too much pressure on DPRK
  - Chinese may undercut international trade embargo
  - Russian may drive a hard bargain in UN Security Council (e.g., support U.S. DPRK policy in exchange for Russian policy toward Ukraine)
- **Precedents in other contexts**

MILITARY CONSIDERATIONS

- **Military actions unlikely to succeed conclusively; also:**
  - Could lead to attacks against ROK nuclear facilities, or invasion of ROK
  - Could lead to use of nuclear weapon (if DPRK already has one or more)

- **If DPRK able to brandish nuclear and other WMD:**
  - Tough diplomatically to obtain support from host country or allies; U.S. Congress likely to be chary as well
  - Difficult to project ground forces ashore at acceptable risk, Naval forces and air bases also at additional risk of sudden disaster
  - Difficult to concentrate forces or protect logistic depots, C3I, etc.; could result in loss of U.S. high-tech advantage
  - Allied forces equally at risk; may be even less well prepared
  - Not even U.S. prepared for Biological Warfare
  - Must also be able to protect host country / population; and to respond with recovery assistance following a WMD attack

- **Big DoD acquisition implications**

CONCLUSIONS

- **U.S. counter-proliferation strategy at a crossroad**
  - DPRK a threat to international norms; test of int'l resolve
  - Ukrainian / Kazakh proliferation could be decisive for NPT & CWC
  - India, Pakistan, and Israel could provide *coup de grace*
  - Russian domestic situation a qualitatively different kind of WMD threat
  - Chinese & DPRK missile proliferation creating demand for WMD
  - U.S. must hold the line in DPRK & Ukraine or face a proliferating world

- **Proliferate world more challenging militarily & diplomatically**
  - Multilateral restraint / arms reductions very difficult to negotiate
  - Big complication for collective security and power projection capabilities
  - Difficult challenges associated with marshalling int'l commitments
  - Regional arms races all too likely; tech transfer-constraints less effective
  - Precedents and diplomatic tradeoffs could be very tough choices
  - Budget implications of operational requirements also difficult to accept

PREPARING FOR A PROLIFERATED WORLD:

MILITARY IMPLICATIONS AND PROGRAMMATIC OPPORTUNITIES

A ROUNDTABLE DISCUSSION

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OBJECTIVE

- TO ASSESS THE EMERGING REQUIREMENTS AND CAPABILITIES NEEDED FOR THE COUNTER PROLIFERATION MISSION

- BY IDENTIFYING:

  MILITARY OBJECTIVES,
  STRATEGIES,
  PLANS & OPERATIONS,
  FORCE DEVELOPMENT, TRAINING AND
  TECHNOLOGY OPTIONS FOR COUNTER-PROLIFERATION

DISCUSSION POINTS

ILLUSTRATIVE CASES:

- **Preemptive Attack against Proliferant WMD R&D/Production**
  - –with Special Operations Forces (SOF)
  - –with Conventional Forces
- **Preemptive Attack against Proliferant WMD forces**
  - –with Special Operations Forces (SOF)
  - –with Conventional Forces
- **Defense against proliferant attack**

ASSUMPTIONS:

- **U.S. has fewer Forward Deployed forces in Regions of Interest**
- **Operational risks begin with insertion or build-up of U.S. forces in region**
- **Use of U.S. nuclear weapons is not an option**

David J. Stein
October 1992

U.S. TAC NUCs MISMATCHED WITH WMD PROLIFERANT TARGETS

- **ARMY**–HAS NO ORGANIC NUCLEAR FIRE SUPPORT

  -FOTL CANCELLED

  -8" AND 155MM AFAPs ELIMINATED

- **NAVY**–TACNUCS FOR SURFACE FLEET STORED AT DEPOT

  -MOST TLAM-Ns ABOARD SSNs HAVE 150kt YIELD

- **AIR FORCE**–GRAVITY BOMBS & STAND-OFF WEAPONS

  -B-61s LOWEST YIELD IS 10 kt (Hiroshima size)
  -SRAM-A (W69) HAS 170kt YIELD

BOTTOM LINE:

EVEN IF U.S. NUCLEAR USE WERE POLITICALLY ACCEPTABLE, THE "LOW" END YIELDS OF AVAILABLE U.S. TACTICAL NUCLEAR WEAPONS IS GENERALLY TOO GREAT FOR MOST WMD PROLIFERANT TARGETS

David J. Stein
October 1992

COUNTER-PROLIFERATION REQUIRES NEW THINKING

- **WE NO LONGER FACE A PARTICULAR, POISED ENEMY BUT THE THREAT OF PROLIFERATION AND REGIONAL CONFLICT**

- **COUNTER-PROLIFERATION IS NOT NECESSARILY A "LESSER INCLUDED CASE" OF PAST COLD WAR PLANNING**
  - **ASSUMPTIONS DIFFER (Objectives, ROE, Collateral Damage, etc.)**
  - **U.S. CAPABILITIES DRAWN DOWN AND BACK**
  - **U.S. CAPABILITIES ASYMMETRIC WITH PROLIFERANT POWER**
  - **U.S. CAPABILITIES AND COMMITMENTS MAY NOT DETER**

- **WE NEED TO CONSIDER THE MILITARY CAPABILITIES AND FORCES REQUIRED TO DETER OR DEFEND AGAINST AND DEFEAT WMD PROLIFERATION**

David J. Stein
October 1992

MILITARY IMPLICATIONS OF WMD PROLIFERATION

- CONSTRAINS U.S. AND ALLIED FORCE OPERATIONS IN COUNTRY
  - –COMPLICATING THE INSERTION OR BUILD-UP OF FORCES
  - –RESTRICTING THE MASSING OF GROUND FORCES
  - –EFFECTING OPERATIONS AT REGIONAL AIRBASES THAT CAN LIMIT AIRCRAFT SORTIE GENERATION RATES

- IMPLICATIONS ABOVE MAY UNDERSCORE CONSIDERATION OF PREEMPTIVE ATTACK WITH "INCISIVE" OR "DECISIVE" MEANS, AND THE NEED TO FIELD ADVANCED ATBM CAPABILITIES AND IMPROVED SELF-PROTECTION AND DECONTAMINATION GEAR

David J. Stein
October 1992

THE MILITARY ROLE IN COUNTER-PROLIFERATION

- **OBJECTIVES:**
  - -Prevent Acquisition
  - -Prevent Use
  - -Defense

- **STRATEGIES:**
  - -Dissuasion/Deterrence
    - -- Show of Force
    - – Security Commitments and Exercises
  - -Direct Engagement

- **MISSIONS:**
  - -Interdiction (Delay, Destroy, Disrupt)
    - – May Involve Special Forces, Weapons & Capabilities or Decisive Applications of Conventional Force
  - -Direct Defense
    - –May involve ATBM, and Improved Self-Protection & Decontamination Gear for Manpower & Equipment

- **FORCES, TRAINING & EQUIPMENT**

- **INTELLIGENCE & OTHER SUPPORT**

David J. Stein
October 1992

COUNTER-PROLIFERATION
OBJECTIVES & MISSION REQUIREMENTS

- PREVENTING WMD ACQUISITION INVOLVES INTERDICTION OF R&D INFRASTRUCTURE AND REQUIRES APPROPRIATE TARGET IDENTIFICATION AND ENGAGEMENT TECHNOLOGIES

- PREVENTING WMD USE INVOLVES INTERDICTION OF WMD FORCES IN BEING AND REQUIRES APPROPRIATE TARGET IDENTIFICATION AND ENGAGEMENT TECHNOLOGIES

- DIRECT DEFENSE AGAINST WMD THREAT REQUIRES:

  –ATBM

  –IMPROVED SELF-PROTECTION GEAR

  –FIELD MOBILE DECONTAMINATION GEAR

David J. Stein
October 1992

MILITARY OPERATIONS and COUNTER-PROLIFERATION

ROLES & MISSIONS:

- CONDUCT RECONNAISSANCE TO SUPPORT INTELLIGENCE COLLECTION
- INTERCEPT SHIPMENTS OF FISSILE MATERIAL, PROHIBITED AND CRITICAL TECHNOLOGIES & COMPONENTS
- INTERDICT WMD R&D/PRODUCTION
- INTERDICT WEAPONS IN STORAGE OR DEPLOYED
- DEFENSE AGAINST WMD THREAT

CURRENT LIMITATIONS:

- LACK OF PRECISE TARGET INTELLIGENCE
- TARGET SECURITY
- RISK OF "90% SUCCESSFUL" ATTACK
- APPROPRIATE ENGAGEMENT TECHNOLOGIES AND TRAINING

David J. Stein
October 1992

CRITERIA FOR EMPLOYING MILITARY FORCES
in
PREEMPTIVE ATTACK ON PROLIFERANT WMD CAPABILITIES

- **CLEAR MISSION OBJECTIVE**

- **I&W OF CLEAR, IMMEDIATE AND SUBSTANTIAL RISK**

- **TARGET INTELLIGENCE THAT IS ACCURATE AND TIMELY**

- **HIGH CONFIDENCE OF MISSION SUCCESS**

  - **Any "Leakage" (Less Than 100% Successful Kills) From Attacks on Adversary WMD Forces Can Impose Unacceptable Costs and Prompt a WMD Retaliatory Response On Any U.S./Allied Forces at Risk, or On Friendly High Value Targets in Region or Elsewhere**

  - **If "Leakage" Occurs, is the Residual Proliferant WMD Capability Militarily Significant?**

- **SUFFICIENT FORCE WITH APPROPRIATE TRAINING & EQUIPMENT**

David J. Stein
October 1992

INDICATORS & WARNING of NUCLEAR WEAPONS DEVELOPMENT

- MOST WEAPONIZATION INDICATORS ARE NOT UNIQUE
- ONLY COMBINATIONS OF ACTIVITIES AND COMPONENTS ARE USEFULLY INDICATIVE
- ACQUISITION OF SNM DOES NOT IMPLY AN IMMEDIATE NUCLEAR CAPABILITY
  - MANY NON-NUCLEAR ENGINEERING CHALLENGES MUST BE MET TO DEVELOP AND FIELD A NUCLEAR WEAPON
  - DEVELOPMENT OF A NUCLEAR WEAPON NEED NOT IMPLY AN OPERATIONAL NUCLEAR CAPABILITY
  - THE NUMBER AND COMPLEXITY OF ENGINEERING CHALLENGES INCREASE AS THE PROLIFERANT ATTEMPTS TO DEVELOP MORE SOPHISTICATED MILITARY CAPABILITIES

David J. Stein
October 1992

THE DECISION-MAKER's DILEMMA

- **VALUE OF PREEMPTIVE ATTACK IS GREATEST WHEN INTELLIGENCE INDICATORS ARE MOST AMBIGUOUS**

- **PREEMPTIVE ATTACK CAN:**

  --UNDERMINE COALITIONS
  –REQUIRE ENDLESS *POST HOC* JUSTIFICATION
  –ALTER REGIONAL ALIGNMENTS ADVERSELY
  –DRIVE OTHER PROLIFERANTS "OFF THE SCOPE"

- **AVOIDING THE DILEMMA THROUGH INDECISION OR DELAY CAN RESULT IN A HIGHER PRICE AT A LATER TIME:**

  –FURTHER DEVELOPMENT OF PROLIFERANT CAPABILITIES
  –LOST TARGETING OPPORTUNITIES
  –INCREASED REQUIREMENTS FOR FORCE COMMITMENT

David J. Stein
October 1992

WHAT'S NEEDED TO IMPROVE U.S. CAPABILITIES?

- FOR "INCISIVE" APPLICATIONS OF FORCE
  - SPECIAL OPERATIONS TEAM (ECHO FORCE)
  - DEDICATED, CONUS-BASED, TRAINED & EQUIPPED

- FOR "DECISIVE" APPLICATIONS OF FORCE
  - CONVENTIONAL FORCE OPERATIONS
  - WITH ALL ASSETS AVAILABLE TO REGIONAL CINC

- SENSORS/DETECTION TECHNOLOGIES

- SPECIAL WEAPONS FOR SPECIAL TARGETS

- SELF-PROTECTION/DECONTAMINATION GEAR

- CONCEPTS OF OPERATION

- TRAINING

David J. Stein
October 1992

DISCUSSION ISSUES

- **IS PREEMPTIVE ATTACK A VIABLE POLITICAL-MILITARY OPTION, AND IS IT THE AMERICAN WAY OF WAR?**

- **TO WHAT EXTENT MIGHT OPERATIONAL THIRD WORLD NUCLEAR WEAPONS EFFECTIVELY DETER THE U.S. (AND ALLIES) FROM AN ACTIVE/INTERVENTIONIST ROLE IN SPECIFIC REGIONS?**

- **IS THERE AN "EQUALIZER" EFFECT OF PROLIFERANT WMD ON U.S. CONVENTIONAL SUPERIORITY?**

- **WHAT IS THE PREFERRED ORGANIZATIONAL APPROACH FOR PROVIDING DETERRENCE, PREEMPTIVE ACTION, AND RESPONSE TO FIRST USE IN REGIONAL CONTINGENCIES?**

- **DO WE HAVE APPROPRIATE CONCEPTS, CAPABILITIES, AND TRAINING FOR DEALING WITH WMD WEAPONS IN REGIONAL CONFLICTS?**

  - **ARE REGIONAL PROLIFERANT POWERS "DETERRABLE" IN THE TRADITIONAL SENSE?**

  - **WHAT IS A NEW, VIABLE STRATEGY?**

David J. Stein
October 1992

DISCUSSION ISSUES (cont'd)

- **WHAT ARE THE CONVENTIONAL DIMENSIONS OF AN EFFECTIVE COUNTER-PROLIFERATION STRATEGY?**
  - **WHAT ARE THE NUCLEAR DIMENSIONS OF AN EFFECTIVE COUNTER-PROLIFERATION STRATEGY?**
- **WHAT NEW NON-PROLIFERATION/ARMS CONTROL STRATEGIES AND APPROACHES SHOULD EVOLVE FROM ADDRESSING DETERRENCE, PREEMPTIVE ACTION, AND RESPONSE TO FIRST USE BY THIRD WORLD ADVERSARIES?**
- **DOES DEVELOPING A COUNTER-PROLIFERATION CAPABILITY STRENGTHEN OR WEAKEN OUR CASE FOR NON-PROLIFERATION?**

David J. Stein
October 1992

A COUNTERPROLIFERATION STRATEGY

Captain Larry Seaquist
30 March 1993

A WIDER ARRAY OF (INTERACTIVE) OBJECTIVES

Objectives

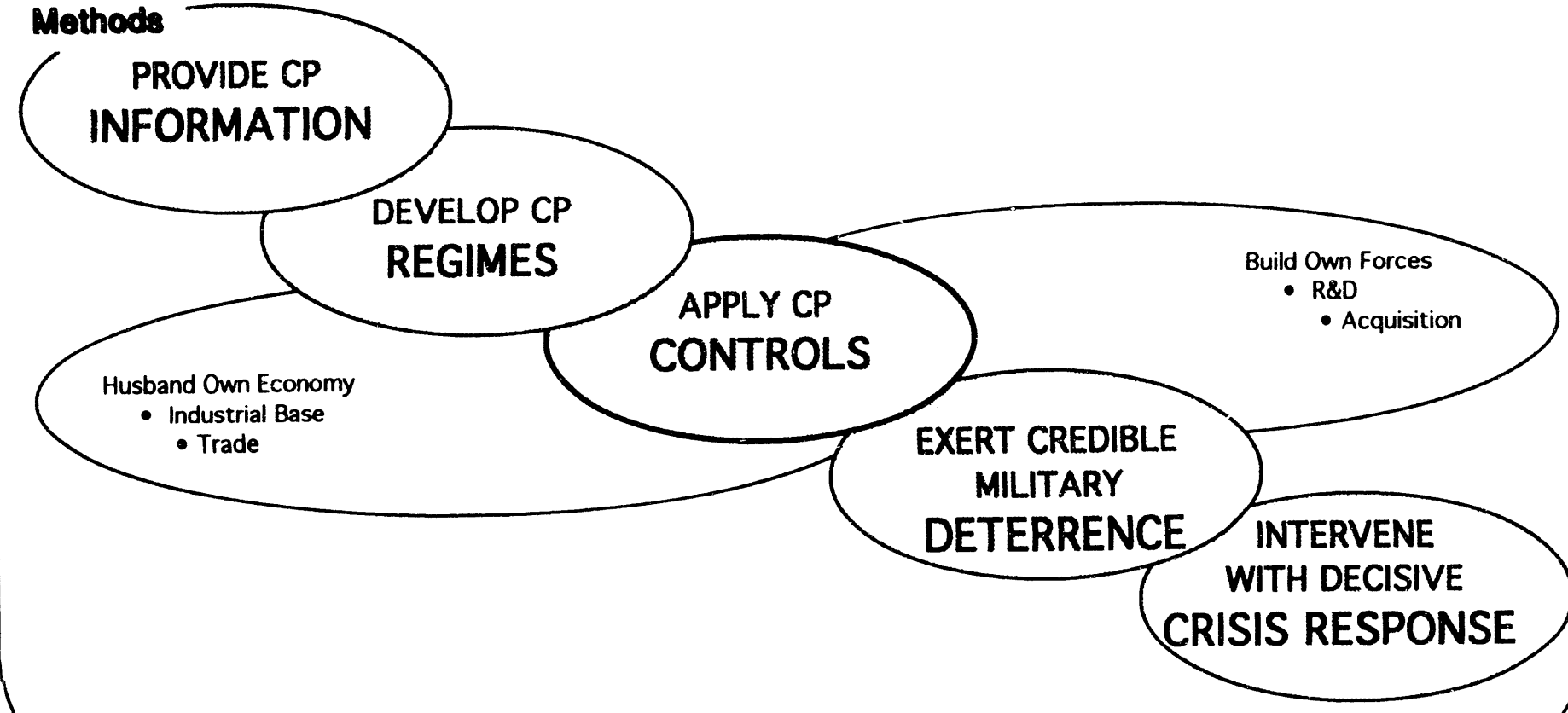
COUNTERPROLIFERATION

ENGAGES A W I D E SPECTRUM OF INTERRELATED ACTIONS

Objectives

ENCOURAGE — LIMIT — DETER — COMPEL →

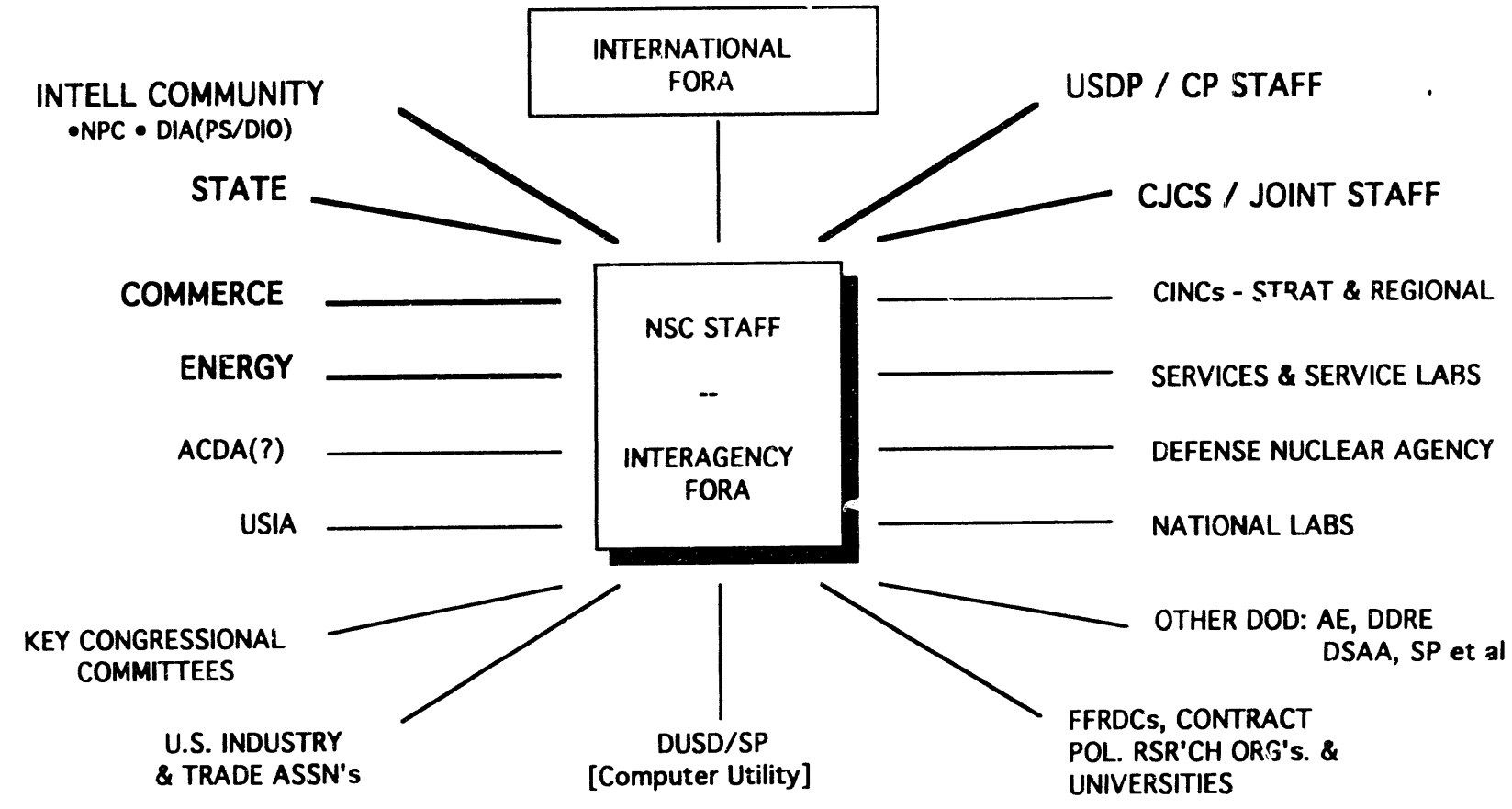
Methods



Part III
Interagency
Organization

USG ORGANIZATION

NEEDED: NEW CP "GUILD"



INFORMATION — REGIMES — CONTROLS — PRESENCE — CRISIS RESPONSE

ENCOURAGE — LIMIT — DETER — COMPEL

Own Economy — Own Forces

DoD COUNTERPROLIFERATION AGENDA

Policy Research Program

ONGOING STUDIES:

- RAND/WATMAN, AGMON -- ECONOMICS OF CONVENTIONAL ARMS TRANSFERS IN M.E.
  - -- *First post-Cold War review of Supply & Demand dyanamics*
  - -- *FY92 funded; just started; review for renewal in '93*

- IDA/UTGOFF -- BW DEFENSE AND DETERRENCE POLICIES
  - -- *Policy-lead, multi-office funded FY92 initiative*
  - -- *Proposed multiyear project to boost BW policy expertise*

- IDA/BOEZER -- POTENTIAL CP ROLES FOR SPECIAL OPS FORCES
  - -- *FY92 start jointly funded by OSD & DNA*
  - -- *Focus on utility, requirements, & limitations of SOF*

- DOE/NATIONAL LABS -- NUMEROUS, PROLIFERATION-RELATED PROJECTS
  - -- *Many funded by Congressional action*

CANDIDATE STUDIES INCLUDE -- AMONG MANY:

- RAND/CHOW -- ECONOMICS OF SPACE LAUNCH, HEU PURCHASE ETC
  - -- *Successful '92 project; not continued due reduction in funds*

- STIMSON -- MIDDLE EAST CONFIDENCE BUILDING MEASURES

- IDA -- INDIA AND THE BOMB

- SRS -- MTR AND SANCTIONS AGAINST USE

DoD COUNTERPROLIFERATION SUMMARY

GET ORGANIZED TO...
Walk thoughtfully,
Take a balanced approach,
Carry a sharp deterrent

CREATE
- CP strategy & policies
- New DoD organization to implement

UNDERTAKE
- Robust CP campaign
- Innovative analysis program

DEVELOP
- Deterrence/Compellance strategies for the new geostrategic climate

BALANCE
- Constructive info & dialog with Military deterrence
- Export & technology controls with Political support for reforms
- U.S. export & technology controls with U.S. business interests
- Int'l export controls with For. economic goals

COUNTERPROLIFERATION

- DIMENSIONS OF A COUNTERPROLIFERATION STRATEGY
- BUILDING A COUNTERPROLIFERATION GUILD
- ELEMENTS OF A COUNTERPROLIFERATION POLICY RESEARCH AGENDA
- THE INTELLIGENCE & PERSUASIVE ANALYSIS PROBLEMS

DIMENSIONS OF COUNTERPROLIFERATION

- WIDER SCOPE THAN NON-PROLIFERATION'S CONCERN W/ WMD + DELIVERY MEANS
  - -- *Dual-use technology erasing the distinctions*
  - -- *Advanced technologies becoming fungible commodities*
  - -- *U.S./Western control eroded*
  - -- *Regimes converging*

- "US VS. THEM" BIFUCATION OBE
  - -- *Need to discern and act on nuanced distinctions among countries*

- NEED TO PAIR EXPORT RESTRAINTS WITH DEFENSES
  - -- *Need "What's it mean to us?" assessements from intell*
  - -- *Need to defend ourselves*

SCOPE

Spectrum of DoD CP Interests

WEAPONS OF MASS DESTRUCTION AND DELIVERY SYSTEMS	ADVANCED CONVENTIONAL & SPACE SYSTEMS	INFRASTRUCTURE • Info & expertise • R&D activities • Production & Log. Cap's.	MILITARY DOCTRINE AND TRAINING	COMMON CONVENTIONAL SYSTEMS	BUSINESS, TRADE & GLOBAL ECONOMICS

PROLIFERATION

BEFORE :
COLD WAR FOCUS WAS FIRST ON NUCLEAR THEN "WMD"
NOW:
MULTIFACETED ARRAY OF INTERRELATED, GLOBAL ACTIVITY

Focus of R&D and major area of proliferation

Underpinning of all national programs; earliest indicators

Still the weaponry of most regional crises

Spectrum of DoD CP Interests

WEAPONS OF MASS DESTRUCTION AND DELIVERY SYSTEMS	ADVANCED CONVENTIONAL & SPACE SYSTEMS	INFRASTRUCTURE • Info & expertise • R&D activities • Production & Log. Cap's.	MILITARY DOCTRINE AND TRAINING	COMMON CONVENTIONAL SYSTEMS	BUSINESS, TRADE & GLOBAL ECONOMICS

Biological threat now as severe as nuclear

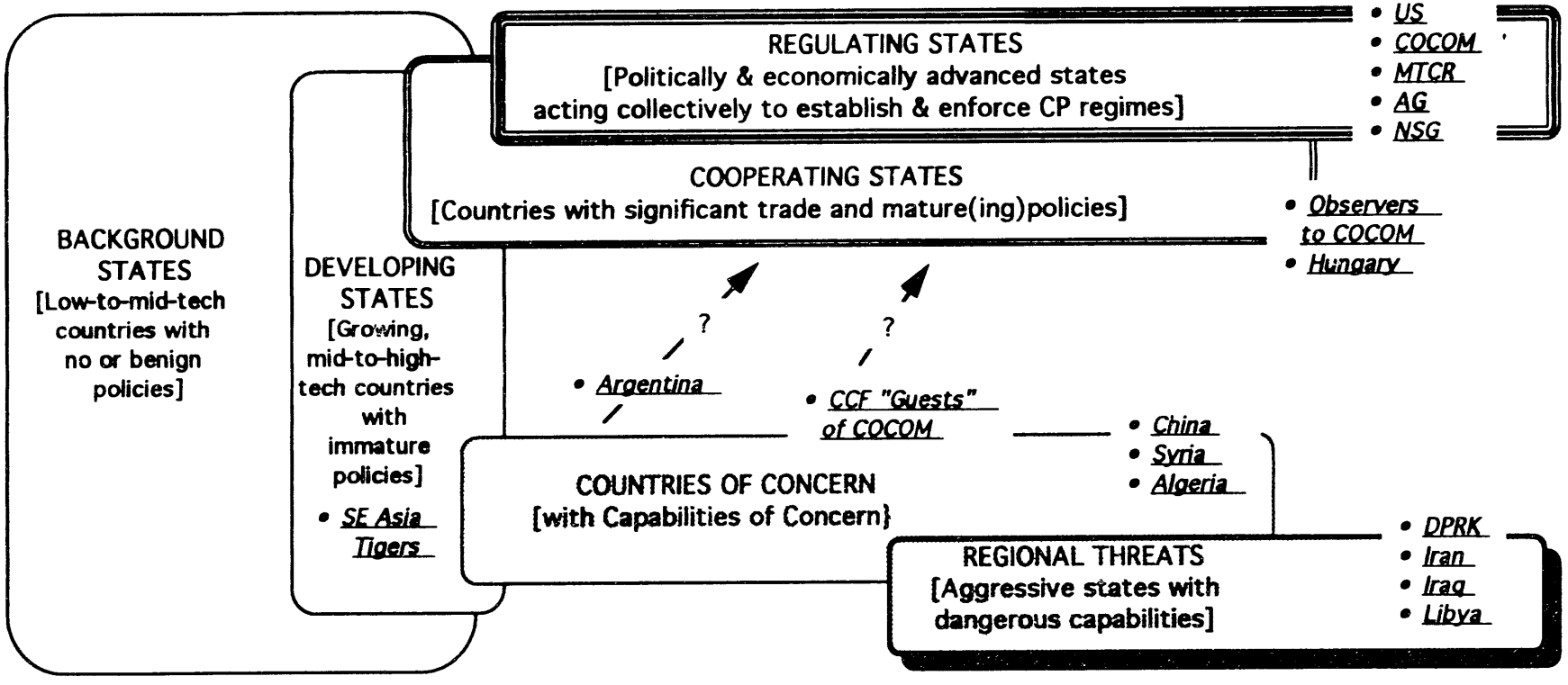
How a sytem will be used is very important to judging impact of technology; doctrines changing

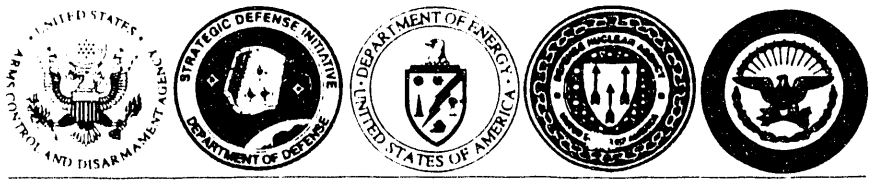
Economic dimensions of proliferation transactions; nations' overall economic health are key factors in managing exports

WMD proliferation intertwined with other, conventional systems and dual-use technologies

COUNTERPROLIFERATION

(STRAWMAN) ILLUSTRATION





MILITARY AND DIPLOMATIC ROLES AND OPTIONS FOR MANAGING AND RESPONDING TO THE PROLIFERATION OF BALLISTIC MISSILES AND WEAPONS OF MASS DESTRUCTION

Tuesday, 30 March 1993

Agenda

09:00 Check-in

09:15 Welcoming Remarks
by Sandy Hallenbeck, Seminar Co-Chair

09:30 Guest Presentation: Preparing for Proliferation: The Military Implications of Regional Proliferation of Weapons of Mass Destruction
by David Stein, Senior Fellow, The Atlantic Council, U.S. Department of Energy

10:00 Discussion

11:00 Guest Presentation: Biological Warfare -- A Different Kind of Problem
by Lisa Bronson, Multilateral Negotiations, International Security Affairs, Under Secretary of Defense for Policy

11:30 Discussion

12:30 Lunch Break

13:30 Guest Presentation: Toward a New Counterproliferation Strategy
by Captain Larry Seaquist, Assistant to the Deputy Under Secretary of Defense for Policy

14:00 Discussion

15:00 Seminar Wrap-up

15:30 Adjourn

Military and Diplomatic Roles and Options for Managing and Responding to the Proliferation of Ballistic Missiles and Weapons of Mass Destruction Seminar

30 March 1993

Invitation List

Richard Aiken
Air Force

Victor Alessi
DOE

Ralph Alewine
ARPA

Michael Altfeld
Navy

David Anderson
DNA

Perry Ballard
DNA

Rand Beers
NSC

Barbara Bodine
State

Paul Boren
DNA

Steve Boyce
JCS

Gail Bradshaw
DOE

Lisa Bronson
OSD

Sheila Buckley
OSD

Susan Burk
ACDA

James Carlson
SDIO

Ashton Carter
OSD

Seth Carus
OSD

Carla Christiansen
DIA

Fred Cirillo
Intel Community

Timothy Clagg
DIA

William Clements
Commerce

Anthony Cordesman
Congress

Robert Cowles
OSD

Anthony Czajkowski
DOE

John Davey
EUCOM

Dorothy Donnelly
DOE

Charles Duelfer
State

Lewis Dunn
SAIC

Robert Einhorn
State

Peter Engstrom
Air Force

Mary Margaret Evans
OSD

Michael Evenson
DNA

Margaret Finarelli
NASA

Charles Fletcher
Air Force

Douglas Frank
DOE

George Friel
Army

James Goodby

Rose Gottemoeller
NSC

Rosanne Greco
JCS

Janice Graham
DNA

Sidney Graybeal
SAIC

Roger Hagengruber
Sandia Natl. Laboratory

Elisa Harris
NSC

Mary Elizabeth Hoinkes
ACDA

William Hoyman
Army

Edward Ifft
OSIA

Joseph Kerr
DIA

J.W. Kraus
JCS

Pail Kiefer
Air Force

Frank Jenkins
SAIC

Mark Lowenthal
CRS

Thomas Marshall
SAIC

David Martin
SDIO

James McCombs
SOCOM

Patricia McFate
SAIC

Michael McNiff
Air Force

Joerg Menzel
OSIA

Darphaus Mitchell
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Sarah Mullen
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Janne Nolan
Brookings

Gordon Oehler
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Bard O'Neil
National War College

Malcolm O'Neill
SDIO

Lewis Orphanos
ACDA

Al Pierce
National War College

Charles Randow
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Richard Rock
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OSD

Michael Rosenthal
ACDA

John Ruble
OSD

Ron Sakowski
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Larry Seaquist
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Robert Seitz
Army

John Sessler
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Barbara Seiders
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P.D. Sellers
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Pat Shannahan
JCS

Leon Sloss
Leon Sloss Associates

P.D. Smith
CENTCOM

Henry Sokolski
OSD

David Stein
DOE

Warren Stern
ACDA

Carlton Stoiber
State

Arch Turrentine
The Harris Group

Gene Visco
Army MISMA

Stan Weeks
SAIC

David Wollan
ACDA

Pat Woodring
ACDA

Norman Wulf
ACDA

Joseph Yager
SAIC

DATE
FILMED
12/9/93
END