THE KOREA/CANADA NORTH PACIFIC ARMS CONTROL WORKSHOP

1995 PROCEEDINGS

DATE: 7 TO 9 JUNE 1995

EDITOR:
DR. BON-HAK KOO

WORKSHOP PROCEEDINGS PREPARED FOR

NON-PROLIFERATION, ARMS CONTROL
AND DISARMAMENT DIVISION
DEPARTMENT OF FOREIGN AFFAIRS AND
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In 1992, Canada's Department of Foreign Affairs and International Trade Verification Research Program and the Korean Institute for Defense Analyses (KIDA) initiated a series of bilateral workshops which focussed specifically on arms control issues in the regional context of North Pacific area. The confidence building and verification processes were the subject of particular attention. In 1995, participants from China, Japan, Russia and the USA were invited to join an expanded dialogue in Seoul.

These proceedings, published in the Korean language by KIDA and in the English language through the Canadian Verification Research Program, include all of the presentations made at the first expanded, multilateral workshop in this series. In addition, in the English language version, a more recent report on a joint research project that is being conducted by a team of Canadian, German and Korean researchers has been incorporated (Chapter 8). This unique tri-regional project, which is close to completion, has developed considerably since it was presented in its initial form at the 1995 Workshop.

This on-going series of workshops in its expanded format represents a valuable channel for the exchange of views on arms control and security matters in this particularly vital and sensitive area of the world. Because participants are encouraged to speak in their own personal capacities and not necessarily as representatives of their respective governments, this exchange has been frank and open. As this process evolves to include increasing participation by academics and officials from six North Pacific countries — Canada, China, Japan, Russia, South Korea and the USA, it has the potential to become a singular vehicle from which to gain a greater understanding of national perspectives in this focussed subject area and to provide a basis to contribute toward the building of confidence at a regional as well as a global level.

Ottawa, April 1996

Security and Arms Control: A Peninsula Approach

Man-Kwon Nam

I. Issue Analysis

A. North Korean Nuclear issue

South Korea was criticized for being more excited about winning gold medals at the Asian Olympic Game in Japan last year, while North Korea captured a far more valuable prize - a "diplomatic gold medal" in its nuclear negotiations with the US in Geneva. By playing a risky game of nuclear brinkmanship, North Korea managed to score against the US a success that will ensure escaping international sanctions and gaining political and economical concessions by simply promising to freeze its nuclear program.

Actually, the US-DPRK agreement is nothing but a rewording of an earlier "package deal" proposed by North Korea. South Korea's position was nearly ignored. The agreement barely allowed South Korea to save face by requiring special inspections, without specifying a date, by calling for the resumption of South-North talks and the implementation of the 1992 inter-Korean declaration on the denuclearization of the Korean Peninsula.

Given the primary goal, namely preventing North Korea from acquisition of nuclear weapons, the agreement seems to have established a framework for solving the nuclear issue. However, North Korea has strongly opposed the idea of the South playing the leading role in providing the technology for building light-water reactors. If North Korea does not keep its promise to freeze its nuclear program and to submit to the special inspections, the offer to build light-water reactors will be withdrawn and the US-DPRK relations will deteriorate.

Under the agreement, there are no means by which we can achieve our goals. It is believed that there are many defects in the agreement, which would prevent us from achieving our goal of stopping North Korea's nuclear program.

- The agreement makes no arrangement for early access for IAEA inspectors to determine how much plutonium North Korea has already separated from the nuclear waste now stored at two sites. The agreement postpones for at least five years IAEA inspections of the waste, until the first light-water reactor is brought into operation.

- The agreement does not make it possible in any way for the international community to determine whether North Korea now possesses a substantial number of nuclear weapons.

- The agreement in no way prevents North Korea from becoming a nuclear power. North Korea can easily undertake and conceal from IAEA inspectors its nuclear weapons program, as was done before by Iraq. The agreement does not restrain North Korea's development of a very sophisticated missile delivery system, which extends the range of its Scuds and Rodong missiles to Japan and other neighboring areas. Both the nuclear weapons and delivery systems can easily be sold at huge profit to many rogue regimes in Iraq, Iran, Libya and Syria.

- The agreement has nothing to do with either political or military measures designed to reduce tensions along the DMZ such as the incident of a US helicopter downing at DMZ on December 16, 1994. The incident supports the view that both South Korea and the US got nothing in return for pledging to lead an international effort to build $4 billion worth of light-water reactors for North Korea.

Should the Geneva agreement fail to accomplish our objective, then, we must not only slow North Korea's acquisition process but we must make it expensive and costly. Should North Korea continue to build a substantial number of nuclear weapons and their delivery systems, we must prepare to cope with the dangers a nuclear North Korea will impose.

Under the agreement, the US began shipping free oil to North Korea, thus taking over the life-support function of the old Soviet Union, so that North Korea's energy crisis is partially resolved. Before signing the agreement, North Korea's economy was almost ready to collapse, but now it seems that the US is rebuilding its economy by providing free oil and its allies are picking up the $4 billion tab for the high-water reactors.[1]

B. South-North Dialogue Issue

The Geneva agreement was signed by the US-DPRK on October 21, 1994. From the standpoint of South Korea, North Korea's refusal to negotiate with South Korea is a major topic of concern. Article III, Section 3 of that agreement provides that "North Korea will engage in North-South dialogue, as the agreed framework will help create an atmosphere that promotes such dialogue." In the period since the conclusion of the agreed framework, North Korea has made clear that it intends to refuse talks with Seoul.

The US officials responded to North Korea's position by enunciating more support for South-North talks, especially a general statement that inter-Korean talks are necessary for a full implementation of the Geneva agreement. However, Ambassador Gallucci told the House of Representatives Subcommittee on Asian and Pacific Affairs on February 23, 1995, that the Clinton Administration did not

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[1]   Relating to the US-DPRK negotiation, the author would like to introduce a fable which gives us a kind of warning when we negotiate with a communist state: *A bear approached a hunter in the forest and asked him what he was after. "I'm after a fur coat for myself," said the hunter. "I'm out looking for some breakfast," said the bear. "Why not step into my cave and we'll talk this thing over?" The hunter agreed to this and they retired to the cave and sat down to work out a* compromise. *The bear got his breakfast and the hunter was in a fur coat.*

believe in "precise linkages" of individual US benefits to North Korea under the agreement with North Korea's willingness to negotiate with South Korea. The connection, he said, should be "somewhat softer."

North Korea may well be engaged in a concerted strategy to weaken and destabilize South Korea. Its refusal to negotiate with South Korea is part of a broader strategy that seeks to isolate the South Korean government from its main pillars of support: its alliance with the US and its popular-base among the South Korean people. North Korean attitudes towards South Korea since Kim Il-Sung's death are more contiguous to attitudes prior to the Kim-Carter meeting in Pyongyang in June 1994.

C. Korean Armistice Agreement Issue

In addition to North Korea's refusal to negotiate with South Korea, Pyongyang is pursuing harder its 20-year objective of negotiating bilaterally with the US over military issues, including the conclusion of a bilateral peace agreement to replace the Korean Armistice. North Korea not only would exclude South Korea from such negotiations, but it would be expected to use such talks to secure changes in US military policy that would weaken ROK-US defense cooperation.

North Korea has escalated pressure on the US to accede to bilateral military negotiations. Its demands grew more frequent recently and these featured an element of threat: a warning that if the US continued to reject bilateral military talks, North Korea would take "unilateral actions." This is reminiscent of the early stage of North Korea's threat strategy following Pyongyang's announcement in March 1993 that it would withdraw from the NPT. At that time, Pyongyang warned that it would adopt "decisive self-defense measures" if the US and its allies imposed sanctions. Now North Korea gave teeth to "its new threat" by expelling the last of the members of the Neutral Nations Supervisory Commission, which was created by the Armistice Agreement.

The reason why North Korea forced the US to join DPRK-US military talks is because it believed that it drives in a wedge between the ROK-US's alliance system and blocks the US military assistance to South Korea in the event of military conflicts. For this purpose, Pyongyang will pursue the following strategic steps: (1) create a sense of crisis around the DMZ to induce redeployment of US forces from the area near the DMZ to the rear area on the Peninsula through DPRK-US military talks (or DPRK-US arms control negotiations); (2) replace the Armistice Agreement with a DPRK-US peace treaty; (3) pose offensive actions to accomplish the complete withdrawal of the US forces in Korea.

Related with Pyongyang's actions, the Seoul government reiterated its position to the US Administration that issues of the US forces redeployment and conclusion of a peace treaty are very sensitive ones possibly bringing about negative security effects on the Peninsula and thus those issues should be dealt with between South and North Korea. Recently South Korea and China agreed, at Prime-Ministeral Talks in Beijing on May 10, 1995, that the basis for any security arrangement on the Peninsula is the Korean Armistice Agreement and thus current mechanisms of the Armistice should be maintained.

II. Assessment of the Future of North Korea

Official comments by both Washington and Seoul were that the conclusion of the Geneva agreement would provide a turning point to improve inter-Korean relations. However, the reality is that the situation is running in the opposite direction due to North Korea's escalation of its anti-Seoul policy. This development of the situation on the part of North Korea could be attributed to the following factors:

- Kim Jong-Il is not prepared to take over the new leadership officially though he was groomed as the sole successor to the late Kim Il-Sung.

- North Korea is not in a position to pursue economic reforms or opening because of not being able to relax its current Juche ideology.

- North Korea is still pursuing a hardline policy to maintain military superiority over South Korea, though North Korea is estimated to be inferior in GNP and net military expenditure with South Korea. This is why the North begun its nuclear weapons program. Despite the Geneva agreement, North Korea is not in a position to abandon the long-standing military-first policy.

- North Korea strongly pursues a strategy to realize the withdrawal of US forces from South Korea. Pyongyang's current move to withdraw from the Korean Military Armistice Commission and to demand that the truce agreement must be replaced by a peace pact between North Korea and the US aims at expediting the US forces withdrawal from the peninsula. In the course of pursuing the strategy, North Korea cannot but pursue confrontational tactics against South Korea.

Current indications are that it is too early to expect any improvement in inter-Korean relations mainly due to North Korea's various problems, both domestic and external. The prospects for the nuclear negotiations between Pyongyang and Washington are also unpredictable. The assessment on the future of a post Kim Il-Sung North Korea might reveal the highly uncertain character of that regime.

The fate of reform in the North depends on a variety of factors such as (1) the quality of leadership, (2) the cohesion of elites, (3) the efficacy of political and social institutions, and (4) the political awareness of its population. Those factors which could affect the future direction of North Korea are quite related with policies to be pursued by South Korea-US toward North Korea. As the Geneva agreement implies, both South Korea and the US will inevitably be engaged in the process of transformation which North Korea is expected to go through. Their policies will surely have an effect on the eventual outcome.

III. Prospects for Inter-Korean Relations

Observers of Korean affairs point out that the basic policy toward North Korea should take one of two conflicting directions during the 1990's: (1) support the survival and gradual transformation of the North Korean regime as part of a protracted unification process; or (2) seek to expedite its collapse and secure unification under the aegis of South Korea.

Proponents of the "softline policy" argue as follows:

(1) More interaction and interdependence will raise the cost of conflict and thus lower the incentives for war;

(2) Since the risk of war comes from desperation rather than wealth, pushing North Korea into a corner will make it more dangerous;

(3) More interaction will induce North Korea to undertake more wide-ranging change and reform, eventually creating genuine peaceful coexistence;

(4) Given the economic realities of the two Koreas, interdependence is likely to develop in such a way that would give South Korea substantial leverage;

(5) Since too hardline a position on North Korea's nuclear issues will not allow an opening for promoting inter-Korean relations, nuclear and economic cooperation should not linked with.

In short, softliners argue that through more exchange and cooperation the two Koreas will be able to build a foundation for a single national community and eventually realize political unity in the not-so-distant future. However, such a view is severely criticized by proponents of the "hardline policy" as dangerous naiveté. Hardliners argue as follows:

(1) The Geneva agreement between the US and North Korea represents a strategy failure and amounts to scotch-taping shut North Korea's bomb-building machinery. For North Korea, "the nuclear option" is perceived to be the only means available to maintain its regime. The North Korean leadership knows very well that abandonment of the nuclear program is equal to abandonment of the regime and thus they will never give up "the nuclear option."

(2) The US-DPRK Geneva agreement is a stumbling, not building, block to the unification of the peninsula as it would, counter-productively, breathe new life into a dying regime.

(3) North Korea has not changed nor will it, unless a pragmatic post-Kim regime takes over the leadership;

(4) North Korea's aim, no matter how unrealistic and absurd to outsiders, remains to undermine and subvert South Korean society and eventually achieve a communist revolution over the entire peninsula;

(5) Since time is on South Korea's side, the ROK-US should maintain unity in policy implementation, and not respond imprudently to North Korea's moves. A strategy of "indifference" towards the North might work by making North Korea change its position or eventually give in.

(6) North Korea, despite its seeming strength and stability, is in reality desperate, fragile and without external help, and will soon collapse. The bankrupt North will then be absorbed by South Korea and therefore the best policy for South Korea should be not to support North Korea in any way.

While the Geneva agreement set the policy direction course of South Korea and the US toward North Korea, policy debate between the two opposing groups seems to be by no means finished. The intermediate approach which is more close to the hardline policy, may be the best policy option for the South, at least by preventing having to face up to the dangers of deeper isolation and by inducing the adoption of more pragmatic policies by the North Korean leadership.

- While the gradual-approach policy would, in general, be conductive to reducing tension and enhancing stability, it could not take effect unless North Korea responds positively.

- Even the most earnest efforts by Seoul would not alone be enough to improve inter-Korean relations. On the basis of past behavior, one would reasonably expect that North Korea will avoid any transaction with South Korea if possible.

- Although Pyongyang agreed, reluctantly, to engage in inter-Korean dialogue in the Geneva agreement, the implementation of this element of the agreement will prove to be quite difficult.

- After all, South Korea's policy approach towards the North should be based on some practical principles: (1) who is the leadership of North Korea; (2) what are the leadership's characteristics; and (3) what is its policy towards the South.

North Korea's strategy seems incredulous to many foreign observers; many South Korean observers undoubtedly share the naive reactions. North Korea is isolated and doomed. The only question is whether the demise of communism in North Korea will be in the form of a "soft landing" or "hard landing."[2]

Such optimistic projections can overlook both the potential dangers of North Korea's strategy to isolate South Korea and the potential cards that North Korea still may be able to play. Those potential dangers of North Korea's "isolation strategy" towards the South are described as follows:

- A progressive isolation of South Korea could lead to political instability in the South. Divisions of national consensus would be exacerbated if Seoul's government is perceived to be ineffective in blunting North Korea's diplomatic offensive.

- Progressive South Korean diplomatic isolation could lead to a schism between the ROK-US. Reactions in South Korea could produce a political decision to withhold money if the US continues to give low priority to South Korea's diplo-

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2   All lessons of history give us an advance notice on the demise of North Korea. However, there is a possibility that North Korea will do something like a last struggle. That is, dying North Korea will not accept a softlanding in South Korea's arms, but instead face its demise by using a bomb which has been buried under the ground in order to die together with the South. The best way to avoid the worst case scenario may be "euthanasia (i.e., mercy killing)", but how to do it is a important task given to us.

matic position. The ROK would increase resistance to the US moves to normalize relations with North Korea.[3]

- The Clinton Administration would be tempted to accept North Korea's offer of bilateral military negotiations. The US has abandoned or deferred a number of positions in its two-year dealings with North Korea. North Korea's growing diplomatic sophistication on military issues could increase the attractiveness of the North's proposals to the US. Pyongyang's key, initial goal may be to secure a pullback of US forces from the area near the DMZ which will insure a major diminution in the role of US forces in the ROK's defense strategy. Hence, there are real dangers in North Korea's diplomatic agenda regarding military issues.[4]

- North Korea might be tempted to take new risks, including violence against South Korea. North Korea will take additional measures to weaken the mechanisms of the Korean Armistice, given its successes to date. It could further weaken the South Korean government by using alternative means: infiltration, radical South Korean students and pro-Pyongyang Koreans.

The dangers of North Korea's campaign to isolate South Korea warrant hard thinking in Seoul and especially Washington about measures to counter Pyongyang. The first test will be the Clinton Administration's position on designation of the ROK model reactor in the light-water reactor supply contract and the role of the Korea Energy Development Organization (KEDO) in signing the contract. The outcome of that issue will set the tone (1) for South Korea's future role in implementation of the Geneva framework and (2) for how aggressively North Korea will wage its strategy to isolate South Korea.

IV. Policy Alternatives towards North Korea
The rationale for South Korea and its allies in pursuing an alternative approach towards North Korea presumes some considerations, with regard to North Korea's internal situations and its political will, as follows:

- The North Korean regime is seriously concerned with its own survival in the short-term, but after strengthening its regime, will pursue its strategy of communized unification by force.

3   This danger was revealed in a reported incident during the captivity of US airman Bobby Hall. The ROK-US differences over the handling of that incident are well known. Less attention was given to a report in *The Dong-A Ilbo* (January 5, 1995, p.1) that Clinton Administration officials warned South Korean officials that any ROK actions that delayed the airman's release would result in a American opinion in favor of withdrawing US troops stationed near the DMZ. That kind of threat, if true, would be unprecedented in the 45-year ROK-US relationship. Such attitudes in the Clinton Administration could spell future trouble in the relationship.

4   Related to the helicopter incident in December 1994, Washington Administration addressed a possibility that it will consider redeployment of US forces positioned near the DMZ to the rearward area of the Peninsula. On this issue, Seoul government made a comment: "North Korea has deployed about 60% of total forces of troops/firepower/weapons in the forward area south of the Pyongyang-Wonsan line, where it can launch a massive attack on South Korea without requiring any increase of troops or unit reorganization. In that situation, redeployment of US forces to rearward area could evcourage North Korea's miscalculation and thus Seoul government opposes to the US's military option" (*The Dong-A Ilbo*, January 5, 1995).

- North Korea sees its long-term survival being threatened by its own economic weakness and international isolation.

- North Korea maintains its readiness to initiate general war (conventional as well as nuclear) on the peninsula when it believes a "window of opportunity exists."

Effective strategic action requires a clear sense of purpose and a hard-headed assessment of how ends are related to means. The following are some of the crucial points which should be clearly understood in formulating a strategy for a "new approach" towards North Korea.

- Denuclearization of the Korean peninsula should continue to be a primary objective of South Korea and our approach towards North Korea should serve that objective. The Geneva agreement will require a long and potentially complicated process of implementation with multiple time-frames for each commitment. South Korea should pay due attention to those benchmarks before talks on any specific measures of a new approach.

- Any kind of approach should increase stability on the peninsula and promote change or reforms in North Korea. It is time for Seoul to overcome the zero-sum perception of inter-Korean relations since the North is extremely cautious about contacts with South Korea due to their particularly destabilizing effect on its society.

- South Korea should carefully assess when and in what areas to propose measures which could reduce tension and build confidence in the political and military spheres.

- South Korea must indicate to North Korea that if the North takes concrete steps towards making the first move, then the South would positively respond to its underlying security and economic concerns.

Precisely what steps should be taken and in what order and timing, would be dependent upon what precise actions North Korea takes by way of the first move. South Korea must appropriately respond to North Korea actions in proportion to encourage further steps toward stabilizing the military confrontation and building confidence. South Korean actions must also be coordinated with the US, Japan, and other international partners.

There may be no other alternative but to engage in another war with North Korea if the North Korean regime is determined to pursue its policy of confrontation. North Korea has been controlled by a military dictatorship whose political legitimacy is seriously being questioned by the impoverished population and it spends some 25% of its GNP for the maintenance of 1.1 million troops(some 70% of those are deployed within 60 miles from the DMZ). Such a huge military force poses a constant threat to South Korea, and may eventually lead to war in the peninsula regardless of what South Korea-US and their allies might do with regard to North Korea's nuclear program in the near future.

For the above reasons, the more viable options left to South Korea-US and their allies in dealing with (1) current North Korean issues including the nuclear problem; and (2) stabilizing military confrontation between the two Koreas, are suggested as follows:

- South Korea and its allies should renew its goal and basic policy approach towards North Korea as follows:

    (1) A goal should be set up to "establish peaceful coexistence relations between the two Koreas."
    (2) A basic Approach must be established in order to accomplish the above goal: (a) block any opportunity for North Korea to realize its communized revolution; (b) promote an establishment of new pragmatic leadership in the North Korea regime; (c) induce opening, reforms and democratization of North Korea society.

- To counter North Korea's campaign to isolate South Korea, the following measures should be considered by both ROK and US Administrations:

    (1) Address joint ROK-US statements that allies (mainly ROK, US, Japan) are prepared to take strong measures to preserve the mechanisms of the Armistice Agreement.
    (2) Rearrange the US-North Korea talks towards dealing with only issues related to implementation of the Geneva agreement. Any further talks on military issues beyond the scope of the Armistice Commission must be South Korea-North Korea tracks. The US must respect this concept of approach towards North Korea.
    (3) Upgrade ROK-US defense planning. This should be done strictly on the reasonable military assumption that if the situation worsens for North Korea or the situation proceeds towards the North's expectations (i.e., a window of opportunity for revolutionizing the Southern part) it might provoke military actions against the South. The military and alliance strengthening benefits of this would outweigh the perceived political difficulties, which seem to prevent ROK and US administrations from candor in spelling out the reasonable assumption of North Korea's possession of a few nuclear weapons

- A more effective stick would be to inform North Korea that, unless it allays the fear that it has or is developing nuclear weapons, the ROK-US must assume the worst and act accordingly. North Korea should be told as "a warning" that the following actions will ensure if the North breaks off the Geneva agreement and/or the Korean Armistice mechanism:

    (1) The ROK-US will reschedule and conduct "Team Spirit" annually. The state of war between South and North Korea never officially ended and North Korea is in a high state of readiness to resume hostilities. The ROK-US should be well prepared for this prospect.
    (2) The ROK-US will respond with weapons of mass destruction if North Korea's attacks the South. This would reopen the option of deploying nuclear weapons in South Korea to prompt preparation of nuclear options

by the US military so that political leaders would have maximum flexibility in responding to a North Korean attack.

(3) North Korea will not be able to avoid being sanctioned by the international community if it refuses to abide by the nuclear agreement it signed with the US.

(4) North Korea cannot be allowed to gobble up more carrots without any positive progress.

- With appropriate modification, an element of the "Sinai arms control verification model" could be applied to the peninsula to overcome current military confrontation around the DMZ. This might play a role as a cornerstone towards "conclusion of a peace treaty between South and North Korea". The Sinai lessons in force disengagement and verification process should be crucial for helping the two Koreas manage the short-term risks of agreed Non-aggression Pact. Both Koreas would agree to conventional confidence and security building measures to reduce tensions across the DMZ, including:

(1) Mutual reduction (and eventual elimination) of armaments and military construction within the DMZ;

(2) Mutual reductions of forces and heavy armaments within specified distances from the DMZ;

(3) A verification process including early-warning systems and ground/aerial inspections by the two Koreas and an international institution.

V. Conclusions

We must be keenly aware of the fact, in the year 1995, that the Korean Peninsula is undergoing momentous change, whether we want it or not. Despite the end of the Cold War, North Korea's foreign relations have remained essentially frozen because of the nuclear issue. Thus, the scope of change on the Korean Peninsula was severely limited. However, once the nuclear issue is resolved, there is no doubt that waves of change will sweep across the peninsula.

The question is, will South Korea spearhead the change, or will it be swept under by the waves? This is the choice we must make. If we are going to act as agents of change, more than anything else, we must first straighten out our perception of and basic approach to North Korea. In the event we are unable to determine how to view North Korea, we will have difficulties not only in assuring coherence and consistency in our policy towards North Korea, but also in forming a national consensus on a unification formula.

We must awaken as soon as possible from the dream of "total reconciliation" and the nightmare of "total mistrust." It is critical to develop a coherent sense of purpose and establish a mature, realistic approach to North Korea. Ultimately, the improvement of inter-Korean relations is premised on North Korea undergoing change. The questions is, what is the most effective strategy for helping bring out this change?

There are a variety of theories used for explaining the regime change, but if we look at the experience of the former Communist countries, there is no other choice, but to open up North Korea and promote modernization. When the nuclear issue

is resolved, the process of opening up North Korea seems realistically feasible and also inevitable. Given the unfolding international situation, the time has come to replace the discord created by the two unproductive approaches to North Korea with a realistic strategy.

Chapter 2

THE ROLE OF CONFIDENCE BUILDING IN INTER-KOREAN SECURITY RELATIONS[1]

James Macintosh

INTRODUCTION

Confidence building is seen by both analysts and policy makers to be a promising security management approach for use in inter-Korean security relations. It is not difficult to see why it has attracted attention, given two basic considerations:

1. Other security management approaches - namely, force reduction, force redeployment, and force restructuring (often referred to collectively as "structural arms control") offer rather less promising prospects given the current uncertain and bitterly hostile inter-Korean security environment; and

2. Confidence building has a demonstrated (if imperfectly appreciated) history of success in the CSCE's European security environment, beginning at a time when East-West political and security conditions were also hostile and uncertain. It can also be scaled to very modest dimensions.

However, to employ the confidence building approach in the inter-Korean context with the greatest chance of success, it may prove helpful to reflect on some issues associated with the basic nature of the approach and the processes associated with it. In particular, understanding how confidence building works may help us to identify:

1. What types of conditions need to exist - and how we can encourage them - for confidence building success; and

2. What types of measures will work most effectively during different stages of application.

This paper concentrates on the implications that flow from the existence of two basic conceptions of what confidence building is and how it works.[2] The traditional view - the view that is most likely to inform confidence building efforts in any new application area - implies one model of confidence building while an alternative and less well-known conception - the transformation view - employs a somewhat different and explicit model. Because the two views offer different advice about how to engage in "confidence building," it makes a difference which one informs the thinking of analysts and policy makers. The paper provides an illustration of this.

The traditional or minimalist view is largely silent on the conceptual issue of how "confidence building" as an activity actually functions but relies upon an implicit model that equates enhanced information with increased security. The alternative transformation view is consciously concerned with explaining how "confidence building" works and sees a somewhat different dynamic operating at the heart of confidence building. In this view, process matters and interaction amongst key participants is important. Not surprisingly, the traditional view recommends the development of information-oriented measures. In contrast, the transformation view sees great importance not only in information- and interaction-type measures but also in the very process of exploring, developing, and negotiating them. The existence of satisfactory preconditions - and their promotion - is an important part of this view.

Outline
This paper concentrates on the exploration of these two views and the security policy implications that flow from their partially competing understandings of confidence building. The paper begins by briefly noting some basic background assumptions about inter-Korean security relations, assumptions that help explain the importance of confidence building as well as the limits facing all inter-Korean security management efforts. Being explicit about these assumptions is seen to be important because it places in plain sight the background thinking about Korean security relations that informs the paper's analysis. Then, the paper turns to the discussion of the two contrasting appreciations of confidence building. As part of this discussion, the paper takes a preliminary look at a number of conditions that may have to be met in order for confidence building to accomplish significant improvements in security relations -or, at least as important, to even a chance of functioning in the first place. Finally, it focuses on the policy implications associated with the two contrasting understandings of confidence building.

The paper argues that a traditional or "minimalist" orientation will encourage initial interest in developing packages of information-type measures (whether called transparency measures, CBMs, or some new term) while a transformation orientation

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2   The author's thinking on this subject has benefited tremendously from the opportunity to discuss confidence building and other security management approaches in the inter-Korean context with Korean colleagues, many of them associated with KIDA. This opportunity has been invaluable because it has obliged the author to refine and clarify his thinking. It also has highlighted the fact that Korean security problems, as understood by Koreans, ultimately must be addressed by Koreans. Outsiders can make a contribution but a certain amount of humility and care are necessary given our imperfect understanding of the inter-Korean context and the still-underdeveloped nature of security management thinking within the international scholarly community.

will encourage initial interest in developing opportunities for specialists and officials to interact and jointly develop common conceptions of security and how to achieve it. Confidence building arrangements can then emerge from this process. Both views of confidence building see as an outcome the development of formal confidence building agreements but the transformation view places much more emphasis on process (the broad activity of developing agreements) while the minimalist view places its main emphasis on procedure (the content of agreements).

Basic Background Assumptions

Confidence building is seen to be an important security management approach in the inter-Korean case for reasons that extend beyond its intrinsic merits (largely understood in terms derived from the CSCE context where confidence building has already produced successful agreements). It is also important in a negative sense because other arms control approaches - namely, force reduction and restructuring - seem to offer very little prospect of short- or even medium-term success in the inter-Korean case. Indeed, it is even debatable whether or not the negotiation of undemanding confidence building accords is feasible given the current state of inter-Korean relations.

This observation (and the assessments informing it) highlights the need to be explicit about background assumptions, particularly assumptions about the nature of the inter-Korean security environment and its possibilities. After all, to properly evaluate arguments about confidence building and force reduction, it is helpful to know the arguments' broader context and justification.

Based on earlier work,[3] the following assumptions and assessments are seen to characterize inter-Korean security issues, constraints, and opportunities:

(1) The nuclear dimension of inter-Korean security problems will need to be settled to a satisfactory extent before any conventional force-oriented efforts can move beyond the preliminary discussion stage. Presumably, a variation on the current theme where "clean, NPT-friendly" power reactor(s) are offered as a strong inducement to shut down North Korea's contentious nuclear programme would achieve this crucial requirement;

(2) Sensible estimates of the North Korean regime's likely willingness to consider various inter-Korean security management options should be a key determinant in assessing South Korean policy options for the near- as well as the long-term. Convincing the North that any concession on its part is in its interest will be very challenging. Proposing one-sided agreements is likely to go nowhere and squander whatever slim prospects exist for constructive progress. Attempting to force concessions will be extremely difficult and, ultimately, may prove counter-productive, to the extent that it destabilizes the North and obliges South Korea to intervene in the aftermath;

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3   These assumptions and the broader reasoning that is associated with them are discussed in "Inter-Korean CBMs and Arms Reduction: The Conventional Forces Dimension," a paper prepared by the author for the Korean Association of International Studies' International Seminar on Fifty Years of National Independence: Past, Present and Future of National Security in South Korea, to be held 16-17 June 1995 in Seoul, Korea.

(3) In the absence of strong positive inducements, primarily of an economic development nature, there seems little chance of any concrete arms control progress with North Korea or any appreciable abatement in the threat posed by the North;

(4) Overly-optimistic assessments of what can be accomplished with (especially) force reduction and confidence building arrangements may obscure more conservative and/or unconventional approaches with greater actual constructive potential. Meaningful force reduction options are not seen to be promising in the near-term;

(5) Decisions reached in South Korea about what security management options and strategies to pursue should be informed at least in part by a tough assessment of what the South really wants and can deal with vis a vis the future of North Korea and reunification;

(6) Although it may be difficult for political actors in the South to conclude or admit (either publicly or privately), reunification has so many negative costs associated with it for South Korea at present that deferring that objective temporarily and attempting to improve conditions in the North, to the extent possible, during the next ten to twenty years may be a preferable course;

(7) The key elements in this approach must be the North's willingness to begin resolving South Korea's main legitimate security concerns and South Korea's offsetting willingness (perhaps along with Japan and the United States, amongst others) to address cooperatively the North's severe economic development problems; and

(8) True security is not the product of agreements so much as it is the result of changes in thinking. Likewise, even if possible, reducing the size of conventional forces and/or moving them further apart, by themselves, may not produce significantly improved security relations. Decisions about which security management approaches to pursue should take this into account. Those approaches that offer the best prospects of shaping security conceptions in a positive way should receive, as a consequence, particular emphasis.

Thus, the paper assumes that there are limited prospects for conventional arms control and that primary reliance on security management approaches of various sorts alone to "solve" security problems on the peninsula is mistaken and likely to be unproductive or even dangerous. Instead, the paper operates on the broader assumption that the use of certain security management approaches (confidence building and, potentially, force reduction) can accomplish two things:

(1) It can help address certain aspects of threatening conventional force relationships (but only when combined with other strategies focusing on fundamental political and economic problems, only within relatively modest limits, and only over the mid-term [5-10 years]; and

(2) It can help to shift thinking about security issues in important ways within both South and (especially) North Korea, potentially helping to structure common conceptions of security and how to achieve and maintain it.

However, these approaches - essentially, the pursuit of force reduction/redeployment and confidence building arrangements - can only accomplish even these limited goals when conditions are accommodating. As well, they must be used carefully *and* in conjunction with strategies that address other key concerns structuring North-South relations.[4]

(1) Trade tightly focused but substantial economic assistance and join development projects for constructive, incremental adjustments in the North's force deployments - this is the central quid pro quo;

(2) Devote maximum effort to the patient development of opportunities for the constructive and sustained interaction officials of various ranks and institutional affiliation in order to promote common conceptions of security. While likely difficult to accomplish, this is critical if there is to be a common security agenda in the future;

(3) Concentrate initially on the development of a confidence building regime - perhaps informally at first - focusing on interaction-oriented experience and information measures to support and reinforce the development of common security conceptions - and confidence in the basic process of resolving fundamental problems;

(4) Concentrate secondarily on the development of longer-term negotiations intended to explore enhanced transparency, force reductions, restructuring, and doctrinal transformations."

See "Inter-Korean CBMs and Arms Reduction: The Conventional Forces Dimension" for a fuller articulation of this view.

It is far from clear that the necessary conditions are yet in place to support fundamental change in inter-Korean relations, however, so the second objective - the gradual development of new security conceptions and styles of thinking - may be the more important goal, an objective that likely will have to be pursued in unison with efforts designed to help stabilize North Korea. Certain under-appreciated aspects of confidence building may make this more feasible than is usually appreciated - although, by no means easy. To see why this is so, we must look carefully and critically at contemporary confidence building thinking.

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4   "Although effective and comprehensive force reduction measures designed to minimize or, better, eliminate the threat of sudden conventional force attack across the DMZ and toward Seoul are the obvious preferred outcomes of any security management negotiation process from the South's perspective, this is unlikely to prove realistic in the near future. Worse, the sustained effort to win these sorts of concessions from the North is likely to undermine other possible options - and it could lead to the destabilization of the North with broadly negative consequences for the entire peninsula and the surrounding region. Without abandoning the pursuit of broad force reduction and restructuring agreements, South Korea may find that long-term positive results are more likely to flow from a four point security management strategy of the following general kind:

Confidence Building

Confidence building usually is understood to involve the use of formal, cooperative measures designed to improve information, increase understanding, and reduce uncertainty about the military forces and activities of fellow participating states. This focus has encouraged some analysts to use the term "transparency measures" as a substitute for CBMs although this misstates the variety of measures typically considered to be CBMs by excluding constraint-oriented CBMs.[5] Limiting consideration to only information-oriented measures, whether called CBMs or something else, also fails to solve the problem of explaining how developing them can improve security relations.

TYPE A: INFORMATION AND COMMUNICATION CBMs

(1) *Information Measures* (provision of information about military forces, facilities, structures, and activities)

Examples include: publication of defence information, weapon system and force structure information exchange, consultative commissions, publication of defence budget figures, publication of weapon system development information;

(2) *Experience Measures* (provision of opportunity to interact with opposite numbers)

Examples include: military personnel exchanges, security expert exchanges, transnational secondments, joint training and exercises, seminars discussing doctrine, strategy, and technology issues;

(3) *Communication Measures* (provision of means of communication)

Examples include: hot lines for exchange of crisis information, joint crisis control centres, "cool lines" for the regular distribution of required and requested information;

(4) *Notification Measures* (provision of advance notification of specified military activities)

Examples include: advance notification of exercises, force movements, mobilizations - including associated information about forces involved;

(5) *Observation-of-Movement Conduct Measures* (provision of opportunity to observe specified military activities)

Examples include: mandatory and optional invitations to observe specified activities (with information about the activity) and rules of conduct for observers and hosts);

(6) *General Observation Measures* (provision of opportunities to engage in non-focused "looks" at relatively small and generally-specified sections of territory)

Examples include: current Open Skies agreement;

TYPE B: CONSTRAINT CBMS

(1) *Inspection Measures* (provision of opportunity to inspect and/or monitor constrained or limited military forces, facilities, structures, and activities)

Examples include: the use of special sensing devices, special observers for sensitive movements, on-site inspections of various forms;

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5   An effective way of representing what confidence building encompasses operationally is the construction of a comprehensive collection of CBM categories. Based on the careful examination of over one hundred specific confidence building proposals presented in the professional literature over the last twenty or more years, we can identify the following general categories, defined by basic function:

(2) *Facilitation of Verification Measures*; (provision of opportunity to effective-ly verify an agreement)

(3) *Activity Constraint Measures* (provision of assurance to avoid or limit provocative military activities)

Examples include: no harassing activities such as "playing chicken" on the high seas or near territorial boundaries;

(4) *Deployment Constraint Measures* (provision of assurance to avoid or limit the provocative stationing or positioning of military forces)

Examples include: no threatening manoeuvers or equipment tests, no threat-ening deployments near sensitive areas (such as tanks on a border), equipment constraints such as no attack aircraft within range of a neighbour's rear area ter-ritory, manpower limits, nuclear free zones;

(5) *Technology Constraint Measures* (provision of assurance to avoid or limit the development and/or deployment of specified military technologies, including systems and subsystems, believed by participating states to have a destabilizing character or impact)

Examples include: no *replacement* of deployed military equipment of cer-tain types (typically, tanks, heavily armoured combat vehicles (HACVs), self-pro-pelled artillery, combat aircraft, and combat helicopters) with new, more advanced types; no *modernization* of deployed military equipment of certain types in certain key, well-defined respects; no *training* with new systems; no *field testing* of new designs; and *no production* of specified new systems or subsystems.

It is clear from this comprehensive typology of categories drawn from the profes-sional literature that many "constraint-type" CBMs have been proposed. Thus, it proba-bly is inappropriate to simply exclude them from consideration without a carefully artic-ulated argument to explain why they should be treated separately - especially if con-straint measures are no longer to be considered examples of CBMs. This does not mean that the idea of splitting the two basic super-categories is without merit but it is neither common practice at present nor something that can be done without justification.

Note, as wells that "verification" has an ambiguous status in a confidence building agreement. Verification is a fundamentally unilateral activity that can be *facilitated* by provisions in a confidence building agreement. According to this view, verifica-tion provisions provide the opportunity and right to verify compliance but they do not constitute verification *per se*. Facilitating verification has a positive confidence building impact.

As we will see below, confidence building is more complex than this simple artic-ulations suggests, but this operationally-oriented understanding is the one with which most analysts and policy makers are familiar. The best contemporary example of a confidence building agreement, of course, is the European-based CSCE Vienna Document.

A Closer Look at Confidence Building[6]

In the author's view, there is more to confidence building than conventional treat-ments suggest. In particular, traditional treatments say little about *what actually happens* when confidence building arrangements are pursued and implemented

successfully. Too often, they even confuse the process of confidence building with the process' measures (CBMs).[7] A careful analysis of the traditional confidence building literature developed over the past twenty years - the literature that informs, directly or indirectly, most thinking about inter-Korean confidence building applications - will reveal that it is driven by an understanding of the phenomenon that could be called a "minimalist" perspective. This perspective is incomplete because it

> "... recognized little in the way of clear causal connections between the negotiation and implementation of confidence building agreements and any deeper, underlying associated process of change or transformation. Instead, "confidence building" is treated for all intents and purposes as an approximate synonym for *implementing* a collection of CBMs. And implementing these measures is associated with a general but unexplored expectation that the adoption of CBMs will reduce suspicion and misperception and thus improve a security relationship. This is presumed to occur because participating states will have more (and more reliable) information about each others' military capabilities and activities."

The minimalist perspective almost certainly is too limited, the product of an earlier time when analysts and policy makers could not yet see the greater potential of confidence building *nor anticipate the need to account for its successful operation*. This was likely because the political environment was very negative in the early- to mid-1980s and the impressive achievements of Stockholm and Vienna (and all that they implied) lay in the future. As a result of studying the more recent experience of confidence building in the preeminent CSCE case, analysts are beginning to appreciate that confidence building, as a comprehensive activity-oriented process, can - and perhaps must - involve something more profound than improved access to security information and modest constraints on military deployments and activities if it is to accomplish anything substantial.

The Transformation View of Confidence Building

If the European case is any guide, it appears that confidence building *must at some point be associated with - and encourage - a process of security conception transformation, if it is to produce meaningful results*. The serious pursuit of confidence building arrangements, according to this view, is an activity that is particularly well-suited to fostering this kind of change in thinking, both because of

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6   The ideas discussed in this section are drawn from "A Confidence Building Framework for the Korean Peninsula," an article by the author scheduled to appear in an upcoming issue of *The Korean Journal of Defense Analysis*. Some of these ideas are also explored in "Inter-Korean CBMs and Arms Reduction: The Conventional Forces Dimension." The conceptual material is explored in much more detail in a larger study *(From Stockholm to Vienna and Beyond: The Confidence Building Process Revisited)* currently being prepared for the Verification Research Programme at Foreign Affairs and International Trade Canada.

7   Hence, we often see the usage "CBMs are a useful approach" instead of "confidence building is a useful approach."

the activity's basic character and requirements and because of the substantive nature of the confidence building measures that comprise an arrangement.[8]

The "transformation process" entails a fundamental, positive shift in the way leaders, policy makers, and publics think about potentially and traditionally dangerous neighbours and the sorts of threats that they may pose. The process typically will occur gradually and unevenly at first as the subject matter of a confidence building negotiation is explored but the opportunity exists for shifts in thinking to occur as negotiators pursue successful outcomes.

It should never be thought, however, that states with hostile intentions will somehow be converted to more pacific views simply through the superficial pursuit of confidence building agreements of their look-alike. "Confidence building" can't stop states from making war if that is their intent. It can only help states move toward more neutral or positive attitudes when they no longer are actively considering the use of force and are dissatisfied (if only vaguely) with the *status quo* in security relations.

The critical transformation in thinking, which can only occur when conditions for change are accommodating, makes it possible to escape from the circle of suspicion and to develop new relationships that have significantly reduced assumptions of hostility built into them. Confidence building probably does not cause the transformation, *per se*, (although it may) but the process of developing, negotiating, and then implementing successively more comprehensive agreements does seem to play a central role in facilitating change. Perhaps just as important, it seems reasonable to speculate that a genuinely successful confidence building process can lead to the eventual "regularization" of transformed relations in the form of a security regime.[9]

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8   The basic character of confidence building is cooperative and non-zero-sum in nature. The requirements for successful confidence building are discussed in the main text but basically amount to the opportunity for interaction amongst officials and experts with a growing sense of shared conceptions of security and how to achieve and maintain it. The substantive nature of CBMs typically involves and promotes constructive interaction, information and knowledge exchange, and (to a lesser extent) constraint. Thus, the nature of the activity and the nature of the activity's product (a CBM agreement) reinforce each other.

9   "Regime" is used in the formal, analytic sense. In the simplest of terms, a regime is an enduring pattern of cooperative behaviour with discernible implicit and/or explicit guidelines for action. See the special regime issue of *International Organization* edited by Stephen D. Krasner (Vol. 36, No. 2 (Spring 1982)). Krasner defines regimes as:

> "sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations. Principles are beliefs of fact, causation, and rectitude. Norms are standards of behaviour defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice. ...

> Regimes must be understood as something more than temporary arrangements that change with every shift in power of interest. ... The purpose of regimes is to facilitate agreements. ...

It is the infusion of behaviour with principles and norms that distinguishes regime-governed activity in the international system from more conventional activity, guided exclusively by narrow calculations of interest." (pp. 186-187.)

A more detailed discussion of supporting **conditions** is necessary to better understand confidence building and the policy options that can support it. In general, it appears that two basic sets of conditions are identifiable as important in supporting confidence building processes. One set - **initiating conditions** - defines what is necessary to initiate a confidence building process in the first place. Without these fundamental conditions being met, confidence building outcomes of any constructive sort appear unlikely. Thus, confidence building efforts (more accurately, "confidence building initiating efforts") must focus first on establishing these initial conditions. The second set - **transformative conditions** - defines what is necessary to accomplish the more fundamental shift in thinking that characterizes the essence of successful confidence building. These are more demanding and it is unclear at present whether the full set noted below is actually necessary for the promotion of a genuine transformation in security relations.

Preliminary analysis[10] suggests that the following are vital initiating conditions:

1. The existence of at least a prototypical "epistemic community"[11] cutting across government and academic lines, able and willing to explore and promote confidence building solutions within at least the majority of the potential participant states. It seems key that this group have reasonable access to at least some senior government decision makers, especially Foreign Ministry officials or security advisors. It is less clear whether they must have access to Defence Ministry officials during the initial stages;

2. An initial negotiating or (at minimum) discussion forum, however modest, to act as a focus for further explorations and constructive interaction, whether formal or informal, by influential government representatives and specialists;

3. A sense of overwhelming security management fatigue emerging in the ongoing, long-term security relationship amongst unfriendly states (i.e., the belief that there have been too many years of stand-off with no prospect of resolution); and - perhaps -

4. The emergence of a new generation of more flexible and sophisticated policy makers capable, at least in principle, of embracing new, more cooperative security ideas.

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10   This discussion is very preliminary and is based on ideas about initiating and transformation conditions derived largely from the CSCE case. These ideas almost certainly will be revised and refined as a result of further analysis. Insights from Korean colleagues will be invaluable in this process as will the experience from the Korean case itself as it unfolds. A fuller treatment will be found in *From Stockholm to Vienna and Beyond.*

11   *An epistemic community* is "a [transnational] network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue area." Peter M. Hass, "Introduction: Epistemic Communities and International Policy Coordination," *International Organization* Vol. 46, No. 1 (Winter 1992), p. 3.

Thus, for confidence building to even begin in an exploratory sense, there must be a core group of specialists working with the same basic ideas about confidence building and security management[12] (even if the ideas are not uniformly supported), a forum for them to interact, some access to government officials capable of and willing to promote these ideas, if only in a provisional manner, and a facilitating atmosphere of "security management fatigue."

For the much more demanding case of successful transformative confidence building, the following additional conditions appear to be necessary:

1. Ambiguous estimates of the military capabilities and intentions of unfriendly states, with substantially varying yet defensible assessments of strengths and weaknesses, equally well supported by available evidence and promoted by roughly equal numbers of experts. These ambiguous estimates reinforce (and perhaps are a partial product of) a sense of unease and dissatisfaction with status quo security policies (distinguishable from a sense of security fatigue which is more generalized);

2. An increasing and sharpened, widely held sense of concern about primarily domestic costs (economic, political, social, and perhaps even moral) of maintaining the status quo in security policy. This can also reinforce (and perhaps be a partial product of) a sense of unease and dissatisfaction with status quo security policies (again, distinguishable from a sense of security fatigue which is more generalized);

3. The relatively recent absence of overt conflict during the period of stand-off (at least ten years?);

4. The emergence and movement into positions of relative power of a new generation of more flexible and sophisticated policy makers capable, at least in principle, of embracing new, more cooperative security ideas - and acting on them In particular, this must include at least some key, relatively senior uniformed military personnel; and - perhaps -

5. A "leap of faith" by at least one key decision maker (an act of leadership in proposing a major security-related initiative with both practical and symbolic significance) that crosses a key emotional and conceptual threshold, breaking the logjam of conventional, status quo thinking and action ("the Gorbachev factor").[13]

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12 It is very important to stress that these ideas need not be carbon copies of existing conventional (predominantly Eurocentric) security concepts and policy approaches. It is likely that there will be elements drawn from existing material but the more important point is that experts and policy makers from both North Korea and South Korea build common conceptions and understandings *together* that have meaning for them and the security environment in which they both live. Outsiders can provide some basis for discussion and an existing programme of ideas but this is only a starting point.

13 Discussions in an earlier Korea-Canada Workshop highlighted the renunciation of the North Korean nuclear programme by a post-Kim regime, along the lines of the South African renunciation model, as the sort of dramatic gesture that could trigger transformation in North-South Korean relations. The death of Kim Il Sung makes this option even more compelling as a new regime emerges in the North.

The implication in this discussion of necessary conditions is that timing matters. If confidence building is attempted before these initiating conditions are met, there is likely to be little chance of success. There is relatively little that can be done about encouraging some of these conditions (participants must simply come to feel this way) but sponsoring the development of an epistemic community, encouraging interaction, and seeking important symbolic acts can perhaps expedite matters significantly.

Of course, not every effort to develop confidence building arrangements will lead to so constructive an outcome, particularly if some of the participants are not serious about developing meaningful agreements - or, at least, serious about discussing them. However, if the initial stage is set by at least one interested party, the possibility exists for interaction amongst negotiators and experts and this can lead to the gradual development of a real confidence building process. *In the absence of such interest and an opportunity to interact constructively, there can be no real possibility of meaningful confidence building as understood in this paper.*

Thus, confidence building, according to this more expansive view, is *not* simply the adoption of specific measures providing participating states with more (and ostensibly more reliable) information about each others' military capabilities and activities (including the opportunity to observe those capabilities and activities up close). Nor is it simply the process of acquiring that information once an agreement is in place. This is a very important claim, one that lies at the centre of any causally-oriented reflection on how confidence building works.

At the risk of oversimplifying the basic claims of conventional("minimalist") confidence building thinking, it must be understood that more information about - and greater exposure to - dangerous neighbours' military forces will not necessarily improve security relations as conventional thinking implies. Indeed, relations are as likely to worsen as added information feeds existing misperceptions and fears, particularly as natural weapon system acquisition and development cycles yield forces of increased military capability and ambiguous character. This seems to be particularly likely in a case like Korea. Even a modest conception of the confidence building process must (but rarely does) acknowledge this and grant that more must be going on than simply the acquisition of additional information for "confidence building" to accomplish anything useful.[14]

Summarizing the main elements in this transformation view, we can define confidence building as

... a discrete security management activity that involves the *process* of exploring, negotiating, and implementing an agreement that, when successful, initiates and/or facilitates a significant positive transformation process in the security relations of the

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14   Decades of Cold War experience with the progressively more refined acquisition of information via National Technical Means (NTM) would suggest that access to more detailed information by itself is not the key to confidence building and, indeed, can easily produce the opposite effect. NTM, after all, did little to disabuse Superpower decision makers of exaggerated and frequently incorrect assessments in the strategic nuclear and conventional realm during the Cold War.

participating states. The transformation process is the product of interaction, information and knowledge exchange, and cooperative constraint. It is a psychological process that involves the transformation of specialist, government decision maker, and public beliefs about the nature of threat posed by other states, primarily entailing a fundamental shift from a basic assumption of hostile intentions to one of non-hostile (but not necessarily friendly) intentions.

Disassociated from this larger process of transformation, confidence building loses much of its meaning and becomes a narrow, information-enhancing activity incapable by itself of fundamentally altering a security relationship. Effectively, it is a dead-end enterprise. Studies that slight this dimension and focus instead on the assembly of collections of CBMs and the narrow generation of increased transparency run the risk of divorcing the confidence building enterprise from the processes of change that actually give it meaning. Although we should be reluctant to dismiss these "smaller" examples as not being real examples of confidence building, it is increasingly clear that we need to distinguish between *transformative confidence building* and less comprehensive examples (perhaps best termed "transparency enhancement") where no process of real change is either intended or possible.

Thus, the transformation view argues that the confidence building process ªí the process of exploring and initiating negotiations; negotiating an agreement; and then implementing the confidence building agreement - facilitates (and perhaps initiates) a transformation in the encompassing security environment when it is successfully pursued. This transformation typically will be seen in the fundamental shift of decision maker perceptions of and beliefs about threat. And when the transformation is successful, the security environment may come to be governed by a cooperative security regime which is defined by the contents of the confidence building agreement and the behavioral practices that emerge during the agreement's negotiation and implementation.

Confidence building, according to the transformation view, is by far the most effective means of operationalizing and institutionalizing the potential for change in security relations. This is because confidence building is a fundamentally cooperative activity focusing centrally on intention and perceptions of threat in the security sphere. It also tends *not* to rely on zero-sum reasoning, as does much of arms control practice more generally. Indeed, the development, negotiation, and implementation of confidence building agreements may be the only effective way of animating the potential for change in a security relationship ripe for transformation and it is likely the best vehicle for moving toward that goal.

General Policy Implications

Despite the lofty final goal of fundamental transformation and the likely need for a variety of conditions to be met for its attainment, the confidence building process can begin with very modest efforts aimed at establishing some basic initial opportunities for interaction and discussion about the goals and nature of confidence building.

Inter-Korean relations, quite clearly, are some distance from the stage where they can support the kind of fundamental transformation that marks the successful

denouement of a comprehensive confidence building process. *Although this does not mean that there is no scope for inter-Korean confidence building, it does mean that the scope is limited and that efforts probably should concentrate on the development of supportive initial conditions*.

This view of confidence building has some important implications for those attempting to develop inter-Korean security management solutions. Most significantly, this view warns against assuming that the mere adoption of CBMs will have any constructive impact on security relations given current inter-Korean political realities, setting aside for the moment the issue of whether or not they could even be successfully negotiated. Simply putting in place CBM arrangements that replicate the content of existing confidence building agreements (whether modest Helsinki or comprehensive Vienna variants) or that are assembled from the literature's broader menu of CBM proposals is not likely to change security relations in any meaningful way. This is not really what confidence building is about and an over-concentration on the operational content of proposed confidence building agreements can only exaggerate this misunderstanding. The transformation view of confidence building argues that process - the development, negotiation, and then implementation of agreements - can matter at least as much as the substance of those agreements.

There is little point in spelling out various CBM proposals of the sort that might emerge as the result of patient negotiations. Many scholars and analysts in South Korea are already devoting their efforts to this task. More important, the content of eventual confidence building arrangements ought to be determined, at least in part, *as the result of a confidence building process.* Too much prior concentration on "package design" can obscure and undermine the value of the process itself. It is nevertheless worth stressing again the view that initial attention should be devoted to developing arrangements featuring interaction-oriented experience- and (to a lesser degree) information-type CBMs. Based on the typology of CBM categories referenced earlier in the paper (note 5), this recommendation means concentrating on the following types of measures in approximately the following order:

(1) *Experience Measures* (provision of opportunity to interact with opposite numbers) Examples include: military personnel exchanges, security expert exchanges, transnational secondments, joint training and exercises, seminars discussing doctrine, strategy, and technology issues;

(2) *Information Measures* (provision of information about military forces, facilities, structures, and activities) Examples include: publication of defence information, weapon system and force structure information exchange, consultative commissions, publication of defence budget figures, publication of weapon system development information;

(3) *Communication Measures* (provision of means of communication) Examples include: hot lines for exchange of crisis information, joint crisis control centres, "cool lines" for the regular distribution of required and requested information; and

(4) **Observation-of-Movement Conduct Measures** (provision of opportunity to observe specified military activities)

Examples include: mandatory and optional invitations to observe specified activities (with information about the activity) and rules of conduct for observers and hosts.

This recommendation stands in some contrast to more conventional (minimalist informed) approaches which focus more on information- and notification-type measures. This assessment does not mean that the pursuit of information- and notification-type CBMs ought not be included in early confidence building efforts, because they can be genuinely useful measures. Instead, it means that specialists and negotiators ought to favour experience-type measures over all other types due to their capacity to promote increased understanding. As well, efforts to develop information-type measures should move slowly and carefully given the extremely suspicious nature of the North Korean regime and its military.

More generally, it is probably most helpful to emphasize again the importance of encouraging and promoting the development of what appear to be necessary **initiating conditions**, almost certainly as part of a larger programme focusing on the stabilization of North Korea through extremely measured and focused joint economic development projects (whether after the North Korean nuclear issue is resolved or as part of a more comprehensive plan including its resolution). Those conditions, as discussed earlier, include:

1. The existence of at least a prototypical "epistemic community" cutting across government and academic lines, able and willing to explore and promote confidence building solutions within at least the majority of the potential participant states. It seems key that this group have reasonable access to at least some senior government decision makers, especially Foreign Ministry officials or security advisors;

2. An initial negotiating or (at minimum) discussion forum, however modest, to act as a focus for further explorations and constructive interaction, whether formal or informal, by influential government representatives and specialists;

3. A sense of overwhelming security management fatigue emerging in the ongoing, long-term security relationship amongst unfriendly states (i.e., the belief that there have been too many years of stand-off with no prospect of resolution); and - perhaps -

4. The emergence of a new generation of more flexible and sophisticated policy makers capable, at least in principle, of embracing new, more cooperative security ideas.

Clearly, the first two are much more amenable to direct policy initiatives although we should not exaggerate the scope for action even here. There is less opportunity for South Korean policy makers (and others) to directly encourage a sense of security management fatigue and the emergence of a new generation of leaders in North Korea although several points are worth making in this regard.

First, isolating and further stressing the current North Korean regime, thereby encouraging its suspicions and hostility and possibly destabilizing it entirely, is unlikely to promote a sense of security management fatigue. Thus, policies of this type could be seen to be counter-productive to the development of confidence building opportunities.

Second, pursuing carefully conceived joint development projects and promoting dialogue on as many levels as is possible[15] could permit a younger generation of leaders in North Korea to associate themselves with policy options that bring some modest level of improvement in the North. This could help prepare the way for more constructive inter-Korean relations in the future as these officials gain influence. If these initiating conditions can be created, there will be at least the opportunity for successful confidence building on the peninsula.

Conclusion

This paper has presented an outsider's view of how confidence building can be important in efforts to improve inter-Korean security relations. Central to this argument is the claim that confidence building involves more than simply the adoption of well-recognized CBMs. Confidence building, according to this non-traditional view, is an activity that facilitates a process of change in fundamental security conceptions. For it to be successful, however, a number of basic conditions must be met. Conditions are not currently supportive in North Korea although they appear to have passed a critical threshold in South Korea. This means that the main effort at present must be devoted to the creation of initial conditions sufficient to support the movement forward, beginning with the promotion of trans-Korean and regional experts groups and opportunities for their interaction. An over-fascination with designing complex CBM arrangements appears to be premature. The main thrust of the confidence building-oriented strategy discussed in this paper is long-term change in security conceptions, not the pursuit of comprehensive but illusive force reduction agreements and contextless transparency measures.

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15   A cautionary note is warranted, however. Presenting the North Korean regime with too many initiatives and opportunities may confuse it and limit the chances of developing productive dialogue. Thus, considerable care ought to be exercised in devising policy initiatives.

THE PROSPECT OF CBMS IN NORTHEAST ASIA: A SOUTH KOREAN VIEW

Kang Choi

THE RECENT TRENDS IN THE DISCUSSION OF ARMS CONTROL

The fundamental changes caused by the end of the Cold War confrontation are posing not only opportunities but also challenges to policy makers and urging them to adopt new thinking and approaches in formulating and implementing security policies.

In the post-Cold War era, one of the most conspicuous things in the discussion of security affairs in Northeast Asia is the issue of arms control. There are several distinctive trends in the discussion of arms control in Northeast Asia.

First, given the characteristics of the military/strategic circumstances and the pending security issues in Northeast Asia, many policy makers and pundits suggest confidence-building measures (CBMs) as a means to promote peace and stability in the region. They also emphasize the experience and lessons of European CBMs as a model to follow. While they are reluctant to import the so-called structural arms control measures of Europe, they tend to simply lift CBMs from the European context and graft them on to Northeast Asia.

However, we should ask whether it is possible and desirable to do so. If the security environment and pending security issues differ from one region to another, it might be necessary to assess the applicability of CBMs as well as other types of arms control measures, which are developed in other regions, against the characteristics and nature of the strategic environment of the designated region. In other words, Northeast Asia is not Europe. It has different set of security problems and has its own distinctive security environment. Security and threat perceptions on the part of the concerned states, the security issues at stake and specific features as well as the situation in the region must be taken into account in any attempt to develop and implement any arms control measures, including CBMs. CBMs may be more suitable and applicable than any structural arms control measures to Northeast Asia. The applicability and feasibility of CBMs in Northeast Asia, however, need to be assessed against the regional setting.

Second, we tend to believe that CBMs have really contributed to peace and stability in Europe. This may be true to a certain degree when we compare the current security environment of Europe to that of the early 1970s. The European CBMs and CSCE, which were born in the short-lived era of detente, were able to survive the renewed East-West confrontation of the late 1970s and the first half of the 1980s. There has been neither surprise attack nor unintended armed clashes and uncontrolled escalation in Europe, which CBMs are intended to avoid. Furthermore, the record of compliance of the signatories to the CBMs is remarkably good.

However, the effectiveness, credibility and contribution of CBMs are not proved yet and it is not known whether CBMs have performed what they are supposed to do. The absence of a surprise attack and the relatively good record of compliance to the agreed CBMs may be attributed to the fear of nuclear war and its disastrous consequences, not solely to the expected utility and functions of CBMs. CBMs can be regarded as one of the factors which have contributed to peace and security in Europe, not the factor.

Third, in the discussion of CBMs in Northeast Asia, we rarely discuss procedural matters in introducing and implementing CBMs in a Northeast Asian context. Rather we look at the final products of European negotiations under the framework of CSCE, which has lasted about two decades. We tend to dismiss or underestimate the implications and importance of the whole CSCE negotiation process. Sometimes, our understanding of CBMs is "snapshot-like" and we tend to look at the trees, not the woods. This may lead us to adopt a stochastic approach in our discussion of arms control. Furthermore, there is a danger of a monotonic interpretation of the arms control process. Arms control, including CBMs, involves painstaking negotiations. The process of negotiation and the interaction between the concerned parties have a great importance in determining the type and nature of the outcome. Sometimes the process itself may be more important than the outcome. In order to understand CBMs more clearly, we need to look at the process of negotiation and interaction.

Finally, in the discussion of CBMs, the definition of CBMs tends to be very narrow and the attention is often focused on very specific and technical measures. That is we usually focus our attention on measures such as information exchange, communication, notification, inspection and verification and some forms of constraint. Most of these are confined to the military dimension. These kinds of CBMs are not the only things that generate confidence and security among nations. There could be other measures such as alliances, security arrangements and increased economic cooperation and interdependence which can perform the same function of CBMs. In other words, it is neither practical nor desirable to confine the scope of CBMs to just the military dimension. Especially, in Northeast Asia, non-military CBMs can indirectly perform the same function as military CBMs, and sometimes more effectively.

These four trends — stereotyping of European CBMs, over-confidence in CBMs, lack of procedural assessment and technical emphasis on CBMs — are likely to mislead us in devising proper policies and approaches for CBMs. It is necessary to reassess and evaluate the validity of European CBMs against the backdrop of the characteristics and nature of the security environment of Northeast Asia.

CONTEXTUAL ASSESSMENT

The contextual background of CBMs differs across regions and it influences the nature and type of CBMs to be adopted. In order to evaluate the applicability of European CBMs to Northeast Asia and to devise ways to adopt CBMs in Northeast Asia, it is necessary to compare and contrast strategic realities between Northeast Asia and Europe.

Regional Structure

First of all, most CBMs, that we are familiar with, have their origins in the bipolar standoff between East and West. Even though there were a larger number of states in the region and there were neutral-nonaligned states, until recently Europe was characterized as being divided into two competing blocs. Each was headed by one of the two superpowers. Consequently, both sides knew where the cold war lines were drawn. Of course, there was some debate about the intentions of the aggressor, but there was no doubt about where the threat would come from should it take place. The Cold War bipolar standoff between East and West was also accompanied by the consolidation of the so-called sphere of influence.

As a consequence, arms control in Europe, including CBMs as well, grew up in a two bloc structure as a way to manage military rivalry and to stabilize military competition. In other words, CBMs were considered as a "status quo measure" to maintain the existing relationship or structure rather than to change it.

Compared to this European character, the current situation of Northeast Asia resembles that of the 19th century European balance of power system. Northeast Asia is the only region in the world where four of the five centers — the United States, Russia, China and Japan — meet and intersect. Three of the four — Japan, Russia and China — are present by virtue of their physical geography. The U.S. involvement in the region is primarily determined by its economic, political, and strategic calculation. In addition, there are two smaller powers — South and North Korea — which face each other across the 155-mile long DMZ with heavily armed forces and severe hostility. Thus, the regional structure of Northeast Asia can be called the "four-plus-two" system.

During the Cold War era, this rather complicated underlying four-plus-two power structure was overshadowed by the dominant East-West bi-polar standoff and the Cold War itself was conducted through a set of bilateral relationships. With the eclipse of the East-West conflict, the complex "four-plus-two" system is to finding its place in Northeast Asia. The virtual absence of European-style alliances leave the region with few building blocks to reorient itself in the post-Cold War environment. This means that the old structure is virtually gone and a new one is not clearly identified and firmly established.

While the United States is trying to retain its traditional political-military leadership as the balancer in the region and is determined to prevent the emergence of another regional hegemon, the disappearance of the Soviet threat, which united the US and its regional allies and provided the rationale for US engagement in Northeast Asian affairs, now requires an adjustment of the traditional security relationships. While Russia continues to have impressive military capabilities, the relative influence of Russia has declined substantially and due to its internal political, social and economic problems this trend is expected to continue into the foreseeable future. On the other hand, given the reduced role of both the United States and Russia in the region, Japan and China are likely to wield greater influence in determining the strategic environment in Northeast Asia.

It is very difficult, if not impossible, to predict how and when this four-plus-two system will find its equilibrium. While everybody is calling for security cooperation, there

is no shared vision of the future regional security structure. There is no consensus about the desirable regional security structure end state. Thus, it is very difficult to forecast the course of evolution of regional security structure and how long it will last. Uncertainty and fluidity will dominate the strategic reality of Northeast Asia for the time being.

This means that we should adopt CBMs of a different nature and for different objectives. That is, in Northeast Asia, CBMs should be directed targeted against the management of transitional period and changes, and should be designed to cope with uncertainty. Thus, we can have some reservations about accepting European CBMs as the status quo. Furthermore, CBMs in Northeast Asia are likely to be more challenging and they will require more creative thinking and approaches.

Military Parity
Another factor, which distinguishes Europe from Northeast Asia, is the existence of rough overall military parity between East and West. The arrival of rough military parity in Europe seemed to make it improbable and expensive to pursue and achieve political goals through military means. Furthermore, arms race stability was there. No one intended to change this relatively stable military balance. The efforts were directed to maintain this stability at a lower level. Military stalemate, which could be perceived as a product of rough military parity, led the Europeans to work together on its management. Thus we can say the arrival of rough military parity created a very benign environment for arms control in general.

If we apply this to Northeast Asia, we can say that Northeast Asia is not ready for arms control. The military balance in Northeast Asia is changing very rapidly and profoundly. It is very difficult to predict how, when and what kind of military balance will be in place. Furthermore, since most countries in the region are modernizing and restructuring their armed forces, it would be hard for them to reveal their defense plan and to make it transparent. They may consider "transparency" of forces, military activities, and defense plans as intelligence devices. Even though we accept the utility and function of transparency measures, they may not be enough to consolidate the ever-changing military balance in Northeast Asia.

Source(s) of Threat and Threat Perception
When CBMs were conceived in Europe, there was a clear and identifiable source of threat from each other's perspective. What was more important than the existence of a clear and identifiable threat was the commonly shared fear of nuclear war and its consequences.

Since the mid-1950s, Europe observed the proliferation of nuclear weapons both quantitatively and qualitatively. It was due to the conventional inferiority of the West European states, their inability to raise conventional force levels sufficient to defend themselves and deter Soviet aggression and Soviet reaction to the nuclearization of NATO forces. In 1954, the NATO Council decided to introduce tactical nuclear weapons into Europe. Their purpose was to compensate for Soviet conventional superiority and to signal the intent to use nuclear weapons early on in any conflict.

While it maintained conventional superiority over the NATO countries, the Soviet Union, in reaction to NATO's decision to deploy theater nuclear weapons, enhanced its theater nuclear forces. About 750 medium-range ballistic missiles were deployed

in the period of 1958-1966. In addition to this number, around 1967, the Soviet Union decided to enhance its theater nuclear forces by reallocating 360 SS-11s from its intercontinental target set to the regional one. These were deployed in 1969-1973, largely compensating for the short-fall in the original SS-5 deployments. The purposes of these forces were: (1) to avoid, if possible, the use of nuclear weapons in the European theater; and (2) if resorting to them became inevitable, to use them in such a way as to minimize the chance of escalation to an intercontinental exchange.

In consequence, by the early 1970s, there emerged a nuclear confrontation in Europe. It was doubtful whether they could control the escalation should war occur in Europe and whether war could serve the political objectives of each side. It was expected that if war took place, it would escalate very rapidly and would be beyond anyone's control. In turn, it generated fear of nuclear war. It was felt necessary to devise some ways to avoid and reduce the chance of accidental war or unintended armed clashes between NATO and Warsaw Pact countries. In a word, common fear of nuclear war and its consequences led the Europeans to think of CBMs as a way to avoid and reduce the chance of unintended armed clashes and surprise attack.

In contrast, in Northeast Asia, while we cannot overlook the nuclear dimension, military reality is constructed mainly by conventional factors. There is no clear linkage between the nuclear and conventional dimensions. Rather there exist two separate dimensions: one is nuclear and the other is conventional, but no intermediate link. If there is war, it is going to be either nuclear or conventional. There is little danger of rapid escalation of war into the nuclear dimension, with the exception of the Sino-Russian border. The nuclear threshold, or fire-break, is relatively high in Northeast Asia. So people tend to think that if conventional war should occur, it is possible to contain that war at the conventional level. This means there is no common fear of nuclear war, which provided rationale for CBMs in the European context. The virtual absence of a clear and present danger of nuclear war and its consequences will make it difficult, if not impossible, to introduce Euro-style CBMs, which are primarily designed to buy more time, to stop crisis just short of war and to prevent surprise attack as a buffer measure. It seems there is no room, or little room, for such buffer-like measures to stand in Northeast Asia.

Furthermore, since the disappearance of the Soviet threat, sources of threat became diversified. Except for the strategic uncertainty about the future, there is nothing in common among the Northeast Asian states in their identification of sources of threat. Even though they have a common set of security issues and concerns, the priority and relative importance of each issue differs from one country to another. We can pack them together, but we cannot artificially assign a priority and importance among themselves. This implies that we should start with the identification of common interests, an agenda for discussion and negotiation rather than the discussion of specific measures.

Geographical Attributes

One common element which connects Europe and Northeast Asia together is the fact that they are located in the Eurasian rimland which gives access to the heartland area, conversely to the circumferential maritime routes. However, except for this, Europe and Northeast Asia have very significant geographical differences which leads

us to take different paths in introducing and implementing CBMs.

Unlike the land-oriented strategic landscape of Europe, Northeast Asia is maritime-oriented. The huge size of land in Northeast Asia is neutralized by the presence of vast seas. It is not surrounded by the seas. Rather it is divided by the seas into two parts: land occupied by Russia and China and an ocean mainly controlled by the United States and Japan. Except for the Korean Peninsula, the United States has no direct access to the Eurasian rimland in this part of the world since the loss of China in 1949. So the United States needs reliable naval and air forces in order to reach this region and to protect its interests and allies. On the other hand, Russia and China are dominantly land-oriented. Recently, they have begun to pay more attention to maritime affairs and to retain, or increase their power projection capability. It is not known yet whether these two competing trends will collide or not. What this implies is that any CBM should be directed toward stabilization of maritime affairs. This raises an issue of reliability and applicability of land-oriented CBMs developed in the European context.

When the CSCE process, in which CBMs were negotiated and adopted, began, the territories of European states were clearly defined. Everybody knew where the lines which separate one from another were drawn. In Northeast Asia, with the exception of the Korean Peninsula which comes close to the Central European situation, a clear geographic demarcation for delineating regional security requirements is absent. Even the term "Northeast Asia" is obscure. No one really knows where Northeast Asia begins and ends. There is no clear geographical definition of Northeast Asia. The absence of a clear geographical definition of Northeast Asia is due to the presence of vast area of waters (or seas) in the region. No one can claim its jurisdiction over these international waters. On the other hand, anybody can utilize these international waters for its own advantage. Geographical obscurity would possibly allow an advantage in arms control agreements by providing loopholes in interpreting the terms of agreements. The unclear geographical definition of Northeast Asia is going to set different agendas for CBMs in the region.

Compared to Europe, Northeast Asia is vast. Northeast Asia is much larger than Europe. The geographical vastness of Northeast Asia affects one's ability to deploy and employ troops and equipment, provide reinforcements and conduct resupply operations. It would be very difficult for anyone to assume a fast moving offensive attack without detection. In other words, the vastness of Northeast Asia itself would serve as an effective monitoring mechanism, which is comparable to some functions of CBMs. On the other hand, the vastness of Northeast Asia will make monitoring mechanisms extremely difficult, if not severely intrusive.

In sum, changing regional structures, disparity of military power between Northeast Asian states, absence of commonly shared fears and threats and the geographical attributes of Northeast Asia are likely to dictate the content and nature of CBMs to be adopted in Northeast Asia. In some cases, we can find the utility of European CBMs. In other cases, we cannot. This does not necessarily mean the inapplicability and inappropriateness of CBMs themselves for a Northeast Asian context. This means that we should focus on the objectives and goals that we want to achieve. Then we should think of proper types of CBMs.

PROCEDURAL ASSESSMENT

Not only is the contextual consideration important, but also the procedural under-standing is important. CBMs, we are familiar with now, are the product of long and painstaking negotiations over two decades. The development and sophistication of CBMs take a relatively long time. However, we tend to look at the outcomes, not the process itself. Without a clear understanding and evaluation of the CSCE and CBMs process, we cannot properly devise ways to introduce CBMs into Northeast Asia. Of course, the CSCE process has shown one possible way. There could be other types of process. However, at least, it can show us a good example and provide us impor-tant implications.

As we all know, the idea of the CSCE came from the East. Since the 1950s, the Soviet Union proposed a conference to establish a European system of collective security. Underlying objectives in a proposal of a conference were: (1) to adopt an agreement that would serve as a substitute for a European peace treaty and legitimize the Soviet Union's position in Europe; (2) divide Western Europe from North America and weaken the US role on the Continent; and (3) to spur the economic develop-ment of the Soviet Union and its allies by enhancing economic cooperation between the East and the West.

Not to our surprise, the initial Western response to the Soviet proposal was quite negative. But toward the end of the 1960s, against the background of a general warming in East-West relations, the idea of a European conference attracted new attention both in the East and the West. In 1969, NATO expressed its readiness to explore the potential issues and the framework for such negotiations. The more flex-ible Western attitude was made possible by the success of German *Ostpolitik*, which had resolved the controversy on the postwar borders in Europe.

In 1969 and 1970 the two alliances clarified their positions on the conference through an exchange of communiqués and declarations. The Warsaw Pact proposed two agenda items: European security and expansion of economic, scientific, and technological cooperation. NATO's reply of May 1970 revealed the Western determi-nation to give CSCE a human dimension and a political/military dimension.

The exchange of signals between the military alliances was followed with keen interest by the neutral and nonaligned states of Europe. Directly affected by the development of East-West relations but so far with limited influence on them, they expected the conference to offer a valuable opportunity to participate in the man-agement of East-West problems. Particularly important among the various statements by these governments in support of the conference was the initiative of the Finnish government, which offered to act as a host both to the conference itself as well as to preparatory consultations.

The way to convening these talks was finally cleared in the fall of 1972 when the Western conditions, the four-power agreement on Berlin and an agreed date for the opening of the MBFR talks, were fulfilled. Based on the Finnish government's invi-tation, the preparatory negotiations took place from November 22, 1972, to June 8, 1973, and they resulted in an agreement on the agenda of the conference, on its orga-nizational structure, and on its rules of procedure.

The negotiations on the Final Act commenced on September 18, 1973, in Geneva and lasted until July 21, 1975. Achieving consensus among thirty-five governments on a document comprising all major aspects of international relations proved enormously difficult and it took almost two years. When the heads of states and governments eventually assembled in Helsinki from July 30 to August 1, 1975, to sign the Final Act of the conference, there was general agreement about the document's historic character. At the same time everybody clearly recognized the fact that it was just a beginning, not the conclusion, and that a long and arduous road remained to be traveled in order to achieve what the Final Act promised.

The first follow-up meeting took place in Belgrade from October 4, 1977, to March 8, 1978. The concluding document that emerged from five months' conference had no substantive content beyond a reaffirmation of the commitment to implement the Final Act. However, the Belgrade meeting played an important role in the CSCE process. Procedurally, it established the pattern for the main follow-up meetings. The organization and structure of the Madrid and Vienna meetings essentially followed the Belgrade precedent. The Madrid meetings from November 11, 1980 to September 9, 1983 achieved significant advances over the Final Act. What is more important than these advances was that the Madrid meetings survived the worst crisis of East-West relations since the end of the cold war. It disproved the argument that CSCE negotiations can be expected to succeed in a period of detente but will remain unproductive in times of high East-West tensions.

Following the comprehensive approach and the structure of the Final Act, the Madrid document dealt with all major aspects of East-West relations. Especially, the mandate for the Conference on Confidence- and Security-Building Measures and Disarmament in Europe (CDE) constitutes the most important element of the document. The expansion of the military dimension of the CSCE process through the convening of the CDE opened the door for more extensive negotiations on CBMs.

In the Stockholm Conference, the European achieved a quantum leap in the development of C(S)BMs. The extremely modest and almost symbolic CBMs of the Helsinki Final Act were turned into an effective instrument for the promotion of military stability. The main body of the Stockholm contains the detailed provisions on notification, observation, annual calendars, constraining provisions and verification. It took more than a decade to have such elaborated, if not perfect, CBMs in place.

By looking at the CSCE process in which CBMs are conceived and further developed, we can identify the following lessons. First of all, while the CSCE process survived the worst situation of the late 1970s and the early 1980s, political accommodation was required for its conception. Without political accommodation, it is very difficult to think about arms control negotiation. Since arms control itself is the military currency of politics, it is not possible to isolate arms control from the political atmosphere. Political relations among the Northeast Asian states have become unprecedentedly positive, with the exception of the Korean Peninsula. Thus, we can think of arms control in general in Northeast Asia. However, improved political relations do not mean the inevitability of arms control. They just provide background. In a word, it may be a necessary condition, but not a sufficient condition.

Secondly, it is necessary to identify issues and to set up the agendas for negotiations. The identification of issues and agendas provides the substance. In the CSCE process, each side clearly identified and sent out the potential issues and agenda for negotiation. Thus, far in advance each side knew what would be the agenda if the conference commenced. This enabled each to identify or estimate the probable response from the other side and allowed them to evaluate the cost and benefit of engagement in CSCE. This reduced the uncertainty of the outcome of negotiations.

When we look at the picture of Northeast Asia, we can rarely see the exchange of views and signals among the Northeast Asian states. It seems that there is virtually no effort of issue identification and agenda setting for extensive negotiation. Rather there are various proposals for regional security dialogue such as mini-CSCA, ARF, ASEAN-PMC, ASEAN-SOM, NEACD, NPCSD, CSCAP and etc. What we should do is to provide substantive matters to these fora. This will make them really meaningful and provide a clear direction. Structure should be designed and established after the identification of purposes, functions and issues to be addressed.

Third, in connection with the second, the agenda, which was set up in the preparatory meetings, was quite comprehensive. It reflected both sides' demands. The agenda comprised four main items:

I.   Questions relating to security;
      - principles of relations between participating states
      - confidence-building measures

II.   Cooperation in the fields of economics, science and technology, and the environment;

III. Cooperation in humanitarian and other fields; and

IV.   Follow-up to the conference.

The Final Act itself is a comprehensive code of conduct whose chapters cover all major areas of international relations. Because of its comprehensiveness, it took a relatively long time to reach an agreement and to further develop and provide more concrete measures. However, it has provided a "cobweb-like" network of interaction. In-between the follow-up meetings, there were various expert meetings and fora for each area. It seems that this complex cobweb-like network has kept the CSCE process alive, contributed to build confidence in non-military areas and enhanced mutual understanding.

On the other hand, in Northeast Asia, there is no such comprehensive structure or network yet. Interaction is taken mainly in a bilateral fashion. There is no linkage between different dimensions. We tend to discuss a specific issue in isolation and to dismiss its linkage with other issues. We better think of a more comprehensive agenda setting as a way to pursue rather than purely confine ourselves to military CBMs. Unbalanced progress in various dimensions may become a source of conflict. While it may take a longer time to set up a comprehensive agenda, such comprehensiveness will enhance durability.

Fourth, we cannot rule out the contribution made by neutral and non-aligned states in maintaining the CSCE process and breaking through the deadlocks in the negotiation process. Unfortunately, in Northeast Asia, there is no such mediator. It is almost impossible to overcome this deficiency in Northeast Asia. However, we can think of the role of international organizations or regimes as a mediator. The possibility of utilizing international organizations such as the UN should be re-assessed.

In sum, Northeast Asia is ready for arms control with the warming political relations between the Northeast Asian states. At this stage, we can learn many valuable lessons from the CSCE process. It seems that we are trying to achieve so many things in short time. We should take more incremental and comprehensive approach.

CBMs for Northeast Asia
What is to be done to promote peace and stability in Northeast Asia? CBMs are more appropriate and practical than the structural arms control measures at the current stage. Then, what kind of CBMs should be introduced and how can we proceed?

In order to accomplish this task, we need to expand our concept of CBMs. CBMs can include both formal and informal measures that address, minimize and resolve uncertainties among states. It includes not only military but also political elements. It intends to create a common understanding of the orientations, ambitions and capabilities of neighboring states. What is important in the Northeast Asian context is while the European CBMs are intended to preserve the status quo, the Northeast Asian CBMs should be directed to prevent long-term problems from taking place in ways that overwhelm the capacity to deal with them.

Comprehensive Security Forum
Given the absence of common threat and the diverse sources of threat, it is not desirable to focus on a specific, particular threat from a national perspective. In other words, it is not desirable to create a forum in which only military issues shall be discussed. Rather it would be much easier and more practical to establish a comprehensive security forum in which not only military concerns but also political, economic and social issues shall be dealt with and all major aspects of international relations can be discussed.

Interests do converge or diverge on an issue-by-issue basis. However, it is not clearly recognized where these interests converge or diverge. While most Northeast Asian states want to have regional stability and peace, it seems that their perceptions of the condition of peace and stability are different. Thus it is necessary for us to establish a comprehensive security forum where these views are exchanged and discussed. The contrast between divergent perceptions and shared interests can be regarded as a foundation for future cooperation since the efforts to establish such a forum itself is a way to enhance confidence between nations. Through the participation in such a security forum, it becomes possible to draw a picture of "the desirable end state" of relations among the Northeast Asian states. In turn, this would eliminate the uncertainty of the future and provide a clear direction for their cooperation.

Agenda for Discussion
1. Agreement on the Guiding Principles
What lacks in our discussion is the guiding principles of relations among the

Northeast Asian states. Rather, we focus on more specific measures. If we can work on the principles guiding relations among the Northeast Asian states, we can identify each country's understanding of international relations and grasp common ground upon which we can establish cooperative relations. Basket I contains ten principles. Some of them are applicable to Northeast Asia. They are:

I.   Sovereign equality, respect for the right inherent in sovereignty;
II. Refraining from the threat of use of force;
III. Peaceful settlement of disputes;
IV. Nonintervention in internal affairs;
V.   Equal rights and self-determination of peoples;
VI. Cooperation among states; and
VII. Fulfillment in good faith of obligations under international law.

Agreement on such principles is likely to contribute to the enhancement of political commitment of the participating parties which will become the backbone of a comprehensive security forum.

2. Increased Contact between the Experts
Under the auspices of a comprehensive security forum, it would be desirable to establish a set of governmental, or at least semi-governmental, expert group meetings in which discussion on various issues can proceed. These groups can work synergistically. What is important is that it should involve the participation of governmental officials. The participation of governmental officials may increase the reliability and representativeness. It can be perceived as semi-official, or "TRACK II and 1/2" which can bridge the gap between TRACK I and TRACK II. This would help build up relationships, develop habits of consultation and identify areas of cooperation on shared interests.

3. Minimum Standard of Openness of National Security Policy
Strategic uncertainty of Northeast Asia is conditioned by the unpredictability of major powers' security policy. Unless we harness this problem, there is a danger of a regional arms race. It seems that everybody agrees on the utility and necessity of transparency. The problem is the level of transparency and targets of transparency. In order to overcome these problems, it would be necessary to set up a minimum level and target of transparency. At a minimum, the information should include data on major weapons procurement programs, a summary of national security strategy, notification of changes in military doctrine, and advance notice of weapons acquisitions that significantly increase power projection capability. It may be considered to be more or less a doctrinal exchange.

We can utilize the UN Conventional Arms Register. Before the annual submission of the report to the UN, each country can distribute its report to other states in the region for review and cross-checking. This indirectly contributes to the mechanism of the UN Register and to the enhancement of reliability of data. Thus, confidence among nations. The importance of either the UN or regional arms register lies in that it would allow us to understand and predict each country's defense modernization programs, and to raise legitimate concerns and questions over each country's arms procurement.

The same logic can be applied to the UN Standardized Instrument for International Reporting of Military Expanditures.

4. Maritime Cooperation Regime(s)

Given the maritime geographical attributes of Northeast Asia, it is necessary for us to focus on maritime CBMs. Northeast Asian states face a common challenge in maintaining the security of sea lines of communications and the general safety of the maritime environment.

A more coordinated and formalized approach to the task of policing the seas would bring the Northeast Asian states together. The scope of cooperation can be expanded to include measures to combat smuggling and piracy, monitor pollution and provide common search and rescue capabilities. One possible mechanism would be multilateralization of the U.S.-Russian or Japanese Russian Incident at Sea Agreements, broadened to include safety-at-sea measures.

5. Utilization of Global Arms Treaties

Most Northeast Asian states are the parties to important global arms treaties such as NPT, CWC, BWC, and etc. Their cooperation at the global level can provide a basis for their cooperation at the regional level. Especially, their cooperation in strengthening the regimes or treaties related to weapons of mass destruction and delivery systems has great ramification upon the Northeast Asian security.

Based on successful cooperation and coordination at the global level, it would become much easier for them to cooperate at the regional level.

Conclusion

The warming political relations among the Northeast Asian states is going to provide a very benign background for arms control, especially CBMs. However, at the current stage, we are not ready to introduce concrete CBMs. There is no common agenda for discussion and negotiation. There is no security forum in which we can discuss security issues.

Thus we should focus on the institutional arrangement in which we can discuss more concrete CBMs which are suitable for promotion of peace and stability in the region. The institutionalization process itself is a part of confidence-building. The desirable institutional arrangement should be more comprehensive rather than particular. It is not desirable to isolate and focus on military CBMs only. At the current stage, we should focus on political confidence and identification of the issues and concerns of the interested parties. We should recognize where our interests converge or diverge and how much.

In addition, rather than discussing on specific measures, we should focus on the sources of the threat to which we are going to apply the selected CBMs. This will

provide us a common ground upon which we can exchange views and concerns and finally we can grasp a clear idea of security cooperation. In a word, we should try to identify a common agenda for discussion and try to establish an institution in which we can have in-depth discussion on various issues.

Of course, we do not underestimate the importance of informal and private consultation. To a certain degree, the formalization process itself will become confidence-building.

In the meantime, we strongly encourage the great powers' cooperation in global arms control treaties and regimes such as NPT, CTBT, CWC, BWC, MTCR, etc. Their cooperation in this dimension has a great ramification at the regional level cooperation.
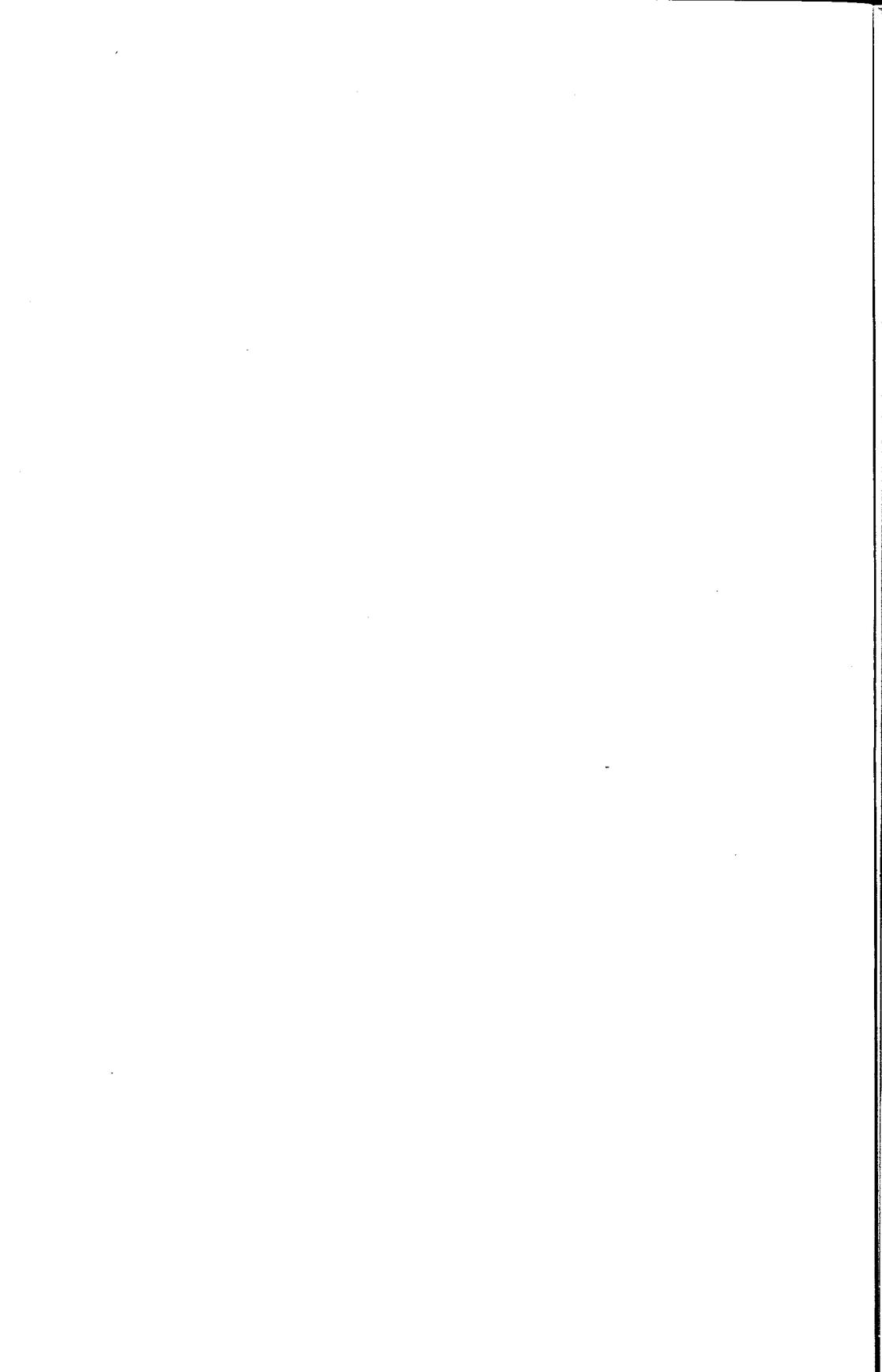
Cooperative Monitoring
of Regional Security
Agreements

Arian L. Pregenzer, Michael Vannoni, and Kent L. Biringer

Abstract

This paper argues that cooperative monitoring plays a critical role in the implementation of regional security agreements and confidence building measures. A framework for developing cooperative monitoring options is proposed and several possibilities for relating bilateral and regional monitoring systems to international monitoring systems are discussed. Three bilateral or regional agreements are analyzed briefly to illustrate different possibilities: (1) the demilitarization of the Sinai region between Israel and Egypt in the 1970s; (2) the 1991 quadripartite agreement for monitoring nuclear facilities among Brazil, Argentina, The Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials and the International Atomic Energy Agency; and (3) a bilateral Open Skies agreement between Hungary and Romania in 1991. These examples illustrate that the relationship of regional or bilateral arms control or security agreements to international agreements depends on a number of factors: the overlap of provisions between regional and international agreements; the degree of interest in a regional agreement among the international community; efficiency in implementing the agreement; and numerous political considerations.

Given the importance of regional security to the international community, regions should be encouraged to develop their own infrastructure for implementing regional arms control and other security agreements. A regional infrastructure need not preclude participation in an international regime. On the contrary, establishing regional institutions for arms control and nonproliferation could result in more proactive participation of regional parties in developing solutions for regional and international problems, thereby strengthening existing and future international regimes. Possible first steps for strengthening regional infrastructures are identified and potential technical requirements are discussed.

Cooperative Monitoring of Regional Agreements

Since the end of the Cold War, the emphasis on regional security has increased significantly. There is a widespread perception that without the stability provided by a system of states dominated by two super-powers, local conflicts over military balance of power, resources, disputed territory and ethnic antagonisms are more likely to escalate into violent conflict. Regional wars can have global consequences, especially when the countries involved posses weapons of mass destruction.

In the last two decades, the United States, Europe and the former Soviet Union have recognized the vital role played by arms control and confidence building measures in enhancing security. Although some other states and regions may be uneasy with the concept that arms control and increased openness can enhance security,

some acknowledge the need to decrease regional conflict, and are beginning to consider new options. In the Middle East multilateral peace process, the Arms Control and Regional Security (ACRS) working group is discussing potential regional arms control and confidence-building measures. In South Asia, India and Pakistan have implemented a hotline agreement and have negotiated several other military confidence building measures such as the notification of military exercises. South America has led the regional arms control process with the Treaty of Tlatelolco, which prohibits nuclear weapons in Latin America, and with the quadripartite agreement for monitoring nuclear facilities among Brazil, Argentina, The Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC) and the International Atomic Energy Agency (IAEA). In Northeast Asia, informal discussions of regional security agreements are in process.

These regional discussions involve a broad spectrum of issues, ranging from nuclear arms control to environmental protection. In the initial stages of regional security discussions, it is important to identify issues where progress is possible. Even if the primary regional arms control concern is nuclear weapons, the first series of discussions may need to focus on less volatile issues, such as the environment, conventional weaponry, or disaster response. In regions where tensions are high, limiting armaments or ceasing controversial weapons development programs may only become possible after considerable confidence building in other areas. Table 1 illustrates potential discussion topics for regional arms control and confidence building measures.

Table 1. Potential Discussion Topics for Regional Arms Control and Confidence Building Measures

Nuclear	Conventional	Delivery System
Fissile material production cutoff	Demilitarized zones	Missile non-deployment
Reactor closure	Arms reductions or limitations	Missile destruction
Nuclear weapon-free zone	Pre-notification/ observation of military exercise	Missile production limitation
Material disposition and safeguards	Incidents at Sea Agreements	Missile test limitations
Test limitations	Arms transfer register	Missile ban
Nuclear emergency response	Military exchange programs	Pre-notification of missile launches

Regional Versus Global

Many regional discussion occur against a backdrop of multilateral or global arms control initiatives. In such cases, the question of the relationship of the regional to the global agreement often arises. Many arms control analysts emphasize the overriding importance of global agreements, especially those which concern nuclear issues, and stress that regional agreements should be embedded in a global context. However, regional agreements can have advantages over their global counterparts.

First, where political issues impede participation in global treaties, a regional agreement may be the only viable solution in the near term. The series of agreements between Argentina and Brazil regarding the cessation of nuclear weapon programs provides a good example.

Second, regional agreements can be tailored to meet particular concerns of regional parties. For example, a regional verification regime might be needed for a Middle East nuclear weapon free zone, because existing IAEA measures may be perceived as inadequate for assuring compliance.

Third, regional agreements sometimes can be negotiated more rapidly than global agreements. The bilateral Open Skies Agreement between Hungary and Romania and the Wyoming Memorandum of Understanding on the destruction of chemical weapons between the United States and the former Soviet Union demonstrate this point.

Fourth, some issues are purely regional in nature. While a third party may be requested to monitor compliance with agreements in some regions, such as the demilitarization of the Sinai between Egypt and Israel, some would argue that the Israeli agreement to withdraw from occupied territory is an inherently regional issue. The issue of control over Kashmir is also a largely regional issue between India and Pakistan.

It is important to keep in mind that participation in regional or bilateral agreements does not preclude participation in global arrangements. Indeed, a regional or bilateral regime may be a stepping stone or a necessary first step. It is possible to imagine a global nuclear weapon dismantlement program for which bilateral agreements between the U.S. and the former Soviet Union, such as START and INF, provide a starting framework.

Long-term effectiveness of regional security agreements ultimately will depend on the commitment and day-to-day involvement of regional parties. Although an external presence may remain important in many regions, it will not obviate the need for a strong indigenous infrastructure for both the development and the implementation of region-specific options for arms control and confidence-building measures. An institutional infrastructure is needed to support the analysis of policy options and the process of negotiating agreements. Implementation of agreements will require a technical infrastructure that could include the development of monitoring technologies, a communications network for exchanging information, data analysis capabilities and a trained inspector.

**Technically-Based Cooperative Monitoring Supports
Implementation of Agreements**

Implementing agreements often involves technically-based cooperative monitoring. Such monitoring can strengthen existing agreements and set the stage for continued progress. An agreement among two or more countries may bring about a temporary equilibrium in their relations, but energy must be invested to make the equilibrium a lasting one. Investing time and resources in cooperatively monitoring the terms of an agreement can contribute significantly to its stability and permanence. Such an investment signals that the agreement is regarded as important and that countries are committed to its success. Cooperative monitoring also provides a method of openly documenting compliance with the terms of an agreement and makes any act of noncompliance difficult to ignore. Although an external party can assume partial responsibility for monitoring the terms of an agreement, participation of regional parties will strengthen the regime.

Cooperative monitoring involves the collecting, analyzing and sharing of information among parties to an agreement. Technologies incorporated into a cooperative monitoring regime must be sharable among all parties, and all parties must receive equal access to data or information acquired by the system. A cooperative monitoring regime also should include procedures for dealing with anomalous data and false positives. Such procedures are necessary for constructively resolving problems and are likely to involve human presence and activity.

Many monitoring technologies developed for other national security purposes in the United States and elsewhere are neither export controlled nor classified and are applicable to a broad spectrum of regional arms control and confidence-building applications. Examples include technologies for detection and assessment, such as unattended ground sensor systems, aerial overflight systems and commercial satellite systems; technologies for data security, such as data authentication and tamper indication; and technologies for access control. When combined with data management, analysis and integration capabilities, these technologies provide powerful tools for implementing regional agreements. They enable parties to observe relevant activities, to define and measure agreed-upon parameters, to record and manage information, and to perform inspections.

In addition to the purely technical benefits, the availability of standardized monitoring systems to all parties to an agreement can remove personal bias, minimize suspicion and balance the ability to detect and analyze relevant information. This is particularly important when parties to an agreement have differing indigenous technical capabilities. Providing all parties with an acceptable minimum monitoring capability will strengthen commitment to the terms of an agreement and contribute to an atmosphere of mutual trust and peaceful resolution of conflict. In addition, the use of remote monitoring technology sometimes can reduce the frequency of inspections, thereby decreasing the intrusiveness and increasing the efficiency of the monitoring regime.

Because of its sharability, the results of cooperative monitoring can have great utility in open discussions of compliance, but additional information also may be important. Countries that participate in cooperative monitoring arrangements usually retain the sovereign right to make compliance decisions, using all available information,

including that collected from purely national means. Cooperative monitoring should be seen as a supplement, not a replacement, for a country's national capabilities.

First Steps in Establishing Technical Infrastructure

Competence with monitoring technology and procedures is essential for the full involvement of regional parties. Lack of knowledge can undermine commitment to an agreement and can impede effective use of technology. In addition, regional competence will enable parties to propose their own solutions to regional problems. Not only is familiarity with monitoring technology needed during the negotiation and implementation phase of an agreement, it will be needed to maintain monitoring systems after implementation. Thorough understanding of monitoring technology also can alleviate concerns that monitoring systems might be gathering more information than stipulated by the terms of the agreement. To be full participants, each country will need its own cadre of technical experts.

Educating regional parties about a range of verification and monitoring technologies and training them to design and operate monitoring systems for particular applications will be an important first step. Although many countries have achieved significant technical capability, applying technology to cooperative monitoring of arms control or other agreements is often a new concept. Even highly technical countries may need help in exploring options for regional confidence-building measures and developing technical monitoring options. For less technically advanced countries, achieving familiarity with monitoring technologies and options may require significant investment in education and training.

Effective education and training should include in-depth discussion of technical issues involved in establishing a monitoring system, as well as experience with monitoring hardware, software, and data processing and integration capabilities. In particular, participants in a training program should gain experience with using systems of technologies to accomplish specific objectives. Understanding how to manipulate and analyze data from remote monitoring sites and to display it in a form that facilitates decision-making will be critical. Computer-assisted cooperative monitoring games, based on the more traditional "war-game" idea, could provide another useful training tool for experimenting with program at Sandia National Laboratories, to assist in the education and training process.

Technical Collaborations on Monitoring Applications

Because technology plays an important role in implementing agreements, it can be a particularly fruitful area for collaboration. Not only do technical collaborations provide neutral ground for interaction among scientific communities, they may also produce results that will aid in implementing future agreements.

Trial confidence-building measures or "cooperative monitoring experiments" can provide a good context for collaborative work. A cooperative monitoring experiment is a technical collaboration on collecting and sharing data relevant to a monitoring application. The object is to familiarize participants with monitoring techniques and procedures. The experiments on sharing seismic data internationally, conducted by the Group of Scientific Experts in preparation for a Comprehensive Test Ban, is a good example of a large-scale cooperative monitoring experiment. Much smaller scale experiments are also possible.

Monitoring experiments provide a forum for collaborations among technical communities and also produce results that can aid policy makers in the formulation of potential agreements. Experiments provide the opportunity to investigate monitoring options in a neutral environment and adjust procedures and technologies to meet regional needs. Experience from experiments from a base for a comprehensive agreement when future political conditions permit. Interpersonal relationships resulting from collaboration further support the confidence-building process. Most important, monitoring experiments are practical steps that can be taken during the phase between expressing an interest in a cooperative agreement and implementing it.

There are a number of potential applications for monitoring experiments. These include monitoring of cross-border traffic, demilitarized zones, nuclear facilities, and the environment. Initially, it might be wise to experiment with monitoring of legitimate, allowed activities, with the intention of establishing mechanisms for providing transparency (or verification) under potential unilateral, regional, or international agreements.

Elements of a Technical Infrastructure

Regardless of the degree to which technology is used in a regional agreement, a technical infrastructure will greatly facilitate implementation. The primary functions will be communication among parties to an agreement, and data collection, analysis and management.

Communication Network

A communication network among parties to an agreement is essential and relatively little equipment is required to support the exchange of routine, formalized information. For example, equipment at the Nuclear Risk Reduction Centers in the United States and Russia (which manage information exchange under a number of bilateral and international agreements) consists of computer monitors, word processors, facsimile machines, phone lines and printers, communication links are provided by satellite. More sophisticated capabilities would be required to collect and transmit data from remote monitoring systems associated with confidence building measures or other agreements.

The number of communication channels will depend on the number of different categories of exchanged information. Separate channels would be needed to support bilateral and multilateral communications, official and unofficial communications, and emergency and routine communications. To prevent unauthorized access and ensure privacy, computer security systems that permit "multi-level security" of exchanged information could be needed. For example, this would allow two countries to carry out a private bilateral exchange of information on the same system used by other countries.

Data Management and Analysis

An organized system for providing access to exchanged information is highly recommended. Data bases with text search and retrieval capabilities facilitate the organization of basic information, such as points of contact in participating countries, the text of mutual agreements, and reports on inspections or fact-finding missions. If countries are in the process of implementing confidence building measures that make use of technical monitoring, equipment and procedures for data acquisition, integra-

tion, and analysis, will be required. This will entail more sophisticated communication and software capabilities. Depending on the nature of the confidence building measures and the regional monitoring network, the system could receive data directly from the sensors deployed for cooperative monitoring applications, or such data could be transmitted to the center after being initially processed at local data acquisition centers. The communication network could provide the basis for data transmission and communication of analytic results to local data centers in each country.

Framework for Developing Cooperative Monitoring Options

The design of a cooperative monitoring system is rarely separable from the political process. Balancing political concerns and technical capabilities can be frustrating to technologists accustomed to designing the "best" technical solution. If cooperative monitoring is incorporated into a regional agreement, it is critical to understand the following four issues: (1) the context for a potential agreement, (2) potential or actual provisions of the agreement, (3) observables associated with the provisions, and (4) technical options for monitoring the agreement.

1. The context of a potential agreement includes the desired list of participants, understanding regional concerns and politics, and understanding the top-level goals of an agreement. If the primary goal of an agreement is to initiate a regional dialogue, a rigorous monitoring regime may be premature.

2. Cooperative monitoring provides evidence relevant to specific agreement provisions, such as prohibited activities and declarations. General statements about the objectives of potential verification measures are also included as treaty provisions. If an agreement forbids the production of a particular item, but does not provide for a verification process, developing cooperative monitoring options will be a moot point.

3. Understanding the observable physical phenomena that can be measured to assess compliance with the provisions of an agreement is an essential step in determining monitoring technologies. Observables include both items or activities limited by the agreement and their observable signatures.

4. Designing acceptable cooperative monitoring options requires identifying technologies that can detect relevant observables, weighing the tradeoffs between monitoring intrusiveness and system vulnerability, and considering other constraints, such as costs.

Examples of Regional Arms Control and Confidence Building Agreements

Three examples of arms control and confidence building agreements that have been implemented on a regional basis will be discussed in this section: (1) the demilitarization of the Sinai region between Israel and Egypt in the 1970s; (2) the 1991 quadripartite agreement for monitoring nuclear facilities among Brazil, Argentina, The Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC) and the International Atomic Energy Agency (IAEA); and (3) a bilateral Open Skies agreement between Hungary and Romania in 1991. Each of these agreements illustrates different ways a regional agreement can interface with international treaties and different roles that third parties or international bodies can assume in a regional agreement. They also illustrate different approaches to the use of technical monitoring.

Military Disengagement in the Sinai: Israel and Egypt

Context

The June 1967 Arab-Israel war ended with Israel in full control of the Egyptian Sinai peninsula up to the Suez Canal. In October 1973, an Arab coalition attacked Israel with the intent of regaining occupied territory. The war ended somewhat inconclusively on the Sinai front with Israeli and Egyptian forces on both sides of the canal.

A formal cease-fire was signed on Nov. 11, 1973. However, the cease-fire line was not acceptable to the Egyptians as a long-term solution. Seeking to avert further hostilities, U.S. Secretary of State Henry Kissinger initiated a process whereby Israel slowly removed its troops from the region. The primary goal was to return occupied land to Egypt, while maintaining Israeli security by assuring sufficient early warning of attack. The process resulted in two disengagement agreements, known as Sinai I and Sinai II. Although Egypt and Israel were the only parties to the agreements, the United States played a major role in their negotiation and implementation. Each side felt that the presence of US troops was necessary: both as a symbol of US commitment to the agreement and as a military presence to enforce the agreement should problems arise.

Provisions

The first Sinai Disengagement Agreement (Sinai I) was signed on January 18, 1974 and required the Israelis to withdraw to approximately 20 km from the Suez canal. A thin buffer zone was established, and limited force zones were created on both sides of the buffer zone. The U.S. and the UN supported the agreement as third parties. The U.S. supported the UN with aerial surveillance flights.

The Sinai II Agreement, again negotiated with the support of Secretary Kissinger, was signed on September 4, 1975. In the Sinai, Israel agreed to withdraw from the strategic Giddi and Mitla pass region in exchange for a mix of third party monitoring by the U.S. and the UN to provide tactical warning, combined with self-verification by Israel and Egypt. The key point of contention was the control of the high ground of the Giddi and Mitla passes in west-central Sinai and the Israeli signal collection stations there. These passes are the primary avenues for large, offensive forces to move across the peninsula. The Israeli government, reinforced by its experience in the 1973 war, wanted significant early warning to mobilize a defense against a pending threat.

Observables

Military hardware and personnel are the observables associated with both of these agreements. No military equipment or personnel were allowed in the demilitarized zones; and numbers were restricted in the limited force zones.

Monitoring

A *Joint Commission and Liaison System*, incorporating representatives from all parties and chaired by the Chief Coordinator of the UN peacekeeping mission, was established to supervise and coordinate implementation of the agreement. Israel and Egypt each established a signal collection station on the ridge-line near the passes and were permitted to fly reconnaissance missions over their own territory up to the buffer zone. This activity did not constitute cooperative monitoring because they exchanged no information with each other on the basis of this monitoring.

The UN provided 4,000 peacekeeping troops to perform general observation and on-site inspections of garrisons in the limited force zones. The U.S. performed periodic overflights of the disengagement zone for tactical early warning and established the Sinai Support Mission (SFM) to monitor access to the Giddi and Mitla passes. Multiple types of sensors, as shown in Table 2 were employed by the SFM to detect activity in the region and to assist analysts in characterizing the nature of the activity. The SFM transmitted detection and characterization data simultaneously to both the Israel and Egyptian signal stations.

Table 2. Sensors Employed by the Sinai Field Mission	
Seismic	The most commonly used sensor because of near-ideal conditions in the desert soil. The battery-powered MINISID-III could detect vehicles at 500m and personnel at 50m range. It transmitted the seismic signal by radio to an adjacent watch station.
Acoustic	This system was a modular addition to the MINISID-III and used its radio transmission system. A seismic activation of sufficient duration activated the unit which could detect personnel to 30m and vehicles to 100m range.
Magnetic	This system was also a modular addition to the MINISID-III and could detect a person with a rifle at 3-4m and a medium truck at 15-20m.
Strain	A strain sensitive cable was buried under roads and main trails and could be up to several hundred meters long. The compression caused by the passage of an object induced a signal proportional to weight to be generated and transmitted to a watch station.
Infrared Break-Beam	The directional infrared intrusion detector (DIRID) was also used to monitor roads and large paths. The system consisted of a transmitter and receiver for two parallel infrared beams. DIRID was mounted on tripods above ground and could monitor a space 3 to 17 m wide. Passage of an object through the beam broke the circuit and caused an activation. The order of beam breakage indicated the direction of movement.
Video	Low light TV cameras with transmission to the base camp were used in locations beyond visual line of sight.
Imaging Infrared	A prototype system called Passive Confirming Scanner was used during 1977-78 to counter low-visibility conditions in dust and fog. The system was removed because of unacceptable reliability.

The system performed quite reliably although periodic refinements were necessary. On average, there were 200 sensor activations a day, almost all of which resulted from permitted activity or natural occurrences. Activations were caused by support vehicles for the SFM and Israeli and Egyptian stations; movement of UN peace keepers, natural seismic disturbances, low-flying aircraft, wildlife, and nomadic Bedouins. All reported violations were relatively minor, unintended, and easily resolved.

After a period of initial suspicion, the Sinai front stabilized and monitoring activities became almost routine. Political leaders in both countries eventually praised the SFM. The right combination of technical measures and manned operations proved to be vital to the success of the operation. The increased level of confidence resulting from the Sinai monitoring and the impartial role of the U.S. and the UN were major contributors to the Egypt-Israel Peace Accord (the "Camp David Agreement") of March 1979. Camp David resulted in a phased Israeli withdrawal from the Sinai completed in April 1982. As the Israelis withdrew eastward and relations improved, there was no need for intensive monitoring of the passes and the system was shut down in January of 1980. Total cost of the SFM during its operation was $92.7 million U.S. dollars.

After the Peace Accord was signed, Israel and Egypt requested that the SFM continue its monitoring role, but in a somewhat different fashion. The SFM now performed on-site inspection and low-altitude aerial surveys. Israel and Egypt continued the practice of *de facto* self-verification during the withdrawal period. Israel maintained four signal collection stations along ridges in the central Sinai, and both countries performed reconnaissance flights up to the line of disengagement. The Israeli withdrawal took place very smoothly with only 29 minor violations cited by the SFM. In April 1982, the Multinational Force and Observers (MFO) was formed to succeed the SFM and to perform peacekeeping and monitoring functions. A *Military Joint Commission* was established and the MFO continued to maintain liaison offices in both Egypt and Israel. The force, consisting of 2,500 multinational troops, maintained watch stations with attended optical devices but without remote monitoring. The MFO also performed periodic low-level aerial surveys and on-site inspections in limited force zones. The Israel/Egypt border is currently stable, and the MFO continues to function in the Sinai so discretely that many people outside the region are unaware of its operations and scope. This may be the best testament to its effectiveness.

Agreement on Monitoring Nuclear Facilities: Brazil and Argentina

Context
Although nuclear arms control in Latin America had been debated since the early 1960s, there was resistance in both countries to sign the Nuclear Nonproliferation Treaty. This is at least partly due to the perception that the treaty unfairly divided the world into nuclear "haves" and "have-nots," and provided insufficient restrictions on the nuclear programs of the former group. Both countries had signed the Treaty of Tlatelolco, a Latin American nuclear weapons free zone agreement, but had not brought it into force. Contentious issues included the transport of nuclear weapons through the zone and the interpretation of peaceful nuclear explosions permitted by the treaty. Throughout this debate, both countries continued nuclear weapon programs, building research and power reactors, nuclear test facilities and missile delivery systems.

After decades of military rule, the 1980s brought a change to civilian government for both Argentina and Brazil. At the same time, export control regulations enacted by the Nuclear Suppliers Group increased the pressure to place nuclear facilities under full scope safeguards. Neither economy was healthy and new governments in both countries wished to redirect resources to domestic problems. The time was ripe for cooperation and confidence building on nuclear issues.

Cooperation on nuclear issues proceeded in a step-wise manner. The first agreement, in 1980 while military governments still prevailed, concerned cooperation on the civilian nuclear fuel and provided for technical collaborations and joint training programs. Technical collaborations increased in scope over the next six years, throughout which time the countries issued several joint statements on nuclear policy.

Only in 1987 did Argentina and Brazil begin to open up facilities related to their nuclear weapon programs. The process began with exchange visits by heads of state to uranium enrichment facilities. They also continued to issue joint declarations regarding the peaceful nature of their nuclear programs and emphasizing the need for confidence building and nuclear cooperation throughout Latin America. By 1990, the Argentine Condor II missile program was terminated, and the Brazilians acknowledged the termination of a nuclear bomb program and secret test site in Cachimbo.

Provisions
The first of a series of agreements specifying provisions for the joint monitoring of nuclear facilities and material was enacted in 1990. Over the next five years, the degree of cooperative monitoring of nuclear facilities gradually increased. In 1991, the countries signed the Argentine-Brazilian Accord on Nuclear Energy, in which they agreed to use nuclear materials and facilities exclusively for peaceful purposes and to prohibit the test, use, manufacture, production, or acquisition of nuclear weapons, Peaceful nuclear explosions were also prohibited, as being indistinguishable from weapons tests. The agreement also provided for the exchange of descriptive lists of all nuclear facilities, declarations of nuclear material inventories, and reciprocal inspections of centralized register systems.

In addition, this agreement established the Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC) to administer a Common system for Accounting and Control of Nuclear Materials (SCCC). The register and reporting system of the SCCC would be presented to the IAEA. Responsibilities of the SCCC included:
- maintaining record and inventory systems for nuclear materials,
- establishing measuring systems to determine the nuclear material inventories and their variations,
- evaluating accuracy and calculating uncertainty of measurements,
- establishing procedures for carrying out physical inventory and for determining and evaluating non-accounted material,
- implementing containment and surveillance systems.

ABACC was staffed with 50 inspectors, half provided by each country, and was assigned the responsibility for conducting inspections, designating inspectors, evaluating inspections and concluding international agreements. As of December 1993, 56 inspections had been carried out.

At the end of 1991, this bilateral agreement was supplemented with the *Quadripartite Agreement* between Brazil, Argentina, ABACC and the IAEA. Although IAEA safeguards had been applied to nuclear materials and facilities supplied by foreign sources such as the United States, Canada and Germany, they did not extend to domestically produced nuclear materials. The *Quadripartite Agreement* placed all nuclear facilities in Argentina and Brazil under safeguards, with coverage similar to Information Circular 153, the IAEA agreement applying to NPT signatories.

In addition to ratifying the *Quadripartite Agreement*, Argentina ratified the *Treaty of Tlatelolco* in November 1993 and in May 194 Brazil brought the treaty into force. In February 1995, Argentina signed the NPT; Brazil remains a "non-signatory" state.

Observables

Because of the broad provisions of the series of agreements between Argentina and Brazil, the list of observables is long and diverse. Clearly, nuclear weapons and associated testing facilities are observables relevant to the terms of the agreement. However, routine monitoring and inspections are explicitly focused on nuclear facilities and material. The chemical composition of nuclear material produced in both countries, activities at nuclear production and reprocessing facilities, and inventories and storage of nuclear material are the primary observables for the monitoring regime.

Monitoring

Monitoring consists of inspections as well as monitoring of nuclear facilities. The agreement permits *ad hoc* inspections to confirm declarations, routine inspections as normally conducted by the IAEA, and special inspections, if necessary. Efforts are made to avoid unnecessary duplication between ABACC and IAEA activities.

The monitoring regime utilizes standard IAEA equipment, including still-frame cameras, tags and seals. Chemical analysis is performed by each country on samples of nuclear material taken during routine inspections.

Bilateral Open Skies Agreement between Hungary and Romania

Context

In May 1989 U.S. President George Bush proposed a multilateral Open Skies regime to increase transparency of military activities between the NATO countries and the Warsaw Pact. Hungary and Canada were strong proponents of the proposal and hosted the initial multilateral meetings in Ottawa and Budapest in 1990. However, despite wide interest in a potential agreement, negotiations quickly bogged down because of a profound disagreement between the Soviet Union and other countries over the acceptable level of intrusiveness.

The stalled negotiations were perceived as particularly ominous to Hungary and Romania. Although these two countries have been linked in alliances during the 20th century, they are historical adversaries. Concerned about the potential collapse of the Warsaw Pact, and frustrated by the stalemate in the multilateral Open Skies process, the government in Romania proposed negotiations for a bilateral Open Skies Agreement in the fall of 1990. Hungary agreed to talks with Romania in January 1991.

Bilateral negotiations began in February 1991 and quickly produced results. The main body of the agreement was negotiated in three days, based on the most recent text from the multilateral talks. Each delegation contained military and technical specialists, and was led by officials who had participated in the multilateral Open Skies conferences. Eight detailed annexes to the main agreement were produced by March, and the agreement was signed in Bucharest on May 11, 1991. It was agreed that the bilateral regime would continue even after entry into force of a multilateral agreement.

Provisions

The primary goal of both the multilateral and bilateral Open Skies agreements is to increase transparency and to reduce tension regarding military matters. The agreements place no limitations on military or other activities. The bilateral Open Skies agreement stipulates aircraft and monitoring equipment, procedures for performing routine aerial overflights of each territory, procedures for requesting and conducting overflights, procedures for data processing and sharing, and methods for resolving disputes. A partial list of provisions is provided in Table 3.

Table 3. List of Provisions of the Hungary-Romania Open Skies Agreement

Aircraft
- Both countries will use air force AN-24 and AN-30 twin-engine turbo-props.
- The observing party can use either its own aircraft or one of the host state's.

Monitoring Equipment
- Sensors were limited to optical and video cameras possessed by both parties. However, provisions were made to allow updating the sensor annex to accommodate new types of sensors

Procedures and Restrictions
- A request to use the host country's aircraft must be submitted seven days in advance.
- Overflights in hazardous airspace (e.g., artillery ranges) are to be publicly announced and have special flight planning.
- Preflight inspection of the aircraft by the observed country may last no longer than eight hours, and must be completed at least three hours before the start of the flight.
- The quota of flight is four per year in each country.
- The distance and duration of flights is limited to 1,200 km or three hours-whichever comes first.
- Repeated passes over a site or loitering by the aircraft is prohibited.

Data Exchange
- Two sets of camera films will be developed jointly technicians at a designated facility in the host country. The observing country takes possession of one film and the host country retains the other. If dual sensors are unavailable, a copy of the original material is given to the observing country.

Resolution of Disputes
- A Consultative Commission was established to modify provisions where the treaty allows updates and to resolve disputes that may arise in the course of implementing the agreement. Disputes regarding findings are resolved at the ministerial level.

Observables

Since there are no treaty-limited activities or items, observables are not related to treaty provisions in the usual manner. However, the military equipment and activities are the primary concerns of parties to Open Skies agreements. In choosing the appropriate technology, its value for detecting such equipment and activities will be the deciding factor.

Monitoring

In preparation for entry into force of the treaty, a demonstration flight was performed in June 1991. The purpose of the flight was two-fold; (1) to validate the equipment and procedures, and (2) to enhance popular support of the agreement through media coverage. The aircraft was navigated jointly by Hungarian and Romanian officers. France provided technical and operational assistance to both countries. The film camera was a commercially available French-built OMERA-33 capable of 10 cm ground resolution under optimal conditions. French technicians installed the camera and associated equipment and assisted the joint Hungarian/Romanian team in its operation. Seventeen countries participating in the Open Skies negotiations sent observers.

The flight covered military facilities in both countries and included a military college with weapons displayed for this flight, an exercise ground, an abandoned Soviet air base, an operating military airfield, a civilian airfield, a railroad junction, and an ammunition depot. Panchromatic film was used to facilitate rapid development and copying. Video cameras were not used because neither air force had experience with their installation and use in aircraft. The average flight altitude over Hungary was 4,500 feet, but weather conditions in Romania required an average altitude of 1,000 feet with excursions to 800 feet to produce photographs of acceptable quality. Problems occurred with navigation because flight crews lacked detailed charts of sites to be overflown and the multinational crew had difficulty communicating. Neither country expected such major navigational problems, but the trial flight was still considered to be successful.

Multilateral Open Skies negotiations reconvened in September 1991, and significant progress was made in narrowing differences on policy and technical issues. The momentum of the successful Hungary-Romania agreement supported the constructive pace of the discussions. The same fundamental issues that Hungary and Romania had faced in their bilateral talks were addressed and compromises were made over the type of sensors to be used, the ownership of aircraft, data processing and distribution, and the geographic scope. The treaty was signed in Helsinki on March 24, 1992. Hungary and Romania have continued their bilateral overflight regime.

Lessons Learned

Four categories of lessons learned from these agreements can be applied to security discussions in other regions: (1) the relationship of regional agreements to multilateral or global agreements; (2) the importance of setting a pace commensurate with regional political conditions; (3) the contribution of technically-based cooperative monitoring to the implementation of agreements; and (4) the value of regional participation in monitoring the terms of agreements.

Relationship of Regional to Multilateral or Global Agreements

Although none of the agreements discussed in this section are devoid of international participation, the degree to which extra-regional parties are involved is highly variable. The United States played a key role in negotiating and monitoring the agreement for Israeli withdrawal from the Sinai, and the United Nations was an important presence during implementation. In addition, both sides monitored compliance individually with their own national means. In the case of Argentina and Brazil, only after years of bilateral agreements did they involve the IAEA in the process. International inspections supplement those performed by the bilateral ABACC. In the case of the bilateral Open Skies regime, the bilateral accord was attained as a substitute for a multilateral regime, and stimulated progress in the multilateral forum. There are no plans to subsume the bilateral agreement under the multilateral one when it enters into force.

When regions have a serious concern, they are unlikely to relegate the negotiation and monitoring of an agreement totally to an international body. Most will want direct involvement in assuring compliance. In the case of agreements affecting more states than the parties to the agreement, such as agreements involving weapons of mass destruction, the parties are likely to want to assure the international community of their compliance with global norms. In such cases, some stamp of approval from an international body will probably be required. This does not mean that the region must give up regional monitoring arrangements. However, they may need to coordinate their procedures with an international body and provide it with supporting data.

There is growing recognition that bilateral or regional inspections may offer efficient options for achieving the goals of multilateral agreements. For example, the Chemical Weapons Convention explicitly permits bilateral inspection to substitute for multilateral inspections, given approval of the international Organization for the Prohibition of Chemical Weapons. This is to avoid duplication of inspections that are already occurring under agreements such as the Wyoming Memorandum of Understanding between the United States and the former Soviet Union.

Setting the Proper Pace

Great patience may be required when negotiating agreements with profound consequences for the national security of participating countries. In the case of Argentina and Brazil, first steps focused on technical cooperation on the civilian nuclear fuel cycle. Only much later were defense-related nuclear facilities discussed, and the first steps only involved exchange visits by the heads of state. Small efforts in technical collaboration and acknowledgment of activities grew into the renunciation   of nuclear defense activities and the implementation of safeguards on nuclear material and facilities throughout Argentina and Brazil. This may be a model for nuclear arms control in other regions, such as the Middle East.

A step-by-step approach was also pursued in the series of agreements between Egypt and Israel. Only after successful monitoring of the initial Israeli withdrawal from the Sinai did the sides feel confident enough in the situation to sign the Camp David Peace Accord.

In the case of the bilateral Open Skies agreement between Hungary and Romania, the perception by both sides of the immediate need for greater transparency led to rapid negotiation and implementation of an agreement.

Contributions of Technically-Based Cooperative Monitoring

Technically-based cooperative monitoring was utilized by all agreements discussed in the previous section. These technical monitoring systems provide objective data relevant to the terms of the agreements, on which compliance decisions can be based. The data can also be shared with the international community, if desired, to assure others of adherence to certain agreements. Although Israel and Egypt continued to utilize their own national capabilities to monitor the disengagement process, they also jointly relied on shared data provided by the Sinai Field Mission.

Technology cannot substitute for human involvement. It is the right combination of human presence, procedures and technology that contributes to the success of agreements. Although technology can provide objective data, humans are needed to analyze the data and to settle disputes. It is important to keep in mind that the ultimate goal of regional security agreements is reduced tension and warmer relations among participating countries. Human interactions during the implementation of agreements can contribute to this end.

Another key observation is that technical monitoring can be pursued incrementally. The Hungary-Romania bilateral overflight negotiations were successful, in part, because the participants choose to fashion an agreement that recognized available resources but retained the option for future improvements. This incremental approach, using cost-effectiveness as a guide, enabled constructive measures to be taken at a politically sensitive time. Neither country could afford elaborate aircraft or sensor systems. Simple aircraft, familiar to both countries, were chosen which eased the task of procedural definition and preflight inspection. Relatively simple and available optical and video sensors were selected. The use of panchromatic film simplified data processing and exchange. As time has passed, improvements, such as the digitization of image information, have been implemented with the help of third parties such as France.

Regional Participation Critical for Success

The success of all three agreements discussed here is largely attributable to the active participation of regional parties in their negotiation and implementation. In no case was an agreement imposed on the region by an outside body or international organization; although the United States played a decisive role in the Israeli/Egypt agreements, and certainly provided resources for cooperative monitoring. One potential weakness of this accord, which may be relevant to future Middle East agreements, was the lack of direct participation of the Israelis and Egyptians in the cooperative monitoring regime. A potential next step would have been to involve both countries in the activities of the Sinai Field Mission. This would not have precluded their continued use of their own national means of verifying the terms of the agreement, but it would have provided for routine contact between technical experts from each country. Such routine contact can be an effective confidence building measure, as has been demonstrated through bilateral inspections between the U.S. and the former Soviet Union.

Argentina and Brazil created an effective infrastructure to support implementation of their bilateral agreements with little assistance from the outside world. The development of this indigenous capability has allowed them to implement the agreements

effectively and independently. It also makes them a critical contributor to larger Latin American security discussions and may provide a model for other regions. They rightfully take pride in this accomplishment.

Summary
Regional security has assumed new significance in the post Cold War environment. Although the use of arms control and confidence building measures to enhance security originated with the United States, Europe and the former Soviet Union, such measures currently are under discussion in many other regions.

Region-specific approaches to confidence building and transparency will require significant input and innovation of regional parties. Establishing a regional infrastructure for arms control and other cooperative measures will be an important part of this process. Since technology can play an important role in implementing regional security agreements and confidence-building measures, education and training of regional parties in the use of cooperative monitoring technologies should be included.

The Sinai accords in the Middle East, the evolution of nuclear cooperation between Brazil and Argentina, and the bilateral Open Skies agreement between Hungary and Romania illustrate that security arrangements can evolve within a regional context. In each case, the use of appropriate monitoring technologies has been crucial to success. These agreements also illustrate the importance with taking an incremental approach to cooperative agreements: the key is to identify issues on which initial progress is possible, even if these issues are not the ultimate concern. Small steps can open doors.

The Cooperative Monitoring Center at Sandia National Laboratories provides a unique forum for offering hands-on experience with the design and development of monitoring systems that can be used to implement and verify cooperative security arrangements and confidence-building measures. Monitoring technologies, including hardware, software, simulation, and data collection and processing can be demonstrated and integrated into specialized applications.

Acknowledgment

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Appendix A:
The Cooperative Monitoring Center: An Experimental Approach
    In July 1994, Sandia National Laboratories established the Cooperative Monitoring Center to provide a forum where international and regional participants can meet to explore ways that technology can facilitate the implementation of confidence build-ing in areas such as arms control, resource management, and environmental moni-toring. Current sponsors of the Center are the U.S. Department of Energy (DOE) and the Arms Control and Disarmament Agency (ACDA). Arms control experts from the academic community and the U.S. Department of State also have played a major role in shaping the project.

    Hands-on experience with monitoring hardware, software, and data processing and integration capabilities is provided to visitors at the Center. Current demonstra-tion capabilities include detection and assessment technologies, data authentication and tamper-indication technologies, scale models of portal monitoring, seismic mon-itoring for underground nuclear tests, commercial satellite and aerial overflight imagery and analysis, pollution dispersion modeling and visualization, remote mon-itoring techniques, decision-making tools, and computer modeling and simulation.

    The Center also functions as a data acquisition and analysis center for a number of experimental remote monitoring applications. Currently, data is received from remote monitoring experiments at nuclear fuel storage facilities in Australia and Sweden and from a remote monitoring sensor test bed that has been established at the Idaho National Engineering Laboratory. The number of remote monitoring sites is expected to grow. In this sense, the Center provides a model for regions interest-ed in establishing their own cooperative monitoring or crisis prevention center.

    Most technologies demonstrated at the Center are commercially available; all are exportable to most countries. The range of demonstrable technologies will increase as relations with other national laboratories, universities, and private industry are developed. It is important to note that Sandia's role is to help users of the Center acquire the tools to design monitoring systems to fit their needs, not to provide them with technology. Therefore, developing partnerships with industry may be needed to establish avenues for regional parties to obtain systems they design.

The Center sponsors sabbaticals, workshops, and training classes aimed at developing solutions to specific problems. It also provides facilities for collaborations on the use of technology in enhancing the effectiveness of transparency and confidence-building measures. Since its establishment, the center has conducted two major workshops on cooperative monitoring.   The first workshop was developed for Middle Eastern participants and was attended by representatives from Israel, Kuwait, Egypt, Qatar, and Oman, as well as U.S. academic and government nonproliferation specialists. The second workshop, which focused on South Asia, was attended by Pakistani representatives as well as South Asia scholars from the United States. The Center also has hosted visits by numerous groups of scientists from the Former Soviet Union, a delegation from South Korea and a group from Northeast Asia studying nuclear weapon free zones. During the next year, academics and scientists from many different countries will collaborate with Center experts on formulating options for monitoring regional agreements. The Center's objective is to encourage workshop participants to take a critical interest in making their own choices, rather than to prescribe "the correct solution" for their problems. Tradeoffs between monitoring intrusiveness and system vulnerability are discussed in detail.

TECHNICAL BASIS FOR MONITORING AND CONTROLLING PROLIFERATION OF NORTH KOREA'S CHEMICAL, BIOLOGICAL AND NUCLEAR WEAPONS

Sung-Tack Shin

Those states most actively working to develop weapons of mass destruction, although limited in number, are for the most part located in unstable regions of the world - the Middle East, South Asia, and North Korea (NK). For at least the next decade, few if any of these states will be able to deliver such weapons more than a thousand kilometers or so in a reliable and timely manner. Therefore, the greatest threat posed by these states is to their neighbors and to regional stability.

The various weapons of mass destruction expressed as CBN (Chemical, Biological, Nuclear) are based on very different technical principles and require distinct sets of industrial capabilities. These analyses of CBN technical pathways are intended to identify opportunities for monitoring and, if possible, controlling proliferation, as well as to note the potential implications of certain old and new technologies, especially in North Korea's mass destruction weapons.

Even if the LWR issue goes on well between the USA and NK in current talks, it is useless to do such a project without verification of a mass destruction weapons cutoff. To accomplish the objective of monitoring and controlling proliferation at each stage, it is absolutely necessary to inspect and verify the implementation by collecting, analyzing and evaluating information pertaining to whether the parties fully comply with their duties respecting treaties or agreements. The objective of our verification policy lies in preventing, through verifying and monitoring the observance of the South-North agreement, any noncompliance; guaranteeing the implementation of CBN control with proper sanctions in case of noncompliance; and thus confirming a mutual trust with improved military transparency.

UNILATERAL, BILATERAL AND MULTILATERAL APPROACHES

Monitoring the proliferation of weapons of mass destruction, or conversely monitoring compliance with nonproliferation agreements, depends on detecting and identifying various indicators or signatures associated with the development, pro-

1   The JNCC has met 23 times with NK's representatives at Panmunjom to set up regimes for bilateral inspection by the *Joint Declaration on the Denuclearization of the Korea Peninsula* (Effective on February 19, 1992).

2   In the strategic arms control process between the United States and Soviet Union, each side agreed not to impede the other side's "national technical means of verification," in effect legitimizing the collection of intelligence pertinent to the treaty.

duction, deployment, or use of weapons of mass destruction. Unilateral intelligence collection efforts can seek to exploit these signatures with the use of remote or covertly placed instruments; bilateral[1] or multilateral[2] verification regimes - typically operating within the framework of a negotiated treaty - can make provision for states to voluntarily open their facilities to cooperative on-site inspection in addition to sanctioning the use of remote instrumentation.

Both unilateral and cooperative approaches have their strengths. A cooperative regime might offer direct access to facilities that would be difficult to inspect in any other way. However, strict limitations may be put on that access. Moreover, since the inspected party knows the type of instrumentation and procedures to be used by inspecting parties, it may be able to defeat those inspections. Intelligence collection efforts conducted outside the framework of a negotiated agreement would probably not have the degree of access to any specific site that would be provided by a cooperative onsite inspection regime, but they might have other advantages such as breadth of coverage. Moreover, they would not be constrained by pre-negotiated procedures, and they might be able to gather information about sites where on-site inspection would be denied. However, if unilateral intelligence efforts involved covert placement of sensors in the territory of the inspected party, such efforts would probably be viewed as a violation of sovereignty, creating political tensions if detected.

Unilateral and multilateral approaches are not mutually exclusive. Indeed, they will be most effective if used synergistically: unilateral intelligence efforts might trigger a challenge inspection. However, many of the signatures discussed below are likely to be ambiguous, if they are detected at all. Deciding on appropriate responses in the face of incomplete or ambiguous information will pose great challenges for nonproliferation policy, as will mobilizing effective domestic and international support for those responses.

NUCLEAR WEAPONS

Fissile Material Production
Since the 1950s NK has been proceeding with its nuclear development program, training specialists and accumulating technologies. A large-scale atomic energy research complex was established in Yongbyun, North Pyongan Province.

In addition, NK has secured uranium mining facilities (estimated deposits: 26 million tons, available: 4 million tons) and facilities for refining uranium and processing nuclear fuels, thus possessing the capability to produce enough nuclear fuels for it own use. In January 1986, it operated a 5 MWe nuclear reactor (25 MWth) for the purpose of plutonium production. Accumulation of technology over the following years led to the construction in the 1980s, without outside help, of a large-scale spent fuel reprocessing facility in the Yongbyon complex. NK has reprocessed spent fuels in this facility. In the early 1990s, NK completed a whole nuclear fuel cycle, from obtaining nuclear fuels to reprocessing them.

In terms of costs, resources required, and possibility of discovery, the difficulty of obtaining nuclear weapon materials - plutonium or HEU - remains the greatest single obstacle most countries would face in pursuing nuclear weapons. Even straight-

forward methods of producing such materials indigenously (such as building a small production reactor and a primitive reprocessing facility to produce plutonium and recover it from irradiated reactor fuel) would require at least a modest technological infrastructure and hundreds of millions of dollars to carry out. Moreover, once such a facility became known, it could generate considerable pressure from regional rivals or the international community. The costs of full-scale indigenous nuclear weapon program - especially if clandestine - can be substantially higher than for a program largely aimed at producing just one or two bombs and carried out in the open.

Under current European and Japanese plans for reprocessing and limited reuse of plutonium from light water reactor fuel, the current worldwide surplus of some 70 tonnes of safeguarded, separated reactor-grade plutonium - the type produced by commercial nuclear reactors in normal operation - will likely continue to grow through the 1990s by more than 10 tones per year. Reactor-grade plutonium is more radioactive and more difficult to handle than weapon-grade plutonium, which is produced specifically for use in nuclear weapons, but it can still be used to make a crude nuclear weapon of significant yield.

Since production of weapon grade nuclear materials is generally the most difficult and expensive part of producing a nuclear weapon, the leakage of significant amounts of weapon-grade material from the former Soviet Union, European states and China would provide a great advantage to potential proliferants like North Korea. Furthermore, NK has gone to great lengths to produce weapon-grade materials rather than reactor-grade plutonium.[3]

Other Technical Barriers

Unlike chemical and biological weapons, whose lethality is roughly proportional to the amount of agent dispersed, nuclear weapons will not produce any yield at all unless certain conditions are met: a minimum "critical mass" of nuclear materials must be present, and that material must be brought together with sufficient speed and precision for a nuclear chain reaction to take place. A proliferant must master a series of technical hurdles in order to produce even a single working weapon.

Nuclear weapons are so destructive that they place few requirements on the accuracy of delivery systems for any but the most protected targets. Most proliferants would likely be able to design first-generation nuclear weapons that were small and light enough to be carried by Scud-class missiles or small aircraft. Given additional technical refinement, they might be able to reduce warhead weights to the point where the 500 kg delivery threshold originally established by the Missile Technology Control Regime no longer provides a reliable barrier to nuclear-capable ballistic or cruise missiles.[4]

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3   Note that some types of nuclear power reactors, including ones in North Korea, Iraq, and South Africa, can produce either reactor-grade or weapon-grade plutonium, depending on how they are operated.

4   Broadening its focus, the MTCR now covers missiles capable of delivering chemical and biological weapons as well as those that could be used to deliver nuclear weapons. Consequently, the payload threshold of 500 kg has been removed.

Although nuclear weapons were first developed 50 years ago and the basic mechanisms are widely known, much of the detailed design information, and particularly the knowledge gleaned by the nuclear weapons states from decades of design and testing, remains classified. Much of this information can be reconstructed by a dedicated proliferant, but it will take time and money. Moreover, "weaponizing" a nuclear warhead for reliable missile delivery or long shelf-life creates additional hurdles that could significantly increase the required development effort.

Specific individuals could fill critical gaps in a given country's knowledge or experience, adding greatly to the likelihood that a program would succeed. High-performance computers (so-called "super computers" in the 1980s) are not required to design first-generation fission weapons. Thus, placing strict limits on their exports would be of minimal importance compared with limiting technologies for nuclear materials production.

Monitoring Nuclear Proliferation

Production of nuclear materials provides many signatures and the greatest opportunity for detecting a clandestine nuclear weapon program. Even so, a large part of the Iraqi program was missed. The Yongbyon nuclear complex was also revealed recently. Since members of the Nuclear Non-Proliferation Treaty are not permitted to operate unsafeguarded facilities handling nuclear materials, the existence of any such facilities would probably indicate an illegal weapon program.[5]

Nuclear tests at kiloton yields or above would probably be detectable by various means, especially if multiple tests were conducted. However, such tests are not necessary to field a workable weapon with reasonably assured yield. Similarly, the deployment of a small number of nuclear weapons might not be easily detected.

Actual Diversion Path for Plutonium-239

The Plutonium URanium EXtraction (PUREX) Process for a weapon-grade plutonium may become increasingly attractive to potential proliferants for a variety of reasons, including availability of information about early designs, difficulty of detection, ease of producing pure plutonium-239, and potential availability of equipment from national chemical infrastructures.

To illustrate where actual examples of attempted or successful material diversions have occurred with NPT signatory states, a list is provided below citing the Iraq and North Korean situations.

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5   The exception to this statement would be unsafeguarded facilities dedicated to military purposes unrelated to nuclear weapons, such as naval nuclear propulsion. Such uses are not prohibited by the Nuclear Non-Proliferation Treaty. They fall outside IAEA jurisdiction, however, since IAEA safeguards pertain only to nonmilitary applications of nuclear power.

Iraq:
- attempted acquisition of kg quantities of Russian Pu-239 (undeclared)
- obtained 2 gm Pu-239 from reprocessing facility (declared)

North Korea:
- research reactor fuel (declared)
- special inspection denial of spent fuel accountancy system (declared)
- the other undeclared potential Pu-239 route (undeclared)
- suspected Pu-239 reprocessing line in existing facility (declared)

The diversion paths with the highest importance for final material acquisition are dual-purpose and dedicated Pu-239 production reactor facilities for fuel irradiation, plutonium reprocessing (extraction) facilities and acquisition from existing declared weapon-grade plutonium sources. The risk from dedicated Pu-239 production reactors is small because the detection of facility clandestine operations would be conclusive by relatively simple technical means.

Verification effectiveness for declared stockpiles and dual-use and research/test reactors should be conclusive using existing safeguard techniques, primarily material accountancy and seal methods. Technical means alone would be very effective for identifying operation of declared production reactors. Diversion from plutonium reprocessing/conversion facilities is quite difficult to verify effectively using routine inspections, and special inspections do not provide any great advantage over routine inspections. A reprocessing plant is physically large and handles a large amount of fissile material in both solid and liquid form in continuous processes. A complex accounting system requiring a significant, and continuous, inspection effort to audit is thus needed.

CHEMICAL WEAPONS

Chemical Weapons Development
Aside from nuclear development, NK since the early 1960s has been pushing forward with research and development as well as acquisition of chemical weapons protection and detection equipment in preparation for chemical warfare. It has so far produced and stockpiled, in large quantities, such gas agents as blister gas, nerve gas, choking, blood agent and tear gas. In its eight factories NK produces most of the agents it possesses. To enhance its operation capability against chemical, biological and radiological warfare, it has set up chemical warfare platoons at the regiment level. Even the civilian population as well as the military and paramilitary personnel receive biochemical defense training. The possession of various means for launching chemical weapons also enables the North to conduct simultaneous chemical attack on both our front and rear areas. Those means include mortars, field artillery, multiple-launch rocket systems, Frog-5 and Frog-7 rockets and Scud missiles. On the sea, fire support vessels, and in the air, fighters, bombers and transport aircraft can be used to attack distant targets.

The technology used to produce chemical weapons is much harder to identify unambiguously as weapons-related than is that for nuclear materials production

technology, and relevant know-how is much more widely available. Although production techniques for major chemical weapon agents involve some specialized process steps, detailed examples can be found in the open literature and follow from standard chemical engineering principles. Unlike nuclear proliferation, where the mere existence of an unsafeguarded nuclear facility in an NPT member state is often sufficient evidence of intent to produce weapons, many legitimate chemical facilities could have the ability to produce chemical agent. Intent cannot be inferred directly from capability.

Agent and Weapon Production
    Certain chemical agents such as mustard gas are very simple to produce. Synthesis of nerve agents, however, includes some difficult process steps involving highly corrosive or reactive materials. A sophisticated production facility to make militarily significant quantities of one class of nerve agents might cost between $30 million and $50 million, although dispensing with modern waste-handling facilities might cut the cost in half. Some of the equipment needed may have distinctive features, such as corrosion-resistant reactors and pipes and special ventilation and waste-handling equipment, but these can be dispensed with by relaxing worker safety and environmental standards and by replacing hardware as it corrodes. Moreover, production is easier if a proliferant country is willing to cut corners on shelf-life, seeking only to produce low-quality agent for immediate use.

    Chemical warfare agents can be produced through a variety of alternative routes, but relatively few routes are well suited for large-scale production. In general, commercial pesticide plants lack the precursor chemicals, equipment, facilities, and safety procedures required for nerve-agent production. Nevertheless, multipurpose chemical plants capable of manufacturing organo-phosphorus pesticides or flame retardants could be converted in a matter of weeks or months to the production of nerve agents. The choice between converting a commercial plant in this manner and building a clandestine production facility would depend on the urgency of a country's military requirement for a chemical weapon stockpile, its desire to keep the program secret, its level of concern over worker safety and environmental protection, and the existence of embargoes on precursor materials and production equipment.

    Agent production, however, is several steps removed from an operational chemical weapon capability. The latter requires design and development of effective munitions, filling the munitions before use, and mating them with a suitable delivery system.

Monitoring Chemical Weapon Proliferation
    Direct detection of chemical warfare agents in samples taken from a production facility would be a clear indicator of weapon activity, since these agents have almost no civil applications.[6] However, considerable access to production facilities is required to ensure that appropriate samples have been collected. Moreover,

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6   Nitrogen mustards have some use in cancer chemotherapy, and phosgene and hydrogen cyanide have industrial applications.

some of the substances produced when chemical agents break down in the environment are also produced when legitimate commercial chemicals break down, so detection of final degradation products does not necessarily indicate agent production. Nevertheless, the suite of degradation products associated with a given chemical agent production process would provide a clear signature.

Other than the agent itself, or an ensemble of degradation products, chemical agent production has few unequivocal signatures. Moreover, highly reliable technologies to detect chemical agent production from outside the site are not currently available. Unlike nuclear weapon facilities, which generally exhibit fairly clear signatures, civilian chemical plants have multiple uses, are hundreds of times more numerous than nuclear facilities, and are configured in different ways depending on the process involved. Moreover, many of the same chemicals used to make chemical agents are also used to make pharmaceuticals, pesticides, and other commercial products. Since many different types of equipment are suitable for chemical agent production, plant equipment per se does not provide a reliable means of distinguishing between legitimate and illicit activities. Nevertheless, some potential signatures of chemical weapon development and production exist, and a set of multiple indicators taken from many sources may be highly suggestive of a production capability.

Indicators at suspect locations that may contribute to such an overall assessment include: visual signatures such as testing munitions and delivery systems; distinctive aspects of plant design and layout, including the use of corrosion-resistant materials and air-purification systems; presence of chemical agents, precursors, or degradation products in the facility's production line or waste stream; and biochemical evidence of chemical agent exposure in plant workers or in plants and animals living in the vicinity of a suspect facility. Nevertheless, the utility of specific signatures depends on how a given weapon program operates, including the choice of production process and the extent of investment in emission-control technologies.

BIOLOGICAL WEAPONS

Agent and Weapon Production
    Biological warfare agents are easier to produce than either nuclear materials or chemical warfare agents because they require a much smaller and cheaper industrial infrastructure and because the necessary technology and know-how is widely available. Moreover, it would not be difficult to spread biological agents indiscriminately to produce large numbers of casualties, although it is much more difficult to develop munitions that have a predictable or controllable military effect.

The biotechnology industry is information-intensive rather than capital-intensive. Much of the data relevant to producing biological agents is widely available in the published literature and virtually impossible for industrialized states to withhold from potential proliferants. A widespread support infrastructure of equipment manufacturers has also arisen to serve the industry. Therefore, producing biological agents would be relatively easy and inexpensive for any nation that has a modestly sophisticated pharmaceutical industry. Moreover, nearly all the equipment need-

ed for large-scale production of pathogens and toxins (Botulin, ricin, animal venom) is dual-use and widely available on the international market.

One technical hurdle to the production of biological weapons is ensuring adequate containment and worker safety during agent production and weapons handling, although the difficulty of doing so depends on the level of safety and environmental standards. A government that placed little value on the safety of plant workers or the civilian population might well take minimal precautions, so that a biological weapon production facility would not necessarily be equipped with sophisticated high-containment measures. Another challenge is "weaponizing" the agents for successful delivery. Since microbial pathogens and toxins are susceptible to environmental stresses such as heat, oxidation, and desiccation, to be effective they must maintain their potency during weapon storage, delivery, and dissemination.

A supply of standard biological agents for covert sabotage or attacks against broad-area targets would be relatively easy to produce and disseminate using commercially available equipment, such as agricultural sprayers. In contrast, the integration of biological agents into precise, reliable, and effective delivery systems such as missile warheads and cluster bombs poses complex engineering problems. Nevertheless, the United States had overcome these problems by the 1960s and had stockpiled biological warfare agents.

Monitoring Biological Weapon Production

Detection and monitoring of biological and toxin agent production is a particularly challenging task. Even use of biological weapons could in some cases be difficult to verify unambiguously, since outbreaks of disease also take place naturally. Thanks to advances in biotechnology, including improved fermentation equipment as well as genetic engineering techniques, biological and toxin agents could be made in facilities that are much smaller and less conspicuous than in the past. Moreover, the extreme potency of such agents means that as little as a few kilograms can be military significant. Since large amounts of agent can be grown up from a freeze-dried seed culture in a period of days to weeks, large stockpiles of agent are not required, although some stocks of the munitions to be filled with these agents would be.

There are no signatures that distinguish clearly between the development of offensive biological agents and work on defensive vaccines, since both activities require the same basic know-how and laboratory techniques at the R&D stage. Moreover, almost all the equipment involved in biological and toxin weapon development and production is dual-use and hence will not typically indicate weapons activity. Indeed, the capacity to engage in illegal military activities is inherent in certain nominally civilian facilities. Some legitimate biological facilities can also convert rapidly to the production of biological warfare agents, defending on the degree of sophistication of the plant and on the required scale of production, level of worker safety, and environmental containment. At the same time, however, legitimate applications of biological or toxin agents (e.g., vaccine production and the clinical use of toxins) are relatively few at present. With the exception of a few vac-

cine production plants, such activities are largely confined to sophisticated biomedical facilities not normally found in developing countries, and these facilities generally do not engage in production except on a small scale. Moreover, given that the global biotechnology industry is still in its infancy, the number of legitimate activities - from which the illegitimate ones would have to be distinguished - is still relatively small.

Sensitive analytical techniques such as polymerize chain reaction (PCR) analysis or use of monoclonal antibodies can identify trace quantities of biological agents and might be able to do so even after the termination of illicit activities. However, the existence of such sensitive laboratory techniques does not necessarily translate into a negotiated verification regime that might be instituted to monitor compliance with the Biological Weapons Convention. Other factors that must be assessed in establishing such a regime include the likelihood of detecting clandestine production sites, the ability to distinguish prohibited offensive activities from permitted defensive national-security or proprietary information during inspections of U.S. facilities.[7]

Because of the difficulty of detecting clandestine biological and toxin weapon development and production, effective tracking of such programs will require integrating data from many sources, with a particular emphasis on human intelligence (agents, defectors, and whistle blowers). Some weaponization signatures (storage of bulk agents, etc.) would probably be easier to detect than production signatures, but many such signatures could be concealed or masked by legitimate activities such as bio-pesticide R&D or use. Production and storage of components for BW munitions might also be masked by activities associated with conventional weapons, such as production of high explosives, bomb casings, or artillery shells. Since excessive secrecy might itself be indicative of offensive intent, greater transparency would tend to build confidence in a country's lack of offensive intentions.

Implications of New Technology
Genetic engineering is unlikely to result in "super germs" significantly more lethal than the wide variety of potentially effective biological agents that already exist, nor is it likely to eliminate the fundamental uncertainties associated with the use of microbial pathogens in warfare. However, gene-splicing techniques might facilitate weaponization by rendering microorganisms more stable during dissemination (e.g., resistant to high temperatures and ultraviolet radiation). Biological agents might also be genetically modified to make them more difficult to detect by immunological means and insusceptible to standard vaccines or antibiotics. At the same time, genetic engineering techniques could be used to develop and produce protective vaccines more safely and rapidly.

Cloning toxin genes in bacteria makes it possible to produce formerly rare toxins in kilogram quantities. Moreover, molecular engineering techniques could lead

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7   U.S. has already determined that inspection procedures under the Chemical Weapons Convention, which allow the inspected party to negotiate the level of access to be provided to international inspectors, are sufficient to protect national security information and trade secrets. However, it is not necessarily the case that the same inspection procedures would be suitable for the Biological Weapons Convention should a formal verification regime be instituted.

to the development of more stable toxins. Even so, for the foreseeable future, toxin-warfare agents are unlikely to provide dramatic military advantages over existing chemical weapons. It is possible that bio-regulators and other natural body chemicals (or synthetic analogous thereof) might be developed into powerful incapacitants, but means of delivering such agents in a military effective manner would first have to be devised. Moreover, if warning of their use were provided, chemical weapon protective gear would blunt their impact.

DELIVERY SYSTEMS

Long-range Guided Missiles
    Since 1976 NK has imported from the former Soviet Union Scud-B missile with a range of some 500 km, developed its own model of the missile, and is currently estimated to possess the production capability of no fewer than 100-150 per year. By exporting this improved version to the Middle East countries including Iran, NK has become a missile-exporting nation. Recently, it developed and test-fired successfully the Rodong-1 with a range of 1,000 km and is in the process of developing mid- and long-range missiles such as Daepodong-1 and 2. These missiles are capable of striking major places in Northeast Asia, not to mention the entire ROK, posing a serious threat to the peace and stability in the region.

    Among its other long-range weapons, NK has Frog-5 rockets and 170 mm self-propelled artillery with ranges of 40 to 50 km, and Frog-7 rockets and 240 mm multiple launch rocket systems with ranges of 70-odd km. When launched from near the DMZ, these rockets and artillery are capable of carrying shells and warheads as far south as the line linking the Seoul metropolitan area, Chunchon and Sokcho. Production and deployment of these long-range weapons is aimed at provoking psychological effects that are accompanied with horror and chaos through an attack on major cities including the Seoul metropolitan area as well as strategic objectives.

    Although military delivery systems such as ballistic missiles, and combat aircraft are not essential to deliver weapons of mass destruction, they can do so more rapidly, more controllably, and more reliably than rudimentary means such as suitcases, car bombs, or civilian ships or planes. Controlling the spread of advanced delivery systems by no means would eliminate the dangers posed by weapons of mass destruction, particularly in terrorist applications. However, limiting the availability of these delivery systems would make it harder for states to use weapons of mass destruction for military purposes, particularly against well-defended, fore-warned adversaries.

Barriers to Missile and Aircraft Proliferation
    The spread of ballistic missiles around the world was greatly facilitated by the export in the 1970s and 1980s of Scud-B missiles from the former Soviet Union. With an increasing number of countries abiding by the MTCR, the number of potential missile suppliers has declined dramatically. Of the principal missile exporters, only North Korea has not agreed to comply. Additional countries have learned to copy, modify, extend the range of, and produce their own missiles, and a small number have developed long-range systems - often in conjunction with

space-launch programs and foreign technical assistance. Even so, MTCR constraints can slow the acquisition by developing countries of technologies associated with more advanced missiles - those having ranges in excess of 1,000 km or guidance errors of less than roughly 0.3 percent of their range.

Given the complex set of technologies and expertise used in advanced aircraft, especially high-performance jet engines, it remains virtually impossible for developing countries to acquire these systems without assistance. However, no internationally binding restrictions limit trade in combat aircraft, and such arms transfers continue to be used as an instrument of foreign policy.

If they have sufficient payload and range - and if they can be procured despite export controls - commercially available unmanned aerial vehicles can be adapted to deliver weapons of mass destruction without much difficulty. Developing cruise missiles by North Korea requires greater technical capability. Even so, technologies for guidance, propulsion, and airframes are becoming increasingly accessible, particularly with the spread of licensed aircraft production arrangements to many parts of the world. The most difficult technical challenges to developing cruise missiles - propulsion and guidance - do not pose much of a hurdle today. The highest performance engines are not required for simple cruise missiles, and many sources are available for suitable engines.

Monitoring Delivery Vehicles

Although individual missiles can be very difficult to detect, a program to develop ballistic missiles is much more visible. Test firing and launching ballistic missiles can be readily seen. Development of intermediate and long-range ballistic missiles such like Rodong-1,2 and Daepodong-1,2 requires extensive flight testing, making it particularly noticeable. Although states pursuing both military and civil space technology may wish to hide their military programs, civilian space-launch programs are usually considered a source of national prestige and proudly advertised.

Monitoring of North Korea's missiles particularly may be undetectable since the information of military programs usually is under secrecy. However, several important forecasts may be available such as the following: First, it is possible to build a missile capable of flying more than 1,000 km with a one tone warhead using Scud technology that North Korea is known to produce. As a result, reports of the Rodong and Daepodong's development appear to be technically credible.

Second, it appears feasible in principle to further increase the Daepodong range to around 2,500 km with a 1.5 tone warhead by constructing the missile body from high-strength aluminum. If both the 2,000 and 2,500 kilometer-range missiles are based on Scud technology, their existence would not imply a breakthrough in North Korea missile technology.

Third, the Rodong missile is essentially the longest range missile that North Korea could build with its existing level of missile technology. Further range

increases for the Daepodong missile would require steps such as building a considerably more powerful engine or using multiple stages.

Fourth, the accuracy of the Rodong is expected to be several kilometers and reducing this figure significantly would be very demanding. For example, if the errors are dominated by reentry errors rather than guidance and control errors, as appears likely, improving the guidance system of the missile would have little effect on the accuracy. With such poor accuracy the Rodong would not be a militarily significant weapon if equipped with a conventional or chemical warhead but could be an effective terror weapon.

Finally, while some key missile components could be tested without requiring flight tests, the overall reliability of the missiles may be low since it would be expensive for North Korea to carry out an extensive flight testing program. An emerging nuclear state may be reluctant to trust such a missile to deliver one of its few nuclear weapons.

Verification of Compliance by Resident Inspectors: A Study Using the Experience of the Neutral Nations Supervisory Commission

Robert E. Bedeski

I. Background - The Armistice Agreement

The problems of the Korean peninsula bring a burden of a century of conflict to an oft-troubled region. As the focus of international rivalries involving Japan, the U.S., Russia, and China, Korea's place in Asian conflicts precedes the recent end of the Cold War. Resolution of the standoff involves far more than North Korea and South Korea, and must take some global considerations into account. The stakes of the major Pacific powers will have a major weight in any new configuration of the peninsula, and any settlement which ignores them will not succeed.

A. Stalemate and Armistice

After years of war and negotiations held between the Commander-in-Chief of the United Nations Command on one side, and the Supreme Commander of the Korean Peoples Army and the Commander of the Chinese People's Volunteers on the other, the military armistice was signed in Panmunjom on 27 July 1953. This agreement stopped the fighting, and established a Military Armistice Commission (MAC), composed of representatives of the two belligerent sides, and a Neutral Supervisory Commission (NNSC) to insure that a new arms buildup did not occur, with the NNSC reporting to the MAC.

The present division of the Korean peninsula had its genesis as a temporary arrangement after World War Two, and was hardened by the Korean war. The Armistice Agreement of 1953 set the terms of military disengagement, and imposed the structure of peace on the two Koreas which has survived to the present. While the Armistice Agreement was never intended to be permanent, it has succeeded in preventing resumption of hostilities. Now North Korea and China are demanding an end to the Agreement, to be replaced by a peace treaty between the U.S. and the DPRK.

The Armistice Agreement is a truce in the Cold War, was never expected to accomplish much beyond a separation of belligerent forces, and is reviled by all participants. Perhaps its only virtue is that it stopped one of the most destructive wars since 1945. That it remains in place despite mutual hostility and disdain is a tribute to the fact that the combatants have preferred to talk than fight.

By ending the war and creating the DMZ, the Armistice Agreement marked the border between communist and democratic capitalist worlds. It confirmed two de

facto nations on the peninsula while structuring the relationship between them. With the end of the Cold War, the time is now ripe to reconsider the Armistice Agreement and all of its ramifications in order that the vastly changed circumstances be appreciated. In particular, the peace of the East Asia region is intimately affected by the disposition of changes on the Korean peninsula. Moreover, practically all countries in the Asia-Pacific area have an interest in any future renegotiation and settlement. This is especially true of the United Nations, which has long had an organizational concern in the Korean peace and cannot be ignored.

The argument I wish to make in this paper is that the Armistice Agreement has survived and served its original primary purpose because it served local, regional and global interests. To discard it without understanding its functions and constituencies can possibly result in unforeseen and dangerous ramifications. It has been an unsatisfactory instrument of peace, yet its absence could lead to higher levels of tensions and new insecurities if a replacement agreement is not fully thought through. This is not to argue for the unlimited continuation of the Armistice Agreement, because its flaws are undeniable. But it is important to build upon essential success and to eliminate those parts which do not serve the interests of peace.

B. Functions of the Armistice Agreement

There are four levels of interest in Korean peace, and a realistic re-negotiation of this peace must deal with all of them. In addition, the 1953 Armistice Agreement - while it performed its original function of keeping the peace - is moving towards obsolescence, and could be amended and even replaced. In the nearly forty-two years of the Armistice Agreement, it has served at least three major functions. These include:

1. **Enforcement** - Maintaining the non-military character of the DMZ has been done through the patrols and surveillance by both sides. Occasional incidents remind the world of continued tensions, and the need for vigilance. Violations - such as unauthorized penetration - are reported and investigated, with the MAC largely responsible for supervision.

2. **Verification** - With air and ground and electronic surveillance, the contracting parties monitor each other's activities. The NNSC was designed to physically inspect suspected violations of the agreement to halt additional arms stocks, but has been inactive since the early years of the Armistice Agreement.

3. **Communication** - Both the MAC and NNSC have provided channels of communication for the former combatants. Antagonism between the adversaries on the MAC has neutralized its effectiveness, but for a long period the two structures were a line of communication between communist and UN forces.

As long as the antagonistic conditions of the Cold War persisted, the Armistice Agreement structures were limited by mutual hostility and distrust. With the end of global U.S.-Soviet nuclear animosity, there is a strong argument to be made for modification or abandonment of the Armistice Agreement and its structures - except for the fact that two offspring of the Cold War remain enemies. So a premature liquidation of the Armistice can be as dangerous as turning off the smoke detectors and sprinkler systems in a building full of flammable materials the danger of conflagration remains.

C. Four Levels of Interests in the Armistice Agreement

A major flaw of the 1953 agreement was the absence of South Korea. The South Korean government at the time refused to participate, and her interests were represented by the U.S. Because of this, there has been a continuing asymmetry and weak correlation between participation and actual interests. To amplify, we can identify the following hierarchy of interested parties, in order of the intensity of their stakes in Korean peace.

1. North and South Korea have the highest degree of interest because their very existence has been tied to the Armistice Agreement. Should it collapse, or be terminated, both nations will be directly exposed to each other's military power. The Armistice Agreement, with the territorial buffer of the DMA, and the military supervision of the MAC, may be the major obstacle that stands between Korea and resumption of War. To replace it with a peace treaty of some other instrument lacking the military obligations of an alliance system, could allow a reescalation of hostilities.

2. The Major Powers of the early 1950s are no longer the same major players today. China and the U.S. remain the key patrons of their respective allies on the peninsula, while Japan has expanded her economy and military capability to become a potential near-major power. The Russians, distracted by the near-abroad, wield little of the influence they once had over North Korea. In all cases, Korean peace is vital to stability and development, but the involvement of the U.S. seems to be the most tentative and tied to an international leadership role that may no longer be tenable in the future.

3. Other countries of the Asia-Pacific region have more indirect concerns over the Korean peninsula and can be divided into two sets of states - those which have historically been active in the region in trade and empire - including the states of Western Europe- and countries with Asia-Pacific geographic location whose horizons have been expanding - especially after World War Two - as the result of trade, diplomacy, and technology to have greater involvement in the region. This would include Canada, Southeast Asia, Australia, and some Latin American states. These countries would be affected by failure to reduce hostility in Korea, and have trade, investment and indirect security interests in the Korean peninsula.

4. Finally, a global community represented by the United Nations is affected by Korean events. Whereas the UN was divided into pro-US, pro-Soviet and neutral forces during the Cold War, the alignments are far more complex today. The Eastern European component of Soviet support has drifted into a more neutral stance, while pro-U.S. countries are decidedly more independent today. This largest group provides a pool of neutral nations which can provide observers, inspectors and peace keepers.

These four levels of national interest are characterized by differing relevance to states within each category and the appropriate degree of participation. These can be classified as follows:

Level One states: Interest in the Korean armistice/treaty is derived from central question of sovereign existence. Obviously the resumption of war would pose a threat to mutual existence of North and South Korea. Both Koreas are, in some respects, political or economic dependencies of major powers, despite protests to the contrary. The North Korean drive for U.S. recognition - using nuclear weapons as a bargaining chip if necessary - is not so much about diplomatic normalization as it is about a search for guarantees that the U.S. will not threaten North Korean existence.

Level Two states: Interest in the Korean question is partial, because a certain share of state security, broadly defined, is perceived to be invested in the arrangement. For the PRC, the Korean buffer is crucial for defense of Manchuria, as events in the 1930s demonstrated. Russian interest has been related to its Pacific maritime regions and the eastern terminus of the BAM railway. The U.S. has no direct security interest in the Korean peninsula, except that its South Korean ally/client has been a remarkable showcase for democratic capitalism. More importantly, U.S. forces have been surrogate for Japanese involvement on the Korean peninsula. For Japan to take over this role from the U.S. could be destabilizing in the region, since it would require a significant change in Japanese defense policy.

Level Three states: This category consists of states with indirect and partial security interests in the Korean peninsula. Japan belongs to this group because its more direct interest is managed by the Americans. Australia, Canada and Southeast Asia are affected indirectly because of trade relations, their direct links with the major players, and geographical or historical engagement - including fighting in the Korean War.

Level Four states: This last category, in theory, has no direct or indirect interest in the Korean peninsula, and provides a pool of neutral nations. They have no alliances with level one or level two states, and could provide staffing for some sort of peacekeeping operation. In 1953, armistice negotiations over the NNSC centered on which countries belonged to this category - and the inclusion of Soviet allies were a major factor in scuttling the ability of the Commission to carry out its functions.

Table 1 provides a rough estimate of the degree of participation in the 1953 Armistice Agreement, and the degree of national interest that should be reflected in a new arrangement.

The serious flaw of South Korea's non-representation in the 1953 Armistice Agreement was not fatal because of U.S. commitment to security. While this guarantee has not decreased, there is a much broader concern today with affairs on the Korean peninsula, and dealing with potential crisis in this wider context. There are concerns over nuclear weapons and over the viability of North Korea in coming

Table One: Parties to the Korean peace agreement direct and indirect		
[Numerical figures indicate level of national interest in the armistice/peace agreement, with one the highest, and four the lowest.]		
	1953 Armistice	New Agreement
North Korea	1	1
South Korea	2	1
USA	1	2
PRC	1	2
Japan	3	3[1]
USSR/Russia	2	3[1]
Soviet East European Allies	3	4
Asia-Pacific	4	3
True Neutrals	4	4

years. Obviously, the ramifications of a new peace treaty are too important to be ignored by the regional and global communities.

II. RAMIFICATIONS FOR A NEW PEACE TREATY

North Korea seeks to replace the multilateral Armistice Agreement with a bilateral peace treaty, although not much is known abut the actual text of their intentions. From the above analysis, we can provide a rough map of relative involvement from a realistic perspective. The Armistice Agreement worked (i.e. prevented the resumption of war) in part because it roughly reflected and corresponded to the direct and indirect interests of the relevant parties. Most critically, despite the absence of South Korea from the Armistice Agreement, Seoul's vital interests have been reliably safeguarded by the U.S. The risk of moving to a peace treaty based on the formal participation in the Armistice Agreement is that it might not have the same safeguards for South Korea that were implicit in 1953. In addition to the U.S.-South Korea Security Treaty, the Armistice Agreement has been a critical expression of U.S. commitment to the integrity of South Korea. A peace treaty could effectively reduce the U.S. commitment to South Korea by ending hostilities, while at the same time, reducing the need for the high degree of commitment. Much depends upon the degree of trust that the U.S. and South Korea could place in a replacement peace treaty. With no further legal rationale for maintaining the presence of U.S. forces in South Korea, there would be rising pressure to remove them. If North Korea were to resume belligerence, the difficulties of

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1   Geographical propinquity suggests that Japan and Russia should be at level two national interest. However, Japan's constitution and the protection offered by the US-Japan Security Treaty combine to distance the country from direct involvement in Korean affairs to the same magnitude as the US or China. Russia is downgraded because of her equidistant foreign policy with the two Koreas, domestic disorder, relative disengagement from Northeast Asian affairs since 1991, and potential leverage over Korean affairs.

re-establishing a rapid deployment in South Korea would be enormous. On the other hand, a peace treaty which include South Korea and mechanisms for verification and arms control might be worth the risk. It might enable North and South Korea to communicate with each other as equals, and reduce Pyongyang's anxieties.

But aside from the impact that a peace treaty might have on the peninsula, there are further ramification for the region - especially the possible role of Japan.

III. THE NEXT STEP TO PEACE ON THE KOREAN PENINSULA: REVISING THE ARMISTICE AGREEMENT

The Armistice Agreement was thus more than a simple bilateral treaty, and any successor instrument must reflect the multinational implications of what was expected to be a temporary peace. The challenge for all parties is to create a replacement that both incorporates the vital functions of the Agreement, and also reflects the new realities of international alignments. Given the history of conflict on the peninsula, it would be ill-considered to ignore the mutual anxieties of North and South Korea which are expressed in high level armaments, and to overlook the interests of the international community. The solution is not to reinvent peace instruments by liquidating all existing arrangements - including the Armistice Agreement, the MAC and the NNSC - but to reform and revise these arrangements to accommodate new realities. The approach should be reformist rather than revolutionary, and should have stability as the key criterion.

It is tempting to scrap the Armistice Agreement because it seems no longer able to meet the needs of the present and future. Yet in terms of security needs, it has kept large forces at least 4 kilometers apart from each other over the 249 kilometers of the DMZ, and raised the costs of breaking the armistice by making the peninsula a nominal ward of the United Nations. Until conditions change - such as peninsula reunification - there seems to be no advantage in scrapping the agreement entirely.

If the Armistice Agreement is to be salvaged by diplomacy, several changes are needed.

1. First, the name itself is too closely linked with the Korean War, and its meaning has been lost to a new generation of leaders. Perhaps something like "Peace Agreement" is more appropriate.

2. Second, South Korea should be made a party to the agreement. It was one of the paradoxes of the past four decades that one of the two states most affected by the Korean war has not been a direct participant. In any renegotiation, this must be corrected.

3. Third, the fiction of armistice symmetry must be adjusted to reality. The United Nations has vastly changed since the early 1950s, and its participation is largely window-dressing. It would not be a bad trade if South Korea replaced the UN as a party to the Armistice Agreement.

4. Fourth, the MAC should be reorganized on the principle of symmetry, with South Korea given membership, and more neutral observers on both sides.

5. Fifth, the NNSC should be reorganized, given genuine enforcement powers, allowed to use the latest verification technology for arms inspection on both sides, and be mandated to set a schedule for conventional arms reduction.

6. Sixth, United Nations participation in the Peace Agreement should focus on nuclear weapons, using the expertise of the IAEA to detect, inspect and verify conformity with international agreements.

IV. BUILDING A NEW PEACE IN KOREA

At the heart of any peace must be a military peace, and this can only be guaranteed by a system of arms control, inspection, and verification. Should one of the two Koreas collapse - after the model of East Germany - much of the problem may disappear. Divided countries continue to be a source of conflict and instability in this region and elsewhere.

Redesigning the peace on the Korean peninsula should begin with the question of arms control. A regime consisting of ground and aerial inspections is the sine qua non of replacing the existing Armistice Agreement. Now that the nuclear issue has been taken up by all sides, the question of conventional arms should be given due attention in restructuring an agreement on the Korean peninsula.

V. ABORTED ARMS CONTROL IN KOREA: THE NNSC

While the inspection and verification tasks of the Armistice Agreement have been moribund since 1954, it would be prudent to require these missions in any new arrangement for the purpose of maintaining stability. One point of departure for reviving this mission is to examine the NNSC for lessons on how inspections might be organized.

The NNSC consisted of representatives of four nations which had not participated in the Korean war, and therefore were considered neutral. Two senior military officers were appointed by Sweden and Switzerland, who were nominated as neutral nations by the United Nations Command. Poland and Czechoslovakia were nominated by the Supreme Commander of the Korean People's Army and the Commander of the Chinese People's Volunteers.[2] The representatives and their duties were specified by the Armistice Agreement (MAA), Paragraph 13(c), in which both sides agreed to cease the introduction of reinforcing military personnel, combat aircraft, armored vehicles, weapons and ammunition into Korea.[3]

The NNSC was to meet daily in Panmunjom with a provision to recess, if agreed, for not more than seven days. The records of all NNSC meetings were to be forwarded to the MAC as soon as possible and were to be kept in English, Korean and Chinese. The NNSC was able to make recommendations to the MAC with respect to amendments or additions to the Armistice Agreement. Finally, the NNSC or any of its members was authorized to communicate with any member of the MAC.[4]

2   *The United States and the Korean Problem: Documents 1943-1953*, 83rd Congress: 1st Session, no. 74. p. 107.

3   Wesley Kriebel, "Korea: the Military Armistice Commission 1965-1970," *Military Affairs* (October 1992), 96.

4   *The United States and the Korean Problem: Documents 1943-1953*, 83rd Congress: 1st Session, no. 74. p. 107.

By the terms of the Armistice, the line of demarcation between North and South Korea closely approximated the front line as it existed at the final hour. Slanting as the line did from a point on the west coast fifteen miles below the 38th parallel, northeastward to the east coast anchor forty miles above the parallel, the demarcation represented a relatively small adjustment to the prewar division. Within three days of the signing of the armistice, each opposing force withdrew two kilometers from this line to establish a demilitarized zone that was not to be trespassed. The Armistice provisions forbade either force to bring additional troops or new weapons into Korea, although replacement one to one and in kind was permissible. To oversee the enforcement of all Armistice terms and to negotiate settlements of any violations of them, a Military Armistice Commission was established. This body was assisted by the Neutral Nations Supervisory Commission which had the mission to carry out the functions of supervision, observation, inspection and investigation, as stipulated in Sub-paragraphs I 3c and I 3d and Paragraph 28, of the Armistice Agreement, and to report the results of such supervision, observation, inspection and investigation to the Military Armistice Commission.

The NNSC was designed to accomplish its task of verification by using three types of operations, including:

1. Fixed inspection teams were located in five ports in North Korea and five in South Korea. Since neither Korea had a substantial armaments industry of its own, it was anticipated that all armaments would be moved through these designated ports. Each Neutral Nations Inspection Team (NNIT) was composed of at least four members - two nominated by the UNC Commander-in-Chief, and two nominated by the Supreme Commander of the North Korean and Chinese forces. Sub-teams of two members (balanced between non-Communist and Communist members) were also allowed. Additional personnel were also permitted as interpreters, clerks, drivers, etc.

2. The North Koreans and the United Nations Command were to give full reports on all replacements of personnel and materials to the NNSC.

3. If either side suspected violations of the Armistice, it could request inspections anywhere in North or South Korea to determine if there was a foundation for the accusation. The NNSC mobile inspection teams at Panmunjom were to carry out these inspections.[5] Composition of the teams consisted of at least four officers, half appointed by the UNC, and the other half by the North Korea and Chinese Command (Armistice Agreement, Article 40b). The neutrality of the Polish and Czech officers - which consistently favored North Korea - usually insured delays or other interference in challenging North Korea, while in South Korea, the special inspections were perceived as more motivated by a desire to gather intelligence for the Communist side, and often faced obstacles.

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5   *Ibid.* p. 108.

These responsibilities and activities were laid out by the Armistice Agreement for the Neutral Nations Supervisory Commission. The operational assumption of the Agreement was that, for the peace to work, there could be no new additions of arms and men. It sought to prevent a renewed, destabilizing arms race on the peninsula, and limited the number of conventional weapons in North and South Korea, to the numbers at the time of signing, and allowed for "in kind" re-supply. Within the Agreement, verification was to be left in the hands of the NNSC, who would then report their findings to the Military Armistice Commission. The Armistice gave the MAC responsibility for supervising "the implementation of the Armistice Agreement and to settle through negotiations and violations of the Armistice Agreement."[6] The MAC set up Joint Observer Teams to assist it in carrying out the provisions of the Armistice Agreement in the DMZ and estuary of the Han River.[7] It was the responsibility of the NNSC to observe conformity with the Armistice Agreement in areas outside the MAC zone, except in the ports where permanent NNSC inspection teams were stationed in accordance with Section 43. The NNSC had no authority except to report violations to the MAC which would then settle the alleged violations through negotiations and report them to the commanders of the opposing sides.

An elaborate inspectorate team system was set up. The NNSC established twenty Neutral Nations Inspection Teams and each inspection team was to consist of not less than four officers, preferably of field grade, two from the Swedish and Swiss contingent and two from the Polish-Czech contingent. Subteams of two officers could be formed as required with half either Swedish or Swiss and half either Polish or Czech. Each of the four contingents consisted of ninety-five men. The allocation was as follows: 15-20 to the secretariat and command headquarters; 35-40 to the inspection teams located at designated ports; 30-35 to the mobile inspection teams; and 5-10 to special functions.[8]

At the time of the armistice, each of the four NNSC states assigned three to four men to each fixed inspection post, a chief, an assistant, a secretary or interpreter, and a telegrapher. The organization of the ten mobile groups depended on the function they were called upon to perform. The first group was set up to investigate complaints from both North Koreans and from United Nations Command concerning conditions in prison camps. The composition of the second group was constantly changing since it was called upon to investigate the illegal entry of military planes into North Korea. Up to November 30, 1953, only four of the ten mobile teams had been used for only six days. As a result, Switzerland proposed the reduction of the number of teams to six and this was accepted in early 1955, at the request of Switzerland, two stationary teams were abolished in both North and South Korea, and the size of the remaining six fixed teams were reduced by 50 percent.[9]

6   David W. Wainhouse, "Neutral Nations Supervisory Commission (NNSC) and Military Armistice Commission (MAC), 1953-1964," *International Peace Observation*, 1966, p. 347. According to the Armistice Agreement, the MAC was authorized to request the NNSC to conduct special observations and inspections at places outside the DMZ where violations of the Agreement were reported. (Article 28).

7   Article 26.

8   Article 24.

9   Wainhouse, p. 345.

On 3 May 1956, the United Nations Command requested the NNSC to withdraw the fixed inspection teams from South Korean ports because of the claim that the Communists had ignored their obligation not to rearm North Korea, and to permit inspections to verify this. Therefore, it was an unfair burden for the teams to operate in the South. On 8 June 1956, the NNSC withdrew all of its fixed teams and instructed the personnel to return to Panmunjom.[10]

The NNSC emerged only because of the battlefield stalemate that forced the combatants to stop the slaughter. It halted a war of attrition which had the potential of widening to a broader theater. The election of Eisenhower to the US presidency gave further impetus to the American desire to halt the war, while Communists probed in other areas of the world for Western weakness. It was an environment that defied permanent peacemaking in part because of the transnational alliances and antagonistic ideologies of the participants. The mechanism of the NNSC was flawed from the beginning. There were three significant restrictions upon NNSC authority which contributed to its failure. First, the NNSC was subordinate to the MAC, which alone was authorized to supervise implementation of the Armistice Agreement. The NNSC was mandated responsibility for verifying restrictions on arms replacements and additions, but was limited by its lack of freedom of movement and cooperation from the Communist belligerents. This scope of limitations on verification ability most certainly allowed blatant violation of the Armistice Agreement. Moreover, the NNSC was exclusively an agent of verification, and had no enforcement power in the sense of having an independent ability to punish non-compliance with the Armistice. When violations were reported to the MAC, the Commanders of the opposing sides were notified. Except to report again to the Commanders that a violation had been corrected, the MAC was authorized to take no further action. Resumption of war may have been the only effective means of enforcement, and the U.S. and its allies were unwilling to take this action.

Second, the NNSC fixed Inspection Teams were geographically restricted in that the reinforcing personnel and supplies which violated the Armistice could easily avoid the ports designated for the fixed inspection teams. This was especially true in the DPRK. South Korea was at a severe geopolitical disadvantage because it was bounded by sea on three sides and the "military sterilized" DMZ on the north: all military supplies had to enter through ports by sea or from the air. Any resupply of arms or personnel was easily observed. North Korea, on the other had, because of its long contiguous land border with China (demarcated by the Yalu River for some of its length), was porous enough to allow undetected movement of military equipment and personnel outside the five designated ports. In theory, the fixed inspection teams were to observe all shipments coming through the ports to determine whether there were violations of the Armistice Agreement. But in practice a pattern of interference in North Korea prevented full and timely inspections. The fixed teams were not

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10   Jacques Freymond, "Supervising Agreements: The Korean Experience," *Foreign Affairs*, XXXVII: 3 (April 1959), p. 501.

allowed freedom of movement when it was felt necessary to do inspections, and the Communist members of the teams rarely cooperated in pursuing reports of violations - even in the ports where the teams were located.

Finally, half of the NNSC was neutral in name only. It was clear from the start that the Polish and Czech members supported their Asian Communist comrades, and stalemate in supervision and inspection was the result. The NNSC failed to achieve its monitoring objectives and began to serve as a device to fill the vacuum which would have been created if abolished. Operationally, the NNSC Inspection Team in both North and South Korea were accompanied by body-guards who restricted their movements even in the limited areas where access was allowed. An explicit protocol on the rights and duties of inspectors versus those of the escorts might have reduced this one area of friction and interference. The main problem was that the NNSC was immobilized from within, by its own composition and by the fundamentally different commitments of its members. The NNSC was unable to make decisions since on all crucial issues the vote was tied. Failure of the Armistice system had the effect of frustrating the balance that was put in place in 1953, and eventually led to introduction of nuclear weapons on the peninsula - a development that has undoubtedly encouraged Pyongyang to generate its own capacity.

VI. BUILDING A NEW PEACE IN KOREA
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Redesigning the peace on the Korean peninsula should begin with the question of arms control. A regime consisting of ground and aerial inspections in the sine qua non of replacing the existing Armistice Agreement. Now that the nuclear issue has been taken up by all sides, the question of conventional arms should be given due attention in restructuring an agreement on the Korean peninsula.

INSTITUTIONAL ARRANGEMENTS FOR ARMS CONTROL: AN OVERVIEW OF A UNITED STATES INFRASTRUCTURE

David E. Evans

While not overlooking South-North ideological differences, the North's most direct threat to the South is its military. This military outnumbers the South in just about every comparable category, includes the threat of biological and chemical warfare and appears to be reaching for a nuclear capability. A way to reduce the actual and perceived threat is through the pursuit of confidence and security building measures and arms control - and a lot of attention is given to such a pursuit. According to the Institute of Foreign Affairs, "Arms Control on the Korean Peninsula (What lessons can we learn from European experiences?)," December 1990, the primary condition for meaningful arms control is that the sides involved should be defensive in conflict - if one wide believes that by war it can gain something, then it is difficult to start meaningful arms control negotiations.

Apparently, in searching for so-called "models" for use with respect to the Korean Peninsula, the European arms control experience has been studied extensively with resulting mixed opinions on relevancy. However, a view suggested here is that it is clear from past experience that through the process of negotiations, agreement and implementation, the parties involved require an infrastructure to effect ht processes necessary to reach the desired outcomes. The infrastructure would be necessary and could be adaptable to bilateral, regional, or multilateral matters of either conventional or nuclear arms control and any confidence and security building measures (CSBMs). As such, the infrastructure, while specific to each party, would also provide interaction with and between parties. For example, if the agreed, mutually acceptable arms control goal is to create a militarily stable environment through a measure of military parity, the infrastructure, as part of a regional arrangement for verification, could be used to support negotiations for verification-related measures and to direct and coordinate the implementation of the verification regime used to confirm that parity exists.

If, for example, there are confidence building measures (CBMs) or CSBMs in place that are accomplished through the provision of information and notifications and the conduct of observations, the infrastructure would promote regional arrangements to ensure information, notifications, and observations can occur. Of course, each party would require its infrastructure to be able to judge the intent of the other party to comply with the agreements (either CSBMs and/or arms control), to ensure its own compliance, and to pass those judgments vertically to a higher authority which could, as appropriate, deal horizontally with the recognized higher authority of the other party.

While the infrastructure required to operationalize CSBMs and arms control agreements might vary depending upon the parties involved, it is clear from experience that each party requires a means to make it happen in as orderly a fashion as possible. The United States (US) has an infrastructure that could be studied broadly, and in some cases specifically, in terms of how it serves internal United States Government (USG) needs and that could be viewed for potential usefulness as an aspect of bilateral, regional and/or other arrangements for the implementation and verification of agreements.

Assumptions

Before providing a view of aspects of the USG infrastructure used throughout the arms control process, including tracking treaty partners in terms of whether they are meeting obligations under agreements, a few assumptions are made about existing conditions.

- The Koreas have achieved a dialogue that would identify goals so as to allow mutually acceptable arms control provisions and/or CSBMs.

- The agreements reached are at least bilateral but could be advanced regionally or multilateral given an agreement on the parties to be involved.

- That the agreements include calls for some or all of the following: notifications, data exchanges, verification measures (the focus being on inspections to confirm data), domestic implementation, and provisions for further consultations given, for example, the possibility of compliance-related questions.

These assumptions point to an optimistic view of the Peninsula environment for the pursuit of agreements which would make any arrangements, bilateral or otherwise, more workable. However, somewhat in contradiction of making the assumptions, an infrastructure is still necessary and could contribute to progress, even without a totally open negotiating environment.

Institutional Infrastructure

The USG has, over time and given its experiences in bilateral and multilateral agreements, developed an interagency process that calls upon all agencies of government that could be affected by a particular agreement. Several institutions have emerged that are involved in some or all of the processes and steps associated with arms control - policy formulation through implementation. The term "interagency" includes USG agencies such as the Department of State, Department of Defense, Department of Energy, Department of Commerce, and others. These organizations often have counterparts in other countries. However, there are some organizations reasonably unique to the USG for further discussion that include: the Unclear Risk Reduction Center (NRRC), which is used primarily to pass/receive notifications and certain data exchanged; the On-Site Inspection Agency (OSIA), which is used primarily for the conduct and receipt of inspections; an emerging Office of National Authority (ONA) which will, inter alia, be used in relation to the domestic implementation of the Chemical Weapons Convention; and the Arms Control and Disarmament Agency (ACDA) which is used throughout the process of Arms Control and also plays the key role in assessing compliance with agreements. In treaty implementation, such institu-

tions could work to serve each party — each party having a counterpart — and/or could serve as the party's primary interface with a comparable regional or multilateral institution. For example, in a bilateral arrangement with Russia, various USG, and often ACDA-led, interagency working groups and implementation task forces interact with comparable activities in Russia. As part of the START Agreement, the Joint Compliance and Implementation Commission (JCIC) was established to, among other things, address implementation issues. Within the USG, an ACDA-led interagency group would direct USG implementation of the Agreement and serve to interact with the multilateral JCIC. So, depending upon the nature of an agreement, a solely bilateral institutional arrangement could be established or a broader global-like arrangement could be made similar to the JCIC. While for various reasons it is not possible to cover the entire spectrum of USG arrangements, it could be useful to cover aspects of those mentioned above in an attempt to create an understanding of the complexities involved in creating and operating such on a practical basis whether intra-party or inter-party, on a bilateral, trilateral, regional, or multilateral forum.

Nuclear Risk Reduction Center

The original purpose of the US NRRC was to reduce the possibility of nuclear conflict between the US and the former Soviet Union as a result of accident, miscalculation, or misunderstanding by establishing a high-speed direct communications link forth exchange of messages relating to CBMs and arms control accords between the two nations. While that purpose continues, the NRRC's role has expanded into the multilateral arms control arena. Now the NRRC is responsible for sending and receiving notifications under several existing and future bilateral and multilateral arms control agreements. In the US this translates to a tremendous investment in resources — people and equipment — and, in some agreements, is linked to centers in other countries on a 24-hour basis.

The concept of a NRRC was first proposed by three US senators as early as 1982. After some years of discussion, the concept evolved from a broad confidence-building initiative with multiple objectives to a communications system with specific and clearly defined responsibilities operating within the Department of State. At the 1985 Geneva Summit, the question of establishing a NRRC was referred to experts. Formal negotiations occurred in 1986 and 1987, and the US-Soviet NRRC agreement was signed in September 1987 for the exchange of notifications concerning ballistic missile launches, as well as the transmission of goodwill notifications and the provision for notifications under future arms control agreements. Moreover, the NRRC Agreement permits the sides to modify notifications as the need arises, with the understanding that all modifications are agreed upon by the two parties. The Washington and Moscow NRRCs began transmitting official messages on April 1, 1988. Since their inception, well over 9000 messages have been exchanged. These messages have involved treaties such as the Intermediate-range Nuclear Forces (INF), the Strategic Ballistic Missile Launch Notification Agreement of May 1988, the Major Strategic Exercises Agreement of 1989, the Nuclear Testing Treaty of 1990, the Confidence and Security Building Measures Agreement, the Conventional Forces in Europe Treaty, and the START Agreement. It is expected that the NRRC will be used for the communications requirements for exchanging notifications and reports associated with the Comprehensive Test Ban Treaty and in support of the Chemical Weapons Convention.

A successful bilateral, regional, or other arrangement for implementation on the Peninsula would require a tool to enhance dialogue — likely in ways not used before — in carrying out the various measures called for in CBMs or arms control regimes. In preparing for implementation, the agreement to formally establish a mechanism such as a NRRC would likely have to codify regularly scheduled meetings between the experts operating such a system. For example, the 1987 NRRC Agreement calls for no less than one policy level meeting per year between the staffs of the US and Moscow NRRCs. However, during the initial set-up phases of the NRRC operation, several meetings would likely be needed. The Washington an Moscow NRRCs hold annual talks on NRRC equipment and communications-related issues. In similar fashion, multilateral communications issues are addressed in periodic meetings conducted under the CSBM Vienna Document auspices. At the heart of a CBM or arms control regime, there would likely be visits or inspections for verification that, when initiated, must be done within agreed time constraints. Respective NRRC-like arrangements would ensure the timely receipt and dissemination of notifications of such activities to enhance the prospects of parties meeting their obligations.

On-Site Inspection Agency

In these times, as earlier, the motto of OSIA, "Trust and Verify," is an apt one, according to John Holum, the current Director of ACDA. "In this pair, it is the second element that leads to the first, strict enforcement is what makes arms control agreements work. And working arms control agreements can in turn foster the trust and relative openness that permit further progress."

OSIA is a joint-service organization responsible for implementing inspections, escort and monitoring requirements under the verification provisions of US international arms control treaties and CBMs. The Agency was formed in January 1988 to meet the on-site verification requirements of the INF Treaty and given a recognized need to realize the advantages of conducting inspections on a bilatieral basis. At the time, the mission of the agency, which consists of military and civilian staff, was cited to be the implementation of the on-site inspection provisions of the INF Treaty. The responsibilities had to cover an inspection mission related to inspections outside the US. This included the requirement, training, equipping and managing of US teams inspecting treaty-related facilities in the then USSR and Eastern Europe. There was also the escort mission which included the coordination of all activities associated with the conduct of inspections by the USSR on US territory or at US operated facilities in Europe. Both missions —inspection and escort — remain with OSIA today.

Since its original inception, the mission of OSIA has expanded well beyond activities associated with INF. Today, the agency is involved in aspects of various agreements — from those involving weapons of mass destruction to the Open Skies Treaty. As an example of the flexibility of such an organization, OSIA recently supported negotiations associated with a bilateral, confidence-building, verification experiment with Russia — an updated Phase II of the 1989 Wyoming Memorandum of Understanding. Phase II consisted of a detailed data exchange related to chemical weapons activities and a series of inspections with appropriate notifications. While not originally envisioned to tackle verification and implementation efforts associated with a chemicals weapons agreement, OSIA was able to take on such a mission. When an existing infrastructure is in place and although the inclination might be to

create something totally new for different agreements, a case can be made that it is much more cost-effective and prudent to slightly expand the charter of an existing, experienced entity. Thus, OSIA as a component of an existing infrastructure, conducted the inspections required under Phase II and escorted Russian inspectors during the conduct of inspections at US facilities.

Since its inception, the US has been careful to adhere to a carefully prescribed purpose of OSIA. The agency is used for data collection and confirmation (through exercising US rights in inspections and monitoring, sometimes continuous monitoring) and for escorting. It does not set policy, but rather provides information to those who do. This is intentional to separate operational matters from policy matters. OSIA prepares reports of its findings and the US interagency process uses this information in support of its efforts to decide whether treaty partners are complying with treaty provisions.

To conduct its business, OSIA requires a large permanent staff and a continuously trained pool of qualified inspectors and linguists. The size of an organization like OSIA applied on a bilateral, regional or other basis, would depend upon the scope of the verification regime associated with an agreement. However, as cited earlier, it would be extremely difficult to gain confidence without some measure of verification. While national technical means might be sufficient in some cases, an arrangement that establishes a "hands-on" approach would prove invaluable. Whether the Peninsula uses an OSIA-like arrangement, or a multilateral-like arrangement such as the IAEA or like the forthcoming CWC technical inspectorate, it will be important to codify such an arrangement. Of course, the shape of the institutional arrangement will depend on the number of parties involved and the scope of the inspection, monitoring, and verification aims of the particular agreement.

Office of National Authority

The Office of National Authority (ONA) concept grew out of the Article VII CWC provisions that require each State Party to "designate or establish a National Authority to serve as the national focal point for effective liaison with the Organization and other States Parties." The USG in effect will be able to use its existing interagency infrastructure to serve the role of the National Authority. However, it was recognized that there would likely be a need for a day-to-day interaction with the international Organization for the Prohibition of Chemical Weapons located in The Hague. As such, the USG is in the process of forming an ONA. On a broad level, the ONA would serve as an executive secretariat of the National Authority and coordinated and facilitate CWC administrative and logistical matters related to implementation. The US deems the ONA as extremely important because, unlike other agreements, the CWC requires a broad interface with non-defense facilities in the civilian sector. Some of the more specific functions of the ONA could include coordinating, compiling, and reviewing declaration data; receiving inspection notifications from the OPCW and passing them to the NRRC for appropriate dissemination; receiving requests for information and assistance from the OPCW; transmitting US responses and requests for challenge inspections; coordinating with appropriate USG agencies to obtain, where required, administrative warrants for inspections; and arranging for on-site escort for CWC inspection teams, coordinating with OSIA and with agencies responsible for the facility to be inspected, as required.

How could an ONA apply in a regional context? There is not a specific answer just yet, or certainly not without having an agreement and understanding the scope of that agreement. However, internally parties to an agreement might require an ONA-like organization to deal with the day-to-day requirements of an agreement. As cited previously, such an arrangement can prove valuable as an intra-party tool acting synergistically with an interagency infrastructure or could have broader uses. Its value to implementation and verification would be great. Its interaction with each party or with a single authority on a regional or multilateral basis or both could be arranged, consistent with the agreement on hand.

Arms Control and Disarmament Agency

ACDA is a national security agency that works in collaboration with the Department of State and with other agency of the USG - playing a crucial role in national security policy development and implementation. The Director acts as principal adviser to the President and the Secretary of State on arms control, nonproliferation, and disarmament. ACDA is involved in the process of arms control from inception throughout implementation - leading US arms control delegations during direct negotiations and during meetings of Commissions or other bodies responsible for implementation. Its responsibilities also includes participating in the process of controlling exports; coordinating and reporting on research on arms control, nonproliferation, and disarmament; providing the Principal Deputy Director of OSIA; and in terms of the Peninsula, contributes to US regional arms control and nonproliferation efforts. The Agency attempts to apply arms control solutions to regional problems and strongly believes that confidence building and nonproliferation measures in the Korean Peninsula can help to reduce tensions in the context of efforts to settle long-standing regional disputes.

To a great extent, ACDA is a key component of the US infrastructure that conceptualizes, develops, negotiates, and implements arms control-related options. This infrastructure must also ensure that there is technological support and human support to carry out the mandates of arms control. So, on the one had, ACDA is involved in policy while on the other, it too must pay attention to more operational concerns such as participating in a process to pursue technology that can most effectively and efficiently contribute to the accomplishment of arms control and nonproliferation security goals. The agency's involvement with policy and some operational matters allows it to, among other things, champion the inclusion of verification concerns during the process of arms control. The US Congress requires ACDA to assess whether arms control agreements can be verified. Further, the agency also certifies compliance, or reports noncompliance, to the US Congress. It should be noted that ACDA's compliance reports are reviewed closely within the USG. The reports serve to help advise the President and the Congress of how the US and its treaty partners are doing relative to compliance. In turn, the President and Congress are able to decide the viability of the agreements and, in some cases, whether certain sanctions should be imposed.

An institutional arrangement on the Peninsula that includes an ACDA-like agency could be important on a bilateral, regional or other basis to champion implementation, verification and compliance-related matters of agreements. ACDA might ask a question related to verification such as, does the agreement allow for technology that could detect militarily significant violations? A question on compliance might simply be, does a certain provision considered for inclusion in the agreement allow for prac-

tical compliance and how much inspection time is required to obtain enough data necessary to judge compliance? A question on implementation could be, which parties to the agreement are required to cover the cost of inspections and what formula is used to compute verification costs?

Thoughts Related to Regional Arrangements for Verification

ACDA believes, and its Director John Holum has recently stated, that in the implementation of all arms control agreements, rigorous verification is indispensable. However, evaluating verifiability is a demanding legal requirement and also a matter of nuance judgment. In the US, the process begins with a technical comparison of our information-gathering capabilities against the constraints in an agreement. Then a decision is made whether this level of verifiability is good enough — weighing such factors as the past compliance record of the parties, the incentives they might have to cheat, and the degree to which undetected cheating could pose a national security risk. If speaking of "effective verification," the policy standard is necessarily rigorous. It is necessary to retain the ability to detect militarily significant violations, with high confidence, in sufficient time to respond effectively with defense adjustments or other responses, as needed.

Therefore, in exploring regional arrangements, a party should consider whether it is desirable to have an independent ACDA-like organization that could ask the critical questions. Depending upon the agreement at hand, the verification objectives could be rigorous or less so. For example, one of the conditions of the Joint Declaration on Non-Nuclearization of the Korean Peninsula was to establish and operated the South-North Joint Nuclear Control Committee. This Committee would probably be analogous to the multilateral START JCIC mentioned earlier. It would seem advisable that an intra-party infrastructure, such as ACDA and the entire US interagency, would be necessary to prepare and submit proposals as to the extent of the verification regime. While the Joint Declaration acknowledged that inspections would be conducted, the vigorousness of the verification regime was not defined. That is, how intrusive would the inspections be? In what order would the inspections be conducted? What are the notification requirements? What are the confidentiality rules? What are the total number of inspections? How many inspectors per inspection team? How long will an inspection last? Who will pay for the inspections? Theses and many more questions would have to be addressed indigenously and then proposed to the next level in order to reach agreement on modalities. In the US, along with ACDA and other principal agencies, the infrastructure to answer such questions would include inputs from experts found in the NRRC and OSIA. The outcome would be a carefully mandate for the negotiating team to discuss such questions and answers in an agreed upon forum with another party or parties during the actual conduct of negotiations.

Any arrangements made to advance the prospects of arms control should not ignore other practical considerations. In establishing an organization such as ACDA, it is important to have the support of the head of government and equally important, that such an organization is recognized and accepted by potential treaty partners as authorized to speak on behalf of the government. Given that recognition and acceptance, ACDA has had a long history of successfully engaging in the process of arms control as evidenced by the number of agreements with which it has been involved.

However, ACDA has also recognized the practical importance of informal consultations and expert-level talks in building confidence and enhancing dialogue. Sometimes such informal settings can be arranged so that officials can talk or essentially "brain-storm" ideas with a view towards introducing the most promising ideas during some future, formal discussion, Conferences and workshops are examples of where people can come together either formally or informally without attribution. An infrastructure should not be adverse to sponsoring such gatherings. For example, if formal talks on a particular issue were stalled between the South and North, an informal mechanism could be used, barring no compelling political or diplomatic reasons to deny such. For example, on a verification issue, technicians could conference in a neutral location to discuss matters of mutual interest such as the purely technical issues of how to do verification. Such dialogue would be purely technical and not attributed to any particular party - in fact, the parties could be gamed as notional. While the benefits might be immediately apparent, such informal contracts could open the door for more formal, broader dialogue. A reminder of this is what began to unfold between the US and USSR when, for example, in INF there were military-to-military talks and visits to each other's country and facilities in an unprecedented way.

A Closing Note
ACDA Director Holum also recently stated that "to neglect the implementation and verification of arms control agreements would be folly. Assuming that such agreements will take care of themselves is a bit like thinking you have fed a hungry man by giving him a menu." Institutional arrangements, whether local or global, must take into account the demands of implementation and verification. Such arrangements must also consider what works best practically in terms of getting the other party or parties to the negotiating table. Consideration must be given to such an infrastructure now so to be ready when the region advances beyond relatively low-risk methods to promote confidence to broader, more encompassing measures associated with CBMs and arms control regimes.

SYNERGIES IN A COMPREHENSIVE NUCLEAR NON-PROLIFERATION REGIME

David Mutimer

With the recent decision to extend the Nuclear Non-Proliferation Treaty indefinitely, the nuclear non-proliferation regime stands at the cusp of substantial change. The NPT is widely acknowledged as the heart, not only of the nuclear nonproliferation regime, but of the wider efforts to control the proliferation of weapons and military technologies of all kinds. Most recent attention, both scholarly and policy, to problems of nuclear nonproliferation has been focussed on the extension decision — and with good reason. However, it is necessary now to look beyond the extension conference, and think about how the proliferation control agenda can be advanced in the altered context of the post-extension world. This paper is part of a project that was launched with the post-NPT extension environment in mind, and is driven by the questions of how can we advance the nonproliferation regime after an extension of the NPT.[1]

The fact of the extension process has provided impetus for the development of a more comprehensive nuclear nonproliferation regime. To begin with, the negotiation of a Comprehensive Test Ban Treaty (CTBT) has come to be seen as an important element in the Nuclear Weapons' States (NWS) fulfilling their obligations under Article VI of the NPT "to pursue negotiations in good faith effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament". (NPT-§VI) Thus, once the United States removed its long-standing objection to a CTBT, the impending Review and Extension Conference provided a spur to the rapid negotiation of a test ban — a process presently underway in the Conference on Disarmament (CD) in Geneva. US President Clinton, in addition to announcing support for a CTBT called, at his 1993 address to the United Nations General Assembly, for a convention banning the production of new fissile material for nuclear weapons (a so-called Cutoff Convention).[2]

While the addition of a CTBT and Cutoff Convention to a renewed NPT would not create a comprehensive nuclear nonproliferation regime, it would certainly pro-

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1   Presented to the 1995 ROK-Canada Workshop, Seoul, Korea, 7 June 1995. This paper is drawn from a lager study, "Towards a More Comprehensive Nuclear Non-Proliferation Regime: A Tri-regional Perspective," presently begin prepared by the author and Bon-Hak Koo, Sung-Tack Shin, and Roland Reimers for the Verification Research Programme of the Canadian Department of Foreign Affairs and International Trade.

2   In the companion paper (Chapter 9) by my Korean colleagues, Sung-Tack Shin and Bon Hak Koo, they review the present state of the development process of the three regimes, and identify their particular contributions to the prospective, comprehensive effort.

vide a solid basis for such a regime. We are thus concerned with assuring the viability and effectiveness of these three regimes, and in seeing their development take the path most conducive to subsequent growth towards a coherent, and comprehensive nuclear non-proliferation regime.

Throughout the history of efforts at arms control in general, and nuclear arms control in particular, verification has had a central role to play. Questions of adequate verification are vital to the political viability of arms control agreements. States will not become party to treaties which have verification requirements which they consider to be inadequate.[3] Thus the verification components of the three treaties will be crucial to their successful negotiation, implementation and effectiveness. In addition, verification schemes are, in general, the most costly feature of an arms control agreement. In this time of budgetary restraint, verification packages must not only be effective but cost effective. In this paper I will consider the relationship among the verification regimes for an extended NPT, a CTBT and a Fissile Material Cutoff. I will ask what potential synergies there are among these three regimes, and how they might best be exploited to produce the most comprehensive, coherent and stable nuclear nonproliferation regime possible.

There are three levels at which interaction among the three treaties under consideration can support the goal of nuclear non-proliferation:

1. **Treaty Synergies:** Each of these three treaties aims to control a different aspect of the nuclear proliferation problem, and thus taken together, they can support one another. For example, the NPT encodes a normative commitment not to seek nuclear weapons. A state will be more willing to make such a commitment to the degree that it can be certain that its neighbours and potential enemies will also keep that same commitment. Functioning CTBT and Cutoff conventions can serve to provide those assurances, first by assuring that a state will be unable to conduct an undetected test, secondly by assuring that the materials to construct nuclear weapons will be very difficult for these states to obtain.

2. **Technical Synergies:** In order for these treaties to provide the assurances they are designed to provide they must be effectively verified. It is possible that the techniques and technologies employed to verify one treaty can be usefully applied to the verification of others, and that the verification practices applied to one treaty will have positive synergistic effects on other verification regimes.

3. **Administrative Synergies:** While it is important to recognise the technical relationships among the verification regimes, it may also prove useful to combine verification regimes' administration. For instance, the NPT is presently verified by a system of on site inspections or safeguards and the

3   The nature of 'adequate' verification is, however, variable. The BTWC, for example, was negotiated with no verification requirements. At the time of its signing, however, most states did not consider biological weapons to be a threat, and so a declaratory treaty was sufficient. No verification was, in the circumstances, 'adequate verification'. This has since ceased to be the case, and so the states party to the BTWC are exploring ways of adding verification measures to the treaty.

verification requirements for a Cutoff of the production of fissile material for nuclear weapons' purposes entails only the extension of full scope safeguards to all parties to such a convention. It thus makes little sense to develop a new administrative structure to oversee a verification regime identical to that already managed by the IAEA.

A   TREATY SYNERGIES

The three measures all aim to promote, in the words of the present CTBT Rolling Text: "non-proliferation of nuclear weapons in all its aspects". The three measures can thus be presumed to support one another. The particular means by which they provide support to one another may suggest the location of verification synergies among the three measures. Table 1 explores the way in which a functioning, verifiable treaty in each area would contribute to the other two.

Taken together, then, the three treaties can be seen to form a relatively integrated package contributing to a comprehensive nuclear non-proliferation regime. The relationship can be represented graphically as in Figure 1.
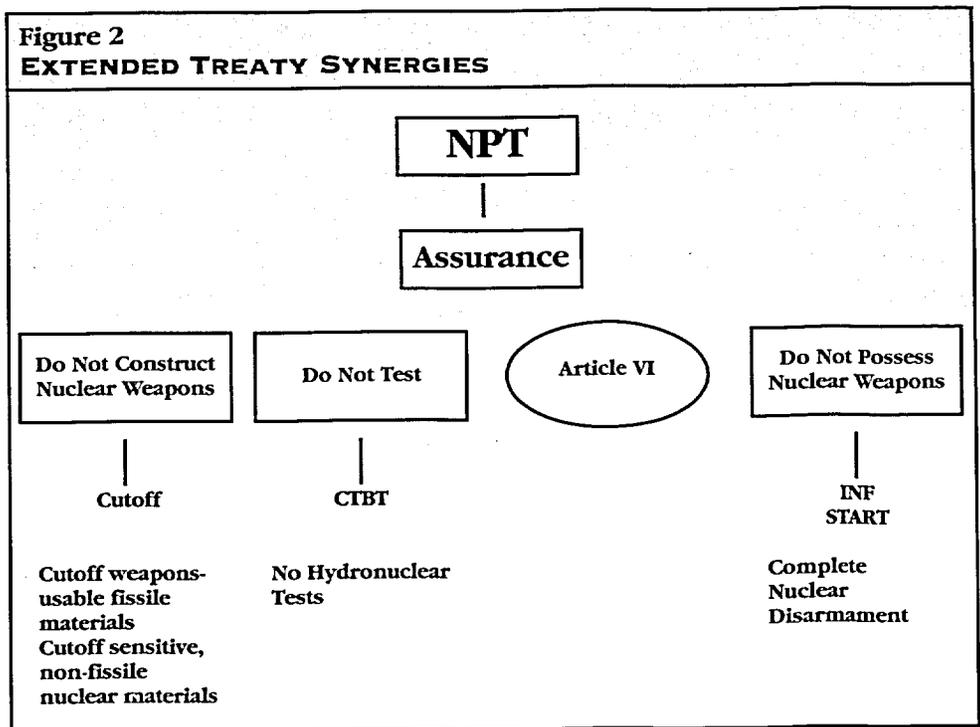
Figure 1
TREATY SYNERGIES
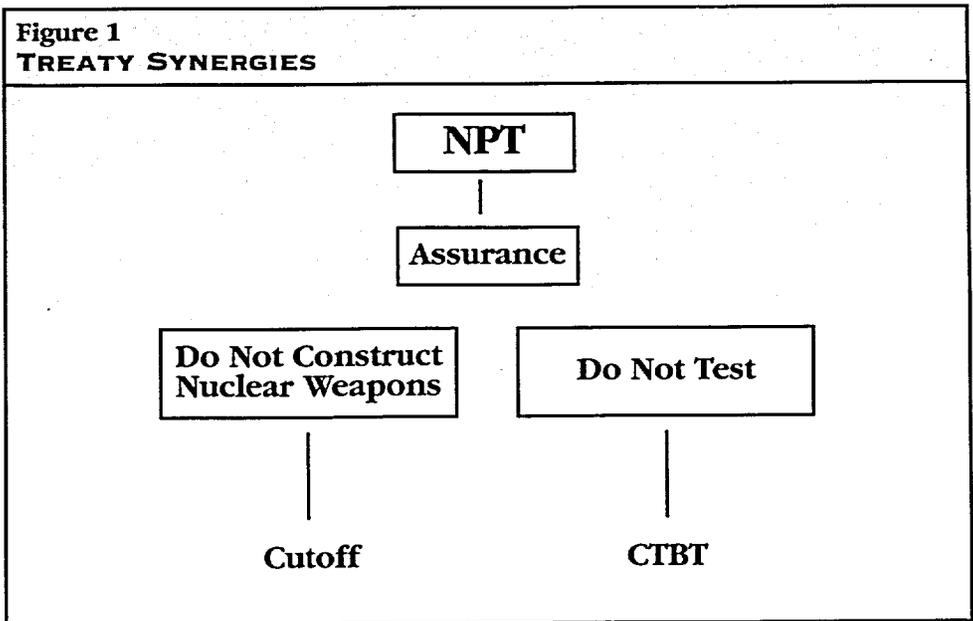
The Cutoff and CTBT both contribute to the boxes labelled "Do Not Test" and "Do Not Construct Nuclear Weapons", but they do not provide comprehensive prohibitions. On the testing side, a CTBT which excludes hydronuclear testing from its ambit will not therefore cover the full range of nuclear tests. Similarly, a Cutoff Convention as presently envisaged, will exclude weapons-usable fissile material, and other, non-fissile, sensitive materials. This observation suggests important ways in which the comprehensive nuclear non-proliferation regime can be developed — the CTBT must be made truly comprehensive, whether or not this is achieved in the

Table 1
TREATY SYNERGIES: NPT, CTBT AND CUTOFF (PRODUCTION)

	NPT	CTBT	Cutoff (Production)
NPT supports...		The NPT provides a central function in support of the CTBT by enshrining a normative commitment within international society to the elimination of nuclear weapons, and the specific commitment by states not to acquire the weapons. Insofar as testing is aimed at the development of nuclear weapons, the NPT provides the normative support to the CTBT's goals.	The NPT provides the same normative support for a Cutoff as it does for the CTBT. The NPT also provides a basis on which to build a Cutoff (Production), as a non-discriminatory Cutoff Convention extends the NPT's commitment not to produce fissile materials for weapons purposes to the NWSs.
CTBT supports...	A CTBT guarantees that a new NWS would not have tested a nuclear weapon. As such, it supports the NPT commitment not to obtain a nuclear weapon, although it does not assure that it has not, as nuclear weapons programmes do not require testing. However, lack of a test narrows the field of possibilities: any device that is obtained would likely be relatively crude if it was developed indigenously, or it would be stolen.		A CTBT provides no direct support to a Cutoff convention
Cutoff (Production) supports...	A Cutoff provides the same support for the NPT. It restricts the ability of a state desiring nuclear weapons to acquire the necessary components.	A Cutoff would provide substantive support to a CTBT. In order to test, it is necessary to have the nuclear material with which to test. It thus provides support for the CTBT in two ways. First of all, it makes it that much more difficult to acquire the fissile material needed for a test in the first place, and secondly it makes the test itself that much more costly because of the increased difficulty in acquiring fissile material for nuclear weapons.	

current CTBT negotiations, and the Cutoff must be extended to include all weapons-usable fissile material and possibly other sensitive nuclear materials.

In order to be fully comprehensive, however, the nuclear non-proliferation regime must take more seriously the implications of the NPT's Article VI. There needs to be a third intermediary box added to Figure 1, which is labelled "Do Not Possess Nuclear Weapons". As with the first figure, the regimes in place or fore-seen can be included to indicate the instrumentality of a comprehensive regime. Including the commitment of Article VI to nuclear disarmament means drawing the nuclear disarmament treaties (INF and START) into the ambit of the nuclear non-proliferation regime. Clearly, just as the other treaties suggest development in the directions indicated above, the inclusion of the disarmament process in terms of Article VI suggests that the ultimate development along this track would be com-plete nuclear disarmament. This can all be represented graphically as in Figure 2, in which the potential lines of development are included underneath the existing or prospective agreements.

Figure 2
EXTENDED TREATY SYNERGIES

NPT

Assurance

| Do Not Construct Nuclear Weapons | Do Not Test | Article VI | Do Not Possess Nuclear Weapons |

| Cutoff | CTBT | | INF START |

| Cutoff weapons-usable fissile materials Cutoff sensitive, non-fissile nuclear materials | No Hydronuclear Tests | | Complete Nuclear Disarmament |

The NPT, CTBT and Cutoff Convention thus provide the foundation for a com-prehensive regime. By considering their mutual relation in this fashion, we are able to point in the direction for future development of that regime.

- **Ensure a CTBT is truly comprehensive.** In the terms Canada has adopted: banning tests in all environments for all times. This includes very low yield tests and the laboratories in which they are carried out. Even if this cannot be

achieved in the present round of CTBT negotiations, it will need to be part of the future agenda.

- **Extend a Cutoff to include stockpiles.** The likely outcome of the present negotiations is for a Cutoff (Production), thus work must continue to develop a Cutoff (Stockpile). This will require the develop means for safeguarded storage and disposal of the fissile materials already produced, but removed from nuclear weapons.

- **Extend a Cutoff to include all weapons usable fissile materials** — Highly Enriched Uranium, and Plutonium — and then to other non-fissile, sensitive nuclear materials, such as Tritium.

- **Explicitly incorporate the nuclear arms control and disarmament process in the non-proliferation agenda.** This will involve a number of steps, but the most immediately important will be drawing all NWS into the disarmament process, and considering "in good faith" the possibilities for comprehensive nuclear disarmament.

B   TECHNICAL AND ADMINISTRATIVE SYNERGIES

One useful method of discovering the location of potential technical and administrative synergies is to develop a generic model of the verification process. The steps through which a verification regime will lead, in an attempt to identify and resolve a potential violation of the obligations being verified (referred to below as an anomaly), are largely independent of the obligations in question or the technologies of verification. We can thus develop model of this process which is not regime specific. By then overlaying this model on the regimes in question, the location for potential technical and administrative synergies will be revealed. The following is a 10 step model of the verification process.

Generic Model of the Verification Process[4]

Step 1: *Detection of an anomaly*

The first step in any verification sequence is the detection of an anomaly in the first line of monitoring, whatever that may be. In the table below, the likely general forms which anomalies can take in the three regimes is outlined.

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4   Derived from a 'notional flow chart' of CTBT verification, F.R. Cleminson, "A CTBT Verification Package", in Steve Mataija, ed., *Non-Proliferation and Multilateral Verification: The Comprehensive Test Ban Treaty* (CTBT), (Toronto: YCISS, 1994), 132-35.

Step 2: *Check against other data sources*

Most verification systems involve more than one verification technique or technology. If an anomaly is detected in one, the next move will be to examine the other sources of information for corroboration or contradiction.

Step 3: *Initial Determination of the anomaly*

Having examined the data available from the full menu of choices for any verification regime, the competent authority must make an initial determination. This determination will be, in essence, whether the event is still an anomaly, having been subjected to the full range of data sources. There are thus two choices:

1. Anomaly warranting further investigation
2. Explicable Anomaly

If 1: Go to step 4
If 2: End

Step 4: *Consult with party in question*

In the NPT Safeguards arrangement, once a problem is identified as such, the IAEA consults with the party in question in order to ascertain whether the state has a reasonable explanation for the anomaly. We can assume that any nuclear verification system will incorporate some consultation at this stage. Again, there are two choices:

1. Insufficient explanation
2. Sufficient explanation

If 1: Go to step 5
If 2: End

Step 5: *Directed Investigation (including OSI)*

The monitoring which serves as a basis for verification in any regime is, of necessity, a general and routine system. Once an anomaly is detected, however, a more directed investigation will be needed. For the NPT a special inspection can be requested, and for the CTBT it is anticipated that an on-site inspection of the suspicious site may be conducted. More generally, however, once an anomaly is detected which has no sufficient explanation from the party in question, a further round of investigation will be necessary, gathering new data which is related directly to the suspicious event, rather than as a general trigger mechanism.

Step 6: *Final Determination of the Anomaly*

Having conducted a directed investigation, the full collection of data is assessed by the competent agency, and a final determination of the event is made. As usual, there are two possible determinations:

1.   Apparent violation
2.   Permitted event

If 1:   Go to step 7
If 2:   End

There is a conceptual break at this point of the process. The first six steps are reasonably considered 'verification' in a narrow understanding of the term. The final four steps are political action taken following the discovery of a violation. They might thus well be termed 'compliance enforcement'.

Step 7: *Executive Council Action*

Once a violation has been determined, the first step in taking redress is for the established executive body of the treaty or regime to take remedial action. The most likely remedial action would be suspension of the state from the practices of the regime.

Step 8: *State parties informed*

A violation should also be reported to the other members of the regime. In a self-help system, states reserve the right to act individually, rather than relying on collective action.

Step 9: *State-level action*

Members can adjust their diplomatic relations with the state according to the information about the apparent violation. This step can range from protest, through sanctions on cooperative programmes and trade, to the ending of diplomatic relations.

Step 10: *Collective action*

The NPT and the CTBT Rolling Text foresee the possibility of action being taken ultimately at the level of the Security Council of the United Nations. Such collective action is the final step in the verification and compliance monitoring chain, as it may step outside the bounds of the membership of the regime in question.

These ten steps identify a verification process removed from the particularities of any treaty's obligations and of the system in place to achieve verification. In order to discover the location of potential synergies among actual regimes, it is necessary to fill this set of blanks with those particularities. Table 2 shows the ten steps of the verification model, for each of the three regimes we are examining.

Assumed Means of Verification

In order to build Table 2, it was necessary to make certain assumptions about the nature of the verification system which would be in place for the two regimes not yet negotiated, and to specify the likely changes to the IAEA's verification of the NPT. The verification system we have assumed for each is as follows:

NPT: The assumption is that the verification system remains largely unchanged. That is, it is a safeguards arrangement, applied by the IAEA, constructed with the states party, in accordance with INFCIRC/153. We are also assuming that the right of special inspection will be exercised in future.[5]

CTBT: The verification system for the CTBT is based on the Rolling Text as of September 13, 1994. While that text is full of square brackets, it does list the elements of a verification system, consonant with the 10 step model developed above:

a   An international monitoring system, based on:

- Seismological monitoring
- Radionuclide monitoring
- Hydroacoustic monitoring
- Satellite monitoring
- Optical monitoring, and
- EMP monitoring.

b   Consultation and clarification

c   On-site inspections

Table 2 is based on the further assumption that there will be some form of Organization (as discussed in the Rolling Text), which will be responsible for making technical determinations on verification issues, and which is not co-extensive with the full collection of states party.

Cutoff: Table 2 organises the verification systems outlined the in the previous chapter into the ten steps outlined above. There are two quite different possible Cutoff Conventions. The first would forbid only the future production of fissile material for weapons' purposes. This I label a Cutoff (Production). The second would include not only future production, but also the verifiable declaration of past production, or in other words, the stockpile of fissile material for weapons' purposes states presently hold. This I label a Cutoff (Stockpile). The verification requirements of each are quite different. For a Cutoff (Production), a verification regime would require the extension of full-scope safeguards to states producing fissile materials for weapons purposes (ie the Nuclear Weapon States Party to the NPT and the non-Party threshold states).[6] For a Cutoff

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5   For a detailed account of the NPT safeguarding system see Adolf von Baekman, "The Treaty on the Non-Proliferation of Nuclear Weapons (NPT)", in Serge Sur, ed., *Verification of Current Disarmament and Arms Limitation Agreements: Ways, Means and Practices*, (Aldershot: Dartmouth for UNIDIR, 1991), 167-89.

6   Gronlund and Wright, *Beyond Safeguards*, (Nerw York: Union of Concerned Scienties, 1994), 47 argue that the creation of a fissile material Cutoff, of the kind presently under discussion, would involve extending to the NWS the controls that are presently in place for NNWS. That is, as NNWS are permitted to produce fissile material, but not to produce it for nuclear weapons under the terms of the NPT, a Cutoff imposes identical restrictions on the future production of the NWS. Hence, the verification requirements are identical.

(Stockpile), some means of verifying the declarations of past production would be necessary. Steve Fetter has argued that a past-production declaration could be verified using the following three verification methodologies:[7]

- Cross-check of records;
- Radionuclide measurement for Pu Production, and;
- Isotopic composition and dating of tails for HEU production.

Because of the distinct differences between the verification regimes of the two forms of Cutoff Convention, I have included two separate columns for the Cutoff in Table 2.

The goal of this process is to determine where technical or administrative synergies might be realised. Technical synergy might be found in places where either the information supplied by one verification system can assist in resolving anomalies in another, or where the techniques of verification are sufficiently similar that they can be used in two or more systems. Administrative synergy may be found in places where both the functions **and necessary expertise** are largely duplicated. Where functions are duplicated, but expertise is not, there a lesser likelihood of administrative synergy, although it is still possible.

Location of Synergies

Table 2 provides a framework within which technical synergies can be located, by providing a step-by-step comparison of the verification processes. The following potential synergies are readily apparent:

Step 1:   It is likely that the monitoring for either NPT or the Cutoff (Production) would provide indication of a violation of the other treaty. The diversion of nuclear material to an enrichment or reprocessing plant might be discovered by the IAEA safeguards. As the NPT outlaws only diversion to explosive purposes, such a diversion is not necessarily a violation of the NPT, but would constitute a violation of the Cutoff Convention. Similarly, the discovery of fissile material production would suggest that there is a diversion in a country applying full scope safeguards.

Radionuclide monitoring for the CTBT has potential overlap with the IAEA, which is developing radionuclide analysis capabilities for its safeguard programme.

Step 2:   The greater the information available to monitors, the more likely they are to make an accurate determination. Thus, the collected data for the verification regimes of all three instruments should be available to the monitors of each at step 2.

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7   For a discussion of these three methodologies and a possible Cutoff convention which includes limitations on Stockpiles, see Steve Fetter, "Nuclear Archaeology: Verifying Declarations of Fissile Material Production", *Science & Global Security*, 3 (3-4) 1993, 237-259.

Table 2
TEN STEP MODEL FOR NPT, CTBT AND CUTOFF VERIFICATION

| | NPT | CTBT | Cutoff | |
			Stockpile	Production
		V E R I F I C A T I O N S T A G E S		
Step 1	➤ Difference between shipper and receiver ➤ Uncertainty in MUF figures ➤ Differences between operator and inspector measurements	➤ There are six possible anomaly detections, based on five of the agreed verification technologies in the CTBT Rolling Text. (See detail below)	➤ Discrepancy between the production record and the declaration ➤ Discrepancy between declaration of Pu and Tritium and radionuclide level in reactor ➤ Discrepancy between declaration of HEU/LEU production and the isotopic ratio or age of the tails.	➤ Difference between shipper and receiver ➤ Uncertainty in MUF figures ➤ Differences between operator and inspector measurements
Step 2	➤ Any anomaly detected during an inspection or during the subsequent evaluation of inspection results is investigated until resolved.	➤ For the detection of any of the six, a check would need to be made of all the others, including Data Exchange (incapable of anomaly detection) ➤ To determine perpetrator, discovering unaccounted fissile material would be vital	➤ For detection of a record-keeping anomaly, check the physical record ➤ For detection of a physical anomaly, check records for inconsistencies ➤ For detection of an apparent undeclared production facility, check intelligence sources, including IAEA records	➤ Any anomaly would be checked against IAEA records.
Step 3	➤ Determination by the Director-General that IAEA is unable to verify that an SQ has not been diverted — reports to Board	➤ Determination either that there was a nuclear explosion, that the event was inexplicable, or that the event was not a nuclear explosion	➤ Determination that the secretariat cannot verify that undeclared fissile material has not been produced	➤ Determination that the secretariat cannot verify that Pu and/or HEU has not been produced beyond declared levels
Step 4	➤ request explanation of state in question	➤ request explanation of state in question	➤ request explanation of state in question	➤ request explanation of state in question
Step 5	➤ IAEA Special inspection	➤ OSI of the location of the anomaly	➤ Inspection outside of the monitored area	➤ Inspection of possible storage sites
Step 6	➤ Irresolvable imbalance in a materials account ➤ Discovery of unaccounted material outside the MBA ➤ Determination by the Director-General that IAEA is unable to verify that an SQ has not been diverted — reports to Board	➤ Determination by someone that there has been a nuclear test ➤ Discovery of permissible activity. (Because location will be relatively easy to determine by seismology, an OSI should resolve the anomaly satisfactorily).	➤ Irresolvable anomaly (inspection found no fissile material, but also no convincing evidence to explain the anomaly) ➤ Discovery of undeclared fissile material	➤ Irresolvable anomaly (inspection found no fissile material, but also no convincing evidence to explain the anomaly) ➤ Discovery of illicit production of HEU or Pu

			Cutoff	
	NPT	**CTBT**	**Stockpile**	**Production**
COMPLIANCE ENFORCEMENT STAGES				
Step 7	‣ Requests clarification from the Country in question ‣ May suspend Member from the practices of the IAEA	‣ Request by the Conference of States Party (possibly executive council) for clarification from the apparent violator ‣ May suspend Member from the practices of the CTBT (RT-A1)	‣ Request by the Proper authority for clarification from the apparent violator ‣ May suspend Member from the practices of the convention	‣ Request by the Proper authority for clarification from the apparent violator ‣ May suspend Member from the practices of the convention
Step 8	‣ Reports to all IAEA members and the UN Security Council	‣ CSP recommends measures to States party in accordance with International law (RT-A1)	‣ Report to the members of the convention	‣ Report to the members of the convention
Step 9	‣ Likely suspension of all international cooperation on the peaceful uses of nuclear energy	‣ Likely suspension of all international cooperation on the peaceful uses of nuclear energy	‣ Likely suspension of all international cooperation on the peaceful uses of nuclear energy	‣ Likely suspension of all international cooperation on the peaceful uses of nuclear energy
Step 10	‣ Possible action by UNSC as a breach of international peace and security	‣ CSP brings matter to the attention of UNGA and/or UNSC (RT-A1)	‣ Report to the UNSC	‣ Report to the UNSC

Step 1 for CTBT:
Because of the number of technologies to be employed in the initial layer of the IMS for a CTBT, we have broken out the anomaly detection for CTBT by technology. This list constitutes a single cell of Table 2. For each technology, the verification technique is identified, and the required additional determination is identified.

A   **Seismic:** Detection of a seismic signal by the International Seismic Monitoring Network which cannot be identified as an earthquake. Earthquake determination comes from the form of the seismic signal (relationship between body and surface waves) and the depth of the source.

• Need is to determine whether it was a nuclear explosion, rather than a chemical explosion, and who conducted it. Such a determination can be achieved by: seismic identification; checking for vented radionuclides; checking for optical or EMP record; and, checking a data exchange database (DED) for recorded chemical explosions. In order to discover the perpetrator, if the location does not answer the question, the need is to discover possible sources of fissile material   .

B   **Radionuclide:** Detection of airborne radionuclides.

• Need is to determine whether the release was caused by a nuclear test or by some nuclear accident (likely concerning a problem with a nuclear reactor). Such a determination can be achieved by: checking seismic, Hydroacoustic, optical and EMP records for any other indication of explosion. Also, cross-check DED for any recorded nuclear accident.

C   **Hydroacoustic:** Detection of the sound of a large explosion under the sea.

• Need is to determine whether it was a nuclear explosion, rather than a chemical explosion, and who conducted it. Such a determination can be achieved by: checking seismic record for any useful recordings (which can be used for identification); checking radionuclide, optical and EMP sensors for any other record of the event; and checking DED for record of chemical explosions. For identifying the perpetrator, determining source of possible fissile material will be crucial, as the location of a sea test would not help in identifying the perpetrator.

D   Optical: Detection of a flash in the atmosphere or outer-space.

  - Need is to determine whether it was a nuclear explosion, rather than a chemical explosion, and who conducted it. Such a determination can be achieved by: checking EMP detectors; for an atmospheric flash, by checking radionuclide detectors. For the perpetrator, determining source of possible fissile material will be crucial, as the location of an airborne or space borne test would not necessarily help in identifying the perpetrator

E   EMP: Detection of a sizeable Electro-Magnetic Pulse.

  - Need is to determine location and perpetrator of the explosion. Such a determination can be achieved by: checking optical detectors and radionuclide detectors. For the perpetrator, determining source of possible fissile material will be crucial, as the location of an airborne or space borne test would not necessarily help in identifying the perpetrator.

Step 3:   For most of the techniques of CTBT verification identified in Table 1, the identification of the perpetrator is the most difficult element of the determination process. Such a determination will be greatly facilitated by an identification of the fissile material used in the test. Clearly, the one possible location of such information will be with the NPT/Cutoff Safeguarding system.

Step 5:   Both the NPT and Cutoff (Production) might require inspections of undeclared facilities at Step 5. It is likely that the same locations would be investigated in each case (areas at which diverted nuclear material, or clandestine fissile material might be stored of used). It also seems clear that **both** forms of special inspection would require some form of intelligence gathering capacity, as it will be necessary to determine where to send a special inspection.

Step 6:   The determination an anomaly in either the NPT Safeguards or the Cutoff convention would seem to require similar expertise concerning the operation of nuclear facilities.

Steps 7-10: The compliance enforcement steps are nearly identical for all three regimes. Indeed, the likely action at step 9 is the suspension of nuclear cooperative activity in the case of a violation of any of these treaties. Similarly, the ultimate recourse for any of the three is to the UNSC.

Conclusions

The construction of a comprehensive nuclear non-proliferation regime, should it be achieved, will have been a long and piecemeal process. The addition of a Comprehensive Test Ban Treaty and a Fissile Materials Cutoff Convention will significantly advance that process, but will not complete it. Thus, in developing these new instruments, and in building links between them and with the NPT, potential synergies should be fully exploited, but the requirements for future expansion of the regime must be kept in mind. What guidance can this exploration of the relationships among the three instruments, at the level of treaty, technical and administrative synergies, provide to the process of regime development?

I found four specific conclusions concerning the treaty synergies among the three regimes, conclusions which provide guidance to their negotiation:

- **Ensure a CTBT is truly comprehensive.** In the terms Canada has adopted: banning tests in all environments for all times. This includes very low yield tests and the laboratories in which they are carried out. Even if this cannot be achieved in the present round of CTBT negotiations, it will need to be part of the future agenda.

The comprehensive nature of the CTBT is important for a number of reasons. As I found above, the contribution of the CTBT to the nuclear non-proliferation process is primarily political, rather than technical. The single greatest political obstacle to effective non-proliferation has been the discrimination between the treatment of the recognised nuclear powers and the rest. A CTBT which permits very low yield tests allows the advanced states — notably the United States — to continue testing, while forbidding it for others. Reproducing the discriminatory aspects of the non-proliferation regime in a CTBT will only hinder the development of an effective non-proliferation regime. In addition, low yield testing by nuclear states would be used to further the development of their arsenals, or in other words further **vertical** proliferation. The connection between horizontal and vertical proliferation is a second important political concern for the further development of the non-proliferation process, and leads to our second finding:

- **Explicitly incorporate the nuclear arms control and disarmament process in the non-proliferation agenda.** This will involve a number of steps, but the most immediately important will be drawing all NWS into the disarmament process, and considering "in good faith" the possibilities for comprehensive nuclear disarmament.

The present rounds of negotiation provide a context in which such a commitment can·be advanced. In particular, the Cutoff Convention can be developed in order to further the disarmament process:

- **Extend a Cutoff to include stockpiles.** The likely outcome of the present negotiations is for a Cutoff (Production), thus work must continue to develop a Cutoff (Stockpile). This will require the develop means for safeguarded storage and disposal of the fissile materials already produced, but removed from nuclear weapons.

Finally, the Cutoff Convention provides the location of a crucial later development of a comprehensive nuclear non-proliferation regime:

- **Extend a Cutoff to include all weapons usable fissile materials** — Highly Enriched Uranium, and Plutonium — and then to other non-fissile, sensitive nuclear materials, such as Tritium.

The extension of a Cutoff to include all weapons usable fissile materials would have three important effects. In terms of the traditional goals of non-proliferation,

it would greatly simplify the tasks of verification, as there would be no weapons usable material produced for legitimate purposes. Such an agreement would also substantially reduce the discriminatory differences between the nuclear and non-nuclear weapons states. Finally, because of these two effects, it would allow for the reduction if not elimination of export controls, which have been a primary political obstacle to effective nuclear non-proliferation.

The three instruments we are examining in this report would clearly contribute to the creation of a more comprehensive nuclear non-proliferation regime. At the level of treaty synergies, they are mutually reinforcing. What of the level of technical and administrative synergies?

Technically, the verification tasks for a Cutoff Convention are essentially identical to those for the NPT's safeguarding arrangements. Therefore:

- **The IAEA should be given the responsibility for verifying a Fissile Materials Cutoff**. Given the accumulated expertise and the administrative experience of the IAEA, there is no reasons to create any other organisational location for the verification of a Cutoff.

On the other hand, the verification tasks associated with the CTBT are distinct from those involved in the NPT and Cutoff, with the one exception of some overlap in radionuclide monitoring. Thus, there is not the same *prima facie* case for the merging of CTBT verification with that of the NPT and Cutoff. Nevertheless, we have identified two links between the CTBT and the NPT/Cutoff which suggest close ties be maintained between the IAEA and the organisation verifying the CTBT. The first is that the identification of the perpetrator of a clandestine nuclear test will be facilitated by identifying the fissile material used in the test. Thus, close communication between the IAEA and the CTBT verification organisation need to be fostered:

- **Clear and effective channels of communication between the verification organisation of the CTBT and the IAEA must be created and maintained**. This suggests that, barring compelling reasons to the contrary, the CTBT organisation should be co-located with the IAEA in Vienna.

The second connection between the CTBT and the NPT/Cutoff is the bridge that CTBT provides between non-proliferation and nuclear disarmament. A CTBT's primary contribution is to disarmament, rather than to non-proliferation. By developing an organisation link between the IAEA and a CTBT, the connection between non-proliferation and disarmament, which is foreseen in Article VI of the NPT, will be institutionalised for the first time. As we have argued above, this connection is important to the future development of effective non-proliferation. Such an institutional link would also provide the basis for an organisational location for a comprehensive nuclear non-proliferation regime, at minimal additional cost.

- **A constitutional link should be established between the IAEA and the Organisation of the CTBT**. At a minimum such a link would involve co-location and a recognition of the connection in the text of a CTBT. The link could

be strengthened from there up to the point of subsuming the CTBT organisation within the IAEA, or alternatively of subsuming both within a global nuclear non-proliferation organisation.[8]

The possible synergies among the NPT, CTBT and Cutoff convention need to be set in the broader context of both the political relationships among the three instruments, and the regional processes for nuclear arms and proliferation control. My Korean colleagues consider the former to some extent in their companion paper, and the latter is to be addressed in the full report, of which this paper is a small part.[9]

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8   The history of the European Union provides a wealth of examples of variable constitutional architectures among international organisations. In particular, the changing relationship among the Commission, the Council, European Political Cooperation and the Western European Union can suggest various models for establishing institutional links between the IAEA and a CTBT organisation.

9   See also David Mutimer, Bon-Hak Koo and Roland Reimers, "Regional Specificity and Global Processes: A Tri-Regional Perspective on Nuclear Non-Proliferation" in Marshall Beier and Steven Mataija, eds., *Proliferation in All its Aspects Post-1995: The Verification Challenge and Response* (Toronto: YCISS, 1995), 85-106.

A Tri-Regional Study on Regional Approaches to Non-Proliferation: A View from Northeast Asia

by Sung-Tack Shin and Bon-Hak Koo

I. Introduction

A number of positive developments in nuclear arms control can be identified in the first half of the 1990s. They include:

- the US and Russia signed the START Treaty;
- Belarus and Kazakhstan acceded to the NPT as non-nuclear weapon states;
- fewer nuclear explosions were conducted than in any other period since 1959;
- the UN Security Council declared in a unanimous resolution on January 31, 1992, that the proliferation of all weapons of mass destruction constituted a threat to international peace and security;[1]
- the NPT safeguards were strengthened by reinforcing the principle of special inspections, allowing the IAEA an access to all suspect sited, whether declared as part of a nation's safeguarded activities or not;
- the international community reached a consensus for the first time that a multilateral comprehensive test ban should be negotiated; and
- the world community has become increasingly aware of the need to focus on controlling and disposing of nuclear materials as well as nuclear weapons themselves.

It is generally acknowledged that the collapse of the Cold War has opened the door for a "new world order." It is true that with the end of the Cold War, the likelihood of nuclear war between the states of the eastern and western blocs has been radically reduced, but the relatively stable bipolar security system during the cold War era has exposed many countries to a new, unstable order in which governments might perceive the need to rely more upon themselves for their security.

The collapse of the USSR created two new types of proliferation problem: who owns and controls its nuclear weapons and their manufacturing complex; and how to prevent materials and knowledge being disseminated outside its former borders.

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1   This resolution links proliferation to Chapter VII of the UN Charter, conceivably leading to the use of force against such threats.

In Northeast Asia, the nuclear situation on the Korean Peninsula has highlighted the possible proliferation of the nuclear weapons.

In this circumstance, some concerned proliferation observers believe: (1) that a need exists to develop new methods and instruments, including military ones, for the dominant global powers to impose non-proliferation on aspirant nuclear proliferators; or (2) that much more responsibility should be imposed upon individual states.

II. NUCLEAR NON-PROLIFERATION TREATY

Background
International efforts to prevent nuclear proliferation began with the Baruch Plan of 1946. The fundamental assumption of the Plan was that the uses of nuclear energy were inherently neither military nor peaceful; rather, all nuclear energy activities had some military potential. Based upon this assumption, the Plan called for international ownership and management of all nuclear facilities and materials to prevent misuse of the nuclear energy.[2] The USSR was opposed to the international ownership of nuclear materials and facilities, and responded with a plan for international monitoring, but national ownership of these items.

Discussions rapidly reached stalemate. However, the proposals illuminated two important issues concerning nuclear non-proliferation that have persisted until the present: (1) there is a clear technical distinction possible between military and civil nuclear activities? or (2) if there is not, is it acceptable to rely on political commitments, rather than technical distinctions and intrusive verification, to underpin any international regime to manage them?[3]

During the 1960s, the US and the USSR sought a nuclear non-proliferation regime to contain the further spread of nuclear weapons. The Nuclear Non-Proliferation Treaty was opened for signature in 1968 and entered into force in 1970.

Purposes
The NPT is an international mechanism to control the ability to procure nuclear explosive devices. The basic goal of the Treaty, as stated in Article I, is to restrain signatories from providing technology or materials to other states for use in the development of nuclear weapons.

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2   For a short account of the Baruch Plan and US attitudes to nuclear proliferation at that time, see Robert L. Beckerman, *Nuclear Non-Proliferation: Congress and the Control of Peaceful Nuclear Activities* (Boulder, Colorado: Westview, 1985), pp. 13-38.

3   John Simpson, "Nuclear Non-Proliferation in the Post-Cold War Era," *International Affairs*, vol. 70, no. 1 (1994), p. 19.

The NPT has three fundamental purposes:

- to enhance the security of all its state parties;
- to foster the peaceful use of nuclear energy; and
- to encourage arms control and disarmament among the five acknowledged nuclear weapons states.

To achieve these goals, the Treaty embodies the legal norm against increasing the number of nuclear weapon states and the verification system of safeguards on peaceful uses of nuclear energy through the International Atomic Energy Agency (IAEA). In addition, the acknowledged nuclear powers agreed to work together toward nuclear disarmament and provide technical assistance for non-nuclear weapon states a peaceful nuclear technology, in return for a pledge by non-nuclear weapon states to give up their nuclear weapons programs and submit their peaceful nuclear programs to the safeguards system.

Structure of the NPT Regime
- Non-Proliferation Norm

The NPT is the sole global instrument to constrain non-nuclear weapon states attempting to acquire nuclear explosive devices. Article I of the NPT requires nuclear weapon states not to transfer nuclear devices and technology to non-nuclear weapon states, and non-nuclear weapon states are banned from developing or otherwise acquiring such devices or technology.

Thus, many NPT and non-NPT states have complained that the NPT regime enshrines a discriminatory system of a few nuclear "haves" versus many nuclear "have-nots."

To address this conflict between nuclear "haves" and "have-nots," the Treaty committed its nuclear weapon state parties, in Article VI, to pursue negotiations in good faith on effective measures to cease nuclear arms race at an early, and on a treaty on general and complete disarmament under strict and effective international control. The purpose of Article VI was to pressure the nuclear-weapon states to halt the nuclear arms race and to reduce their dependence upon such weapons, thereby eliminating in time the difference between the "haves" and the "have-nots."[4]

All states adhering to the non-proliferation norm will receive in return guarantees of their right to develop nuclear energy of peaceful purposes.

- Safeguards System

In Article II and III of the Treaty, non-nuclear weapon states pledged to refrain from acquiring nuclear weapons and to place all the nuclear materials within their jurisdiction under IAEA safeguards by declaring their quantities, composition and

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4   Wolfgang K. H. Panofsky and George Bunn, "The Doctrine of the Nuclear-Weapon States and the Future of Non-Proliferation," *Arms Control Today*, vol. 24, no. 6 (July/August 1994), p. 3.

location. This can be done through the state signing an INFCIRC/153 safeguards agreement with the IAEA, and allowing IAEA personnel to monitor the disposition and use of nuclear materials.

In order to verify non-nuclear weapon states not to transfer know-how and material from civil nuclear programs to weapons development, the NPT adopted a system of safeguards and inspections operated by the IAEA for declared nuclear materials and facilities.

The purpose of IAEA/NPT safeguards is to provide assurance that nuclear materials declared to the Agency are being used for their stated purposes and have not been diverted to nuclear explosive use. The system is intended to reassure states that their neighbors are not seeking to evade their commitments and to persuade them that they need not seek nuclear weapons to insure against others doing so.[5]

According to the safeguards system, the IAEA may request "special inspections" to clarify discrepancies in information supplied to it, and to investigate allegations that undeclared nuclear materials or facilities exist within the state.

This IAEA safeguards system is concentrated on fissile materials for two simple reasons: many nuclear facilities have both a civil and a military potential; and without fissile materials of a specific nature, nuclear explosive devices cannot function.

• Security Assurance Mechanism
Non-nuclear weapon states may pursue a nuclear capability to compensate threats of use of nuclear or other weapons against the territories of their own states. International commitments by the nuclear weapon states which guarantee the security of non-nuclear weapon states may reduce non-nuclear weapon states' motivations for proliferation, and thus act as useful reinforcers of the nuclear non-proliferation regime.

Multilateral nuclear security assurances may be of three types: Negative Security Assurance (NSA); Positive Security Assurance (PSA); and no-first-use agreements. These security assurance mechanism, however, failed to be incorporated into the NPT.[6]

• Compliance Mechanisms
Two types of compliance mechanism are operative in connection with the nuclear non-proliferation regime: (1) the IAEA/UN agreements; and (2) the export control guidelines of the Nuclear Suppliers Group.

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5   John Simpson, "Nuclear Arms Control and An Extended Non-Proliferation Regime," *SIPRI Yearbook 1994*, Stockholm International Peace and Research Institute (1994), p. 607.

6   For details of three types of security assurances, see Simpson, "Nuclear Non-Proliferation in the Post-Cold War Era," p. 24.

A. IAEA/UN Agreements

The IAEA/UN system consists of a set of procedures to be implemented in the event of IAEA safeguards inspections uncover either diversions of fissile materials from declared uses or the existence of undeclared materials or facilities.

In case the IAEA discovers such diversion or the existence of undeclared fissile materials or facilities, the IAEA may withdraw some of the privileges of membership of the IAEA, such as access to technical assistance.

The IAEA may refer the case to the UN Security Council. Following the Security Council meeting in January 1992, such discrepancies can be regarded as threats to international peace under Chapter VII of the UN Charter. The UN could impose sanctions, or in extreme cases, the use of military force. The cases of Iraq and North Korea since 1991 have both illustrated how this compliance system would operate in the new international environment.

B. Export Control Guidelines

The guidelines produced by Nuclear Suppliers Group (NSG) have evolved since 1974. They were drawn up by nuclear materials supplier states to prevent access by potential proliferators to facilities, components of facilities and dual-use technology which could be used for military purposes.

The guidelines require a supplier state to apply licensing procedures to these items. They have also served informally to ban the export of reprocessing and enrichment technology.

The main effect of the NPT has been:

a.   to limit overt nuclear weapon status to China, France, the Soviet Union, the United Kingdom, and the US;

b.   to create a small number of "ambiguous" nuclear weapon states which are known to possess nuclear materials not subject to international monitoring; and

c.   to encourage the strong growth among over 150 states of political norm of non-nuclear weapon status.

Consequences

While the five existing nuclear powers were recognized as such, the non-nuclear weapon states agreed not to develop nuclear weapons. However, the non-nuclear weapon states were allowed by the Treaty to acquire materials, technology, and facilities for civil nuclear applications, and even for "peaceful nuclear explosions." Article IV notes that "nothing in this Treaty shall be interpreted as affecting the inalienable right of all the parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination."[7]

For the first 10 or 15 years, this system was generally successful. Most states signed and ratified the NPT, and the Treaty established a widely respected set of international norms. A few states, however, refused to sign, rejecting the NPT's *de jure* discrimination between nuclear "haves" and "have-nots," and arguing that while the non-nuclear weapon states were prohibited from obtaining such capabilities, the major nuclear powers failed to honor commitments in the NPT to reduce their own nuclear weapons.[8]

The Iraqi and North Korean cases demonstrate the pitfalls of the non-proliferation regimes. Since closed non-democratic states can hide evidence of a nuclear weapons program until its final stages, sanctions will not deter nuclear program of rogue states. Clearly, in the absence of a credible enforcement mechanism, the NPT regime cannot stop nuclear proliferation among the states which pursue clandestine nuclear programs. Indeed, three major proto-nuclear states — India, Pakistan, and Israel — remain outside the NPT system, and are resistant to external pressures, threats of sanctions, or external "security assurances."[9]

The Iraqi case might be unique, and with some tightening of safeguard procedures, access to intelligence, and the use of special inspections, similar cases can be avoided.[10] These claims, however, are not reassuring to those states most threatened by potential violations of the NPT. Indeed, if Saddam had not alarmed the entire world community by invading Kuwait, Iraq would probably have developed nuclear weapons without interference. The North Korea case provides an additional example of the precariousness of the existing NPT regime. Three years of negotiations and pressure from the US have not forced Pyongyang to accept IAEA inspection of all suspected nuclear sites. Other would-be nuclear powers, including Iran and Algeria, are likely to follow the Iraqi and the North Korean route.[11]

III. NPT EXTENSION

The Need to Reinforce the Operation of the NPT Regime

Prior to 1990, international efforts for non-proliferation centered on investigating nuclear facilities and stocks of fissile materials which were not safeguarded by the IAEA. Six nations were "suspects": Argentina, Brazil, India, Israel, Pakistan and South Africa.

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7   Gerard M. Steinberg, "Non-Proliferation: Time for Regional Approaches?" *Orbis*, vol 38, no. 3 (summer 1994), p. 410.

8   K. Subrahmanyan, "Export Controls and the North-South Controversy," *The Washington Quarterly*, vol. 15, no. 1 (Spring 1992), pp. 135-144.

9   Steinberg, "Non-Proliferation: Time for Regional Approaches?" p. 412.

10   Hans Blix, "Verification of Nuclear Nonproliferation: The Lessons of Iraq," *The Washington Quarterly*, vol. 15, no. 2 (Autumn 1992), pp. 58-59.

11   Steinberg, "Non-Proliferation: Time for Regional Approaches?" p. 411.

Since 1990 this listing has changed drastically. Argentina, Brazil and South Africa were removed from this list, either by negotiating a full-scope safeguards agreements with the IAEA or by acceding to the NPT. However, two new categories of "suspect states" have emerged:

a. The NPT renegade. This covers states such as Iraq, North Korea and possibly others who have breached their commitments under the Treaty.

b. The fragmented nuclear weapon states. They include those republics of the former USSR which had nuclear weapons stationed on their territory when that country ceased to exist at the end of 1991. Although all tactical weapons were soon transferred to the Russian Federation, large numbers of strategic warheads remain in Belarus, Kazakhstan and Ukraine.[12]

In the aftermath of the revelations about Iraq's clandestine nuclear weapon program, the revelations that South Africa had manufactured nuclear devices during the 1980s, and the uncertainties over North Korea's nuclear program, considerable criticism has been directed at the ability of the nuclear non-proliferation regime to ensure the status of nuclear weapon states. These demonstrated the problem of enforcement under the existing system.

The criticisms regarding the IAEA's ability to detect nuclear-weapon related activities in Iraq, South Africa and North Korea have precipitated an effort to redirect and strengthen the NPT verification system.[13]

The 1995 NPT Conference: Issues and Consequences
A conference will be convened from April 17 to May 12, 1995 at the UN in New York to decide on the further extension of the NPT, as well as to review its implementation.

In the 1995 NPT conference, state parties to the NPT will review the operations of the NPT, as specified in Article VIII.3, and decide on an option for extension, as specified in Article X.2 which states "twenty-five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods. The decision shall be taken by a majority vote of the parties of the Treaty."

Regarding the operations of the NPT, at least four substantive issues will arise: allegations under Article I and II that nuclear weapon state parties have assisted nuclear proliferators; Article III and IAEA safeguards; access by the developing world to nuclear energy under Article IV; and security assurances to non-nuclear weapon states.

12   Simpson, "Nuclear Non-Proliferation in the Post-Cold War Era," pp. 26-27.

13   Simpson, "Nuclear Non-Proliferation in the Post-Cold War Era," p. 28.

- Non-Proliferation of nuclear weapons

The NPT is based on discrimination in favor of the nuclear-weapon states of 1969 and against all the other parties to the Treaty. The nuclear weapon states may keep their weapons, while the non-nuclear weapon states may not acquire them. The non-nuclear weapon states cannot test without first having violated the pact. Every additional nuclear test by the nuclear-weapon parties emphasizes the discrimination.

Another related issue is the debate on Article I and II, under which nuclear weapon states pledge not to transfer weapons and non-nuclear weapon states pledge not to acquire them. Many non-nuclear weapon states complained that nuclear weapon states have provided assistance to nuclear weapon programs in Israel and South Africa.

Accusations of breaches of Article II will almost certainly arise in 1995, however, as no review of the Treaty could omit discussion of Iraq's clandestine program and a condemnation of its actions. Whether North Korea's nuclear program will also be the subject of similar discussions remains to be seen.

a. Chinese Position

China, as the only nuclear weapon state in the Northeast Asian region, agrees to the fundamental principle of horizontal proliferation of nuclear weapons. As a natural consequence, it opposes emergence of new nuclear weapon states in the

Suspected States and Their Nuclear Status	
Country	Nuclear Status
Israel, India, Pakistan	Suspected to have developed nuclear weapons
South Africa	Developed nuclear explosive devices, but gave them up and joined the NPT
Argentina	Has nuclear capability and joined the NPT
Iraq	Pursued nuclear weapons program, but failed to develop because of external intervention
North Korea	Pursuing nuclear weapons program and negotiating with nuclear weapon states
Iran	Suspected that it is pursuing nuclear weapons program
Taiwan and South Korea	Stopped nuclear weapon program and joined the NPT

region. Thus, it argues that prior to a permanent extension of the NPT, nuclear weapons state must implement nuclear disarmament. However, since China is the most underdeveloped state among the nuclear weapon states, it does not accept imbalances among the nuclear weapon states.

b. Japanese Position
Japan accepts permanent extension of the NPT. Nevertheless, some right-wing groups recently argued that if North Korea were armed with nuclear weapons, Japan should get out of the NPT and arm with nuclear weapons.

c. South Korean Position
South Korea opposes horizontal proliferation of nuclear weapons, and supports the permanent extension of the NPT. South Korea's non-proliferation policy focuses on the removal of motivation for acquiring nuclear weapons, rather than heightening technical barriers to acquire them.

• Safeguards System (Article III)
The IAEA/NPT safeguards system is a keystone of the non-proliferation regime. This system will be increasingly important in the future with development and spread of nuclear technology.

Following the discovery of Iraq's clandestine nuclear program which evidenced several of the known limitations of IAEA safeguards under Article III of the NPT, sustained efforts have been pursued to improve those procedures. Attempts have been made to introduce new safeguarding concepts, but financial burden on the IAEA causes difficulties in implementing new safeguards concepts effectively.

a. Chinese Position
China opposes strengthening IAEA safeguards system. China worries that the strengthened safeguards system may hinder its nuclear weapon programs. But, on the surface, it officially argues that safeguards system should not interfere to the development of civil nuclear industry

b. Japanese and South Korean Position
Both Japan and South Korea have declared that they will not develop nuclear weapons, thus, they clearly support strengthening IAEA safeguards system for effective verification. South Korea, in addition, to strengthening the safeguards system, supports mutual inspection with concerned countries, such as North-South mutual inspection system enshrined in the North-South Joint Declaration for Denuclearization on the Korean Peninsula. However, both countries oppose strengthening auxiliary safeguards systems, such as the Zangger Committee, which constrains the export of nuclear materials for peaceful purposes. Both countries believe that these systems may hinder their peaceful nuclear development programs.

- Peaceful Use of Nuclear Energy (Article IV and V)

Since the NPT entered into force, nuclear-weapon states were focused on constraining the proliferation of nuclear technology. Since it is difficult to distinguish peaceful use of nuclear energy from military use, and some peaceful nuclear technology can be easily transferred for military use, nuclear weapon states have been in an extremely strong position to ban nuclear explosive tests even for peaceful purposes by non-nuclear weapon states. In contrast, non-weapon states argue that nuclear explosive tests for peaceful purposes are not banned by the Treaty, thus use of nuclear energy of peaceful purposes is their inherent right as sovereign states.

a. Chinese Position

Since China can not compete with either the US or Russia in nuclear weapon stockpiles and technology, China needs to continue nuclear explosive tests for weapon purposes. Therefore, China officially supports for peaceful nuclear explosive tests. Nevertheless, China accepts a complete nuclear test ban only if the US and Russia eliminate current nuclear weapon stockpiles and implement immediate comprehensive nuclear disarmament.

b. Japanese and South Korean Positions

Japan and South Korea maintain that those states which comply with the safeguards system must have a privilege to use nuclear energy for peaceful purposes. They also maintain that nuclear materials and technology should be provided to these states unrestrictedly. Nevertheless, since peaceful nuclear explosion is important for the development of nuclear technology, but can be transferred to military purposes, international management of nuclear material, such as a regional nuclear control center for nuclear reprocessing and plutonium storage, is preferable.

- Security Assurances

The NPT text contains no security assurances for non-nuclear weapon states, and commitments to new proposals in this area are being sought by many such states. The accession of China and France to the Treaty has cleared the way for a new UN Security Council Resolution on positive security assurances subscribed to by all the nuclear weapon states. It may also be possible for them to subscribe to an unconditional collective negative security assurance, involving pledges not to use nuclear weapons first nor threaten their use against non-nuclear weapon states.

a. Chinese Position

China has officially provided negative security assurances, and pledged never to be the first country which uses nuclear weapons first.

b. Japanese and South Korean Positions

Japan and South Korea acknowledge the necessity of negative security assurances to non-nuclear weapon states by nuclear weapon states, and they support a general treaty or declaration on negative security assurances. However, since both countries are under the US nuclear umbrella, they worry that the US negative security assurance to North Korea may have a negative affect on the US nuclear umbrella. So, they oppose a negative security assurance directed at a specific country or countries.

IV. CTBT

Background

In Article VI of the NPT the nuclear weapon states[14] committed themselves to end the nuclear arms race. The Preamble of the NPT specifically calls for an end to all nuclear testing, an important consideration in their legal renunciation of the nuclear option.

In 1958, when the performance of nuclear weapons was being improved at an outstanding pace, testing appeared to offer the best verifiable control on the nuclear arms race. In this circumstance, President Dwight Eisenhower initiated negotiations for a comprehensive test ban after declaring a moratorium on testing.

However, in the 49 years since the first nuclear test, six nations have conducted such tests, comprising over 1,800 nuclear explosions worldwide. In parallel with these tests, there have been continued efforts to restrict nuclear testing, but these efforts have failed to achieve a Comprehensive Test Ban Treaty (CTBT).

Notwithstanding, the main constraint on nuclear testing since 1963 has been the Partial Test Ban Treaty (PTBT), under which almost all states other than China, France and North Korea have committed themselves not to test in any other medium but underground.

The 1974 Threshold Test Ban Treaty (TTBT) limits underground test explosions to yields of 150 kilotons or less, and the 1976 Peaceful Nuclear Explosion Treaty (PNET) requires that explosions normally carried out for peaceful purposes (such as canal excavations) do not involve single explosions larger than 150 kilotons.[15]
But these Treaties apply only to the USA and Russia.

Since 1980, there have been no above-ground nuclear explosions even by the non-signatories, i.e., France and China. In the early 1990s, all of the nuclear powers, except for China, observed unilaterally declared moratoria on nuclear testing. This manifestation of a commitment to end nuclear testing provided an important impetus for new multilateral negotiations for a comprehensive test ban treaty which began in the Conference on Disarmament in January 1994.

Without a CTB by 1995, it may only be possible to extend the NPT for a brief period, and there are likely to be efforts to link further extension to the CTB. A brief extension would pose the grave danger that the NPT would simply expire at the end of that period, destroying the foundation of the global non-proliferation regime.[16]

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14   A nuclear weapon state is defined in the NPT as one which exploded a nuclear device prior to January 1, 1967. Nuclear testing is thus the criterion which distinguish a nuclear-weapon state from non-nuclear-weapon state.

15   Wolfgang K. H. Panofsky, "Paths to a Test Ban: Straight to a CTB," *Arms Control Today*, vol. 20, no. 9 (November 1990), p. 4.

16   Gerard C. Smith, "End Testing, Stem the Bomb's Spread," *Arms Control Today*, vol. 20, no. 9 (November 1990), p. 11.

Meaning of CTB to Non-Proliferation

Although a testing ban will actually do little to slow the spread of nuclear weapons, it has assumed a symbolic importance as a measure of the nuclear weapon states' commitment to nuclear disarmament.

A comprehensive test ban could create a world-wide environment that would discourage both new proliferators and undeclared nuclear-weapon states from pursuing their programs. Thus, a CTB could make a major contribution to non-proliferation. While a technically competent state with access to fissionable material can build simple bombs without tests, more complex fission and thermonuclear weapons will require testing. Moreover, the political impact of a nuclear test would spur the nuclear efforts of nearby states. Continued testing by the nuclear weapon states underscores their belief in the importance and utility of a regime which permits some powers to improve their nuclear arsenals while others must forgo nuclear arms.

The idea that a test ban would advance non-proliferation has two fundamental elements:

a. It is believed that a CTB would establish a technical barrier against the development of second-generation nuclear weapons. Testing is essential to gaining confidence in more complex and effective designs, and certainly in thermonuclear weapons — the next large step beyond fission bombs. An effective test ban would place a great restraint on world-wide nuclear arms competitions.

b. Perhaps more important, the CTB has become the litmus test of the commitment of the nuclear weapon states to nuclear disarmament.[17]

CTB Negotiations

The end of the Cold War has led to considerable changes in the CTB negotiations. In 1993, three of the nuclear weapon sates — France, Russia and the US — operated voluntary moratoria on nuclear testing, while the UK operated an involuntary one, since it tests in the US. Only China continued to test.

In 1993, international support for a CTBT became virtually universal. On December 16, 1993, the UN General Assembly adopted by consensus a resolution calling for the negotiation of a multilateral CTBT. This was the first time that the resolution had not been opposed by at least one of the declared nuclear weapon states since such resolutions were first offered at the UN in the 1950s.

President Clinton, in his speech before the UN in September 1993, endorsed a CTBT in principle, but he was only willing to commit the US to a limited testing moratorium conditioned on similar restraint by other countries.

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17   Lennon, "The 1995 NPT Extension Conference," p. 214.

On January 25, 1994, the CD began its 1994 session and promptly passed the mandate for CTB negotiations that had been drafted in December 1993. The mandate re-established the *ad hoc* Committee on a Nuclear Test Ban, directed that Committee to "negotiate a universal and multilaterally and effectively verifiable comprehensive nuclear test ban treaty, and established working groups on verification and on legal and institutional issues."[18]

On September 7, 1994, the Conference on Disarmament produced a rolling text for a comprehensive test ban treaty. The rolling text is divided into three parts that reflect the different levels of support or consensus on various issues:

a.   The first part contains nine provisions which includes a statement that the treaty will be open to all states for signature before its entry into force.

b.   The second part includes provisions dealing with more fundamental issues such as scope, entry into force, organization and verification.

c.   The third part is comprised of a list of previously issued documents from a number of CD delegations with various proposals that have not yet been put into treaty text or have not yet been thoroughly discussed.

CTB Issues
Despite the Article VI and the NPT Preamble calling for a CTB negotiations, the issue of CTB has been the single most contentious issue at all four NPT review conferences. Indeed, two of the four conferences (in 1980 and 1990) broke up without achieving a consensus on a final document because of disagreement over language relating to the failure to negotiate a CTB. In the absence of a complete and operating treaty, the CTB issue seems destined to remain the major source of discord in the debate over Article VI.

Some members of the non-aligned movement have proposed that if a CTB treaty is not completed by 1995, they would only support a short NPT extension until such a treaty is conducted.[19]

Opponents of the test ban base their arguments largely on the alleged need for testing to maintain the reliability and safety of the existing stockpile. In reality, neither reliability nor safety depends on continued nuclear testing. While testing played a role in correcting past problems, the reliability of existing weapons can be assured in the future by a careful program of non-nuclear testing and replacement.[20] Several contending issues relating to a CTBT can be identified as follows:

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18   Dunbar Lockwood, "Nuclear Arms Control," *SIPRI Yearbook 1994*, pp. 653-54.

19   George Bunn, "Viewpoint: The NPT and Options for Its Extension in 1995," *Non-Proliferation Review*, vol. 1 (winter 1994), p. 53.

20   Spurgeon M. Keeny, Jr., "Focus: The Comprehensive Test Ban," *Arms Control Today*, vol. 20, no. 9 (November 1990), p. 2.

• CTB Verification Regime

Verification of nuclear test ban treaties serves three technical objectives: (1) to detect events which could be nuclear explosions; (2) to identify whether such an event is or is not a nuclear explosion; and (3) to measure the yield of an event once it is established that it is a nuclear explosion.

There are real technical difficulties involved in devising a verifiable CTBT regime. Drafting a meaningful definition of a nuclear explosion will be particularly nettlesome; it will have to capture very low-yield (less than one kiloton) tests that may not be verifiable even with wide-ranging and highly intrusive inspections.[21]

• Scope of Test

The question of scope has become a major issue. China has continued to insist on the right to conduct peaceful nuclear explosions, and France and Britain are still pushing for the right to conduct safety and reliability tests that "may be authorized in exceptional circumstances."

• Definition of Test

A related issue is the definition of a nuclear test. This is more difficult than one would imagine because the definition must capture low-yield (less than one kiloton) tests that may not be verifiable, even with wide-ranging highly intrusive inspections.[22]

If a CTBT does not explicitly ban low-yield tests, certain nuclear activities prohibited to non-nuclear weapon states that are parties to the NPT could be legally sanctioned for non-NPT parties. An international treaty legitimizing such activities for non-NPT parties would be resented by those non-nuclear weapon states that are NPT parties.

• Types of CTBT

One can envision three different types of CTBT:

a. A CTBT could be a symbolic "declaration of intent" not to conduct nuclear tests — a sort of nuclear honor code;

b. A second type would take the form of a traditional international agreement, subject to ratification, but without intrusive verification measures. All tests would be prohibited, but the treaty would not contain extensive, highly intrusive verification measures; and

22   Reiss, "The Last Nuclear Summit?" p. 8.

22   Lennon, "The 1995 NPT Extension Conference," p. 215.

c. A third type of CTBT would take much longer to draft. It would strive to elim-
    inate any uncertainty that the parties were conducting even low-yield nuclear
    tests; by necessity, this treaty would contain elaborate and unprecedented ver-
    ification provisions.[23]

Chinese Position

China continues to characterize its nuclear forces as "purely defensive" and to
confirm the unqualified no-first-use declaration that accompanied the detonation of
its first bomb in 1964.

China, which conducted the only nuclear test in 1993 and 1994, did not declare a
testing moratorium and was therefore under no legal or political obligation not to test.

In an official statement issued by its Foreign Ministry on October 5, 1993,
China said that it would never be the first to use nuclear weapons; that it has all
along stood for the complete prohibition and thorough destruction of nuclear
weapons; and that history has shown that nuclear testing moratoria are designed
to maintain nuclear superiority. China also pointed out that among the five
declared nuclear weapon states, it has conducted the smallest number of tests.
At the same time China stated that it would "take an active part in the negotiat-
ing process and work together with other countries to conclude" a CTBT.[24] It
added that it would seek to negotiate a CTBT no later than 1996, implying that
it intends to test until than.[25]

In recent years, China has suggested that its support for a CTBT might be con-
tingent upon the US and Russia taking the lead in halting the testing and produc-
tion of nuclear weapons and reducing their nuclear arsenals to a level close to
China's.

Beijing's reluctance to accept a moratorium at this time and its ongoing test pro-
gram may address serious technical problems, such as defects in existing systems
or safety and reliability concerns. It also wishes to develop high yield-to-weight
ratio nuclear devices suitable for single or multiple warheads for mobile systems
and to be carried to inter-continental ranges. However, given the small number of
tests China would conduct before 1996, a major development would not appear to
be its likely goal.[26]

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23 Reiss, "The Last Nuclear Summit?" p. 9.

24 Arms Control Reporter, sheet 608.D.9.

25 Lockwood, "Nuclear Arms Control," p. 653.

26 Panofsky and Bunn, "The Doctrine of the Nuclear-Weapon States and the Future of Non-
    Proliferation," pp. 6-7.

Japanese and South Korean Positions

Both Japan and South Korea acknowledge that a CTBT is an effective measure to prevent the development of new types of nuclear weapons and to hinder modernization and mass-production of such weapons. Therefore, they maintain a firm stance on a CTBT that it should ban all kinds of nuclear explosions including peaceful ones even by the nuclear weapons states. However, if such a ban cannot be achieved, they demand that all peaceful explosions should be open to international inspection. For a better verification mechanism, the two countries argue that the international community needs to cooperate in the development of test monitoring technology.

V. CUT-OFF CONVENTION

Background

In 1992, Russian President Boris Yeltsin proposed a ban on production of fissile material for nuclear weapons. Russia reiterated that position at the Conference on Disarmament on August 17, 1993. A month later, in an address to the UN General Assembly on September 27, 1993, President Clinton proposed the negotiation of a multilateral convention, known as the cutoff convention, to achieve such a ban. Pushed by the two nuclear superpowers, the UN General Assembly called for an international support for a production cut-off on December 16, 1993, by adopting a resolution which calls for a non-discriminatory, multilateral and internationally and effectively verifiable treaty for nuclear weapons or other nuclear explosive devices.[27]

At present, international cooperation for containing the spread of nuclear technology and materials is based on informal agreements, such as the Coordinating Committee on Multilateral Export Controls (COCOM), Zangger Committee (established in 1971 with 15 major nuclear export countries and created an updatable "trigger list" of nuclear materials and equipment), and the fourteen original member of Nuclear Supplier Group (NSG),[28] which restricts the transfer of certain technologies in all aspects of the fuel cycle to states with unsafeguarded programs.

In April 1992, in Warsaw, Nuclear Suppliers Group agreed to extend the scope of nuclear supplier controls:

a.   Certain kinds of dual-use technology should be subject to export controls through national legislation.

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27   *Official Records of the General Assembly, Resolution and Decisions,* 48th Session, Resolution 48/75, Part L, pp. 120-121.

28   In 1974 the "London Club" of nuclear technology and materials suppliers nations, including France as a non-party to the NPT, was convened and drew up guidelines (the so-called "London Guidelines"), and published the guideline in 1978. Their key elements were that they were to apply to nuclear facilities and their components, and that "restraint" was to operate in the export of "sensitive" technologies.

b. Such exports should be made to states that were NPT parties or that accepted comprehensive IAEA safeguards.

c. A system for consultation on export license applications was created to try to prevent a company or state applying consecutively for a licence to import a similar product from a number of supplier states.[29]

These mechanisms were to apply to nuclear facilities and their components, and restraint was to operate in the export of sensitive technologies.

The purpose of there controls on nuclear materials and facilities has been to make it more difficult for a potential proliferators to acquire nuclear weapons by limiting the ability to import relevant technology and materials.

Issues:
    The existing NPT/IAEA regime places no formal constraints on the production and stockpiling of fissile or other nuclear materials that could be used in weapons, other than the existence of a legal and political commitment not to do so.

Therefore, a cutoff convention would provide a number of important benefits:

a. It would stop the buildup of fissile material and thus limit the number of warheads that could be produced by threshold states.

b. It would help the nuclear weapon states fulfill their obligations under NPT Article VI to end the "nuclear arms race" and would also make the overall non-proliferation regime less discriminatory.

c. The convention along with its associated safeguards could reduce the likelihood of theft or diversion of plutonium or highly enriched uranium (HEU) in Russia.[30]

The debate on controlling nuclear materials centers on:

a. Whether the underlying principles of the nuclear non-proliferation regime, and in particular Article IV of the NPT,[31] should be revised to ban, or at least constrain, the production and/or use of plutonium and HEU in peaceful applications.[32]

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29 Simpson, "Nuclear Arms Control and An Extended Non-Proliferation Regime," p. 615.

30 Lockwood, "Nuclear Arms Control," p. 660.

31 Article VI of the NPT permits non-nuclear weapon state parties unrestricted access to all forms of peaceful nuclear technology, even though its implementation through the domestic legislation of individual states does not breach the NPT itself.

32 Simpson, "Nuclear Arms Control and An Extended Non-Proliferation Regime," p. 617.

b. How to handle fissile material currently committed to military applications.

c. How to manage safeguarded material that could be used for explosive purposes.

Also, a cutoff convention contains a number of problems similar to a CTBT. A cutoff convention risks creating a discriminatory system that perversely favors the threshold nuclear countries that are not NPT members at the expense of those countries that are. Under such a convention, nuclear material previously produced by the nuclear threshold states would not be subject to IAEA safeguards; in theory this material could be used to make nuclear weapons. In contrast, all the nuclear material produced by NPT members would be under safeguards. Thus, a cutoff convention would not only confer preferential treatment upon Israel, India and Pakistan, but also grant international treaty obligations to the three countries as *de facto* nuclear weapon states.[33]

Chinese Position
    As the only nuclear weapon state in Northeast Asia, China wants to keep its privileges. Since it maintains lots of research reactors for both military and civilian purposes, the demand for plutonium and highly enriched uranium is increasing. Thus, China maintains explicit opposition against the establishment of the cutoff convention to control production and use of fissile materials.

Japanese Position
    Japan is operating reprocessing and uranium enrichment facilities. It also tries to operate fast breeder reactors and to develop new reactor models. Thus, in principle, Japan opposes the creation of the cutoff convention, unless there is an exception for this.

South Korean Position
    South Korea declared that it would not possess nor produce fissile materials in the Joint Denuclearization Declaration on the Korean Peninsula which was signed by the North and South Korea in 1992. It wants other countries also follow the same path. However, South Korea's fundamental position on fissile materials is that the use of plutonium and highly enriched uranium for civil purpose should be subject to the country who produced them, if they are under the international safeguards system. Nevertheless, South Korea did not express any explicit position on the cutoff convention.

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33   Reiss, "The Last Nuclear Summit?" pp. 9-10.

VI. Three Levels of the Synergistic Interaction

Synergies of Three Treaties

The nuclear era started with the detonation of a nuclear weapon test, and marked the beginning of a nuclear arms race. Attempts to ban nuclear test explosions date back to the late 1950s. So far, however, only partial solutions have been pursued. The present test ban regime comprises a set of treaties which together outlaw the acquisition, and thus the testing of nuclear weapons by non-nuclear weapon states, and regulate the conduct of nuclear test explosions by nuclear weapon states.

NPT's main role could be accomplished with the combined synergies of CTBT and Cutoff convention. The most symbolic non-proliferation issue, however, the conclusion of a CTBT, is still waiting to be successfully verified.

The scope of a comprehensive nuclear test ban treaty determines the design for its verification system. In past discussions, the scope of a treaty was either addressed with regard to the level down to which the compliance of a treaty could technically be verified, or with regard to the distinction between weapons-related and peaceful applications of nuclear explosions.

The distinction between nuclear weapon test explosions and nuclear explosions for peaceful purposes represented another source of disagreement. The conclusion of the TTBT and the PNET has codified this distinction, although the superpowers subsequently declared it to be artificial.

In December 1993 the United Nations General Assembly produced a consensus resolution containing a call for a non-discriminatory, multilateral and effectively verifiable treaty on the production or cutoff of fissile[34] materials for nuclear weapons and for nuclear explosive devices used for non-military purposes.

A number of contributing geopolitical realities have now made the prospect of a cutoff treaty a serious option as an arms control measure. Among these realities are concerns over a repeat of a nuclear weapons program similar to those of Iraq, North Korea and elsewhere. The security of the stockpiles of fissile material in the new states of the former USSR and the existence of excessive stockpiles of fissile material already produced by the major nuclear weapons states are also current concerns.

Future agreements related to a cutoff in the production of fissionable materials for weapons purposes will have to provide for the existence of these materials by providing means to store and dispose of them. Storage of materials is straightforward, but requires proper inventory keeping, then tight security to provide safe and secure storage. Since storage of plutonium and enriched uranium is a long-term proposition — Pu-239 has a half-life of 24,400 years and U-235 has a half-life of

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34   Fissile isotopes are defined as those that can sustain a nuclear chain reaction with interactions of fast or thermal neutrons.

713 million years — conversion to peaceful purposes and disposal are better alternatives, but they are not easy technically.

Using the material in power reactor fuel would require an extensive conversion capacity as well as up-to-date technology. Objections to the use of plutonium in reactors have been voiced by German exports who fear unknown risks in the use of mixed-oxide fuel. Enriched uranium can be mixed with natural or depleted uranium until its level of enrichment approaches that of natural uranium. Plutonium can not be easily diluted isotopically; the only choice is to mix it chemically with highly radioactive, long-lived waste and store it. Consuming either material in a reactor is technically possible, but it is more feasible for uranium.

The synergistic effects between measures, technologies and administrations are of high value. They tend to be mutually reinforcing in many different ways.

Technical Synergies
To put into practice and to verify the results of material accountancy, containment and surveillance, all existing safeguards for NPT and Cutoff Convention today make use of four procedures namely:

- design review,
- maintenance of plant operating records,
- reports on plant operation, and
- on-site inspections.

The practical and final procedure is the on-site inspection activity. The on-site inspections should include the following, as well as questions and answers such as in a consultation:

- on-site briefing and tour,
- facilities radioactivity measurements,
- process and environment samplings, and
- records and documents cross-check.

The major breakthrough in on-site inspection for CTBT verification purposes came in 1987, with the Treaty on Intermediate-Range Nuclear Forces (INF). Accompanying this Treaty and forming an integral component of it was a detailed on-site inspection regime encompassing five types of on-site inspection:

- baseline,
- close-out,
- elimination,
- quota or 'short-notice', and
- portal monitoring.

The technical means exist to conduct underground nuclear explosions of very small yields or muffle their seismic signals by either detonating devices shortly after earthquakes or in cavities. It was proposed to agree either on a very limited or a very low threshold treaty. The treaty would either limit the number of nuclear explosions or it would set a threshold at approximately 1 kiloton, reflecting present detection capabilities.[35]

Technical synergies for any non-proliferation treaties such as NPT, CTBT and a Cutoff Convention are composed of the following scheme:

- interdependent,
- consolidative, and
- collective.

Administrative Synergies

While it is important to recognize the technical relationships among the verification regimes, it may also prove useful to combine verification regimes' administration.

The IAEA developed a program of on-site inspections, audits, and inventory controls known as "safeguards" in the mid-1960s; the safeguards were designed to deter the diversion of fissionable materials, equipment, and components from peaceful uses to military purposes. "Full-scope" safeguards entail accounting and inspection measures on all of a nation's peaceful nuclear activities.

With the advent of the NPT and Cutoff Convention, non-nuclear weapon states which become parties to these treaties accept safeguards worked out with the IAEA for the exclusive purpose of preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Nuclear weapon states which are parties to these treaties agree not to provide special fissionable material or nuclear-related equipment to any non-nuclear weapon states for peaceful purposes unless the fissionable materials are subject to IAEA safeguards. Nuclear weapon states have agreed to place their nuclear facilities, except those with direct national security significance, under IAEA safeguards.

New steps must be taken to strengthen the IAEA's effectiveness in monitoring compliance with the NPT and Cutoff Convention. These should include support for the IAEA's right to request special inspections at undeclared sites or locations. These suspect site inspections would not necessarily detect cheating, but they would make cheating more difficult and costly.

Strong support by the UN Security Council for NPT goals is also essential. The Security Council needs to bring its considerable authority to bear upon potential

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35   Jozef Goldblat, 'Further Limitations and Prohibition of Nuclear Test Explosions: The Problem of Verification, 'Verification of Disarmament or Limitation of Armaments: Instruments, Negotiations, Proposals, Serge Sur, ed., The Bulletin of the Atomic Scientists, July/August 1993.

violators of the treaties. The Council could declare that any violation of IAEA safeguards, the NPT, or any other legally-binding nuclear non-proliferation obligation would be considered a threat to peace and would require consideration of strong sanctions.

The appropriate monitoring and surveillance procedures are important for a CTBT. Data collection and distribution, consultation and clarification, and on-site inspections are the elements of administrative synergism that make a strong function of the technical aspects. For example, on-site inspection will have an important role to play in verifying compliance with a CTBT. An international organization designed to carry out inspections will serve as a deterrent to cheating, build confidence in the CTBT regime, and assist significantly in uncovering any prohibited nuclear tests.

VII. METHODOLOGY OF TECHNICAL SYNERGY ENHANCEMENTS

Structural Relation

The main objective of the NPT's nuclear safeguards is to deter the diversion of nuclear material from peaceful activities to military purposes by the risk of early detection. But the deterrent role of safeguards is secondary to that of building confidence between nations by demonstrating that states which have undertaken not to acquire nuclear weapons abide by their undertakings.

A Fissile Material Cutoff Convention is needed which gives information on the variables contributing to the risk of potential diversion paths for nuclear weapons fissile material. An extensive, systematic outline of potential diversion paths, covering both declared and undeclared sources of fissile material, is needed basically, such as:

- Uranium mine → natural Uranium
- Enrichment cascades → LEU, HEU
- Reactor → production Rx. power Rx.
- Reprocessing → Plutonium, TRU

The various facilities, or material acquisition sources, that may potentially contribute to the production and acquisition of the three fissile material isotopes are generally in the order of the progression of the civilian or military fuel cycle route needed to achieve an adequately pure fissile isotope for weapon use. The only fissile isotopes from which fission weapons have been made to date, are:

- U-235,
- U-233, and
- Pu-239.

Any nuclear weapon is made from these nuclear fissile materials, needs to be tested, and is then placed in a controlled arsenal.

A CTBT has become an article of faith among US government officials. The argument is twofold:

- states seek to acquire nuclear weapons in response to their own perceived national security concerns, not in response to the development of new nuclear weapons by the existing nuclear powers; and

- nuclear test explosions are not a minimum essential requirement for obtaining a rudimentary fission weapon, for which high confidence in a highly destructive nuclear yield can be acquired without conducting full-scale nuclear test explosions.

Innovation of Inspection Technology

The basic verification measure used by the IAEA is nuclear material accountancy, with containment and surveillance as important complementary measures. If nuclear material accountancy is to be effective, inspectors have to make independent measurements so as to verify the figures presented in a state's accounts. The equipment available to them for this purpose is mainly designed to measure the gamma rays and neutrons emitted by various nuclear materials, and the techniques used are grouped together under the title of non-destructive analysis, such as the following:[36]

- Low resolution spectrometry,
- High resolution spectrometry,
- Neutron emission and detection,
- Gross neutron counting,
- Cerenkov glow observation,
- Measurement of radiation from spent fuel,
- Calorimetry, and
- Weighting.

Containment and surveillance techniques are applied in order to economize on the safeguards inspection effort and also to give assurance that nuclear material follows predetermined routes, that the integrity of its containment remains unimpaired, and that the material is accounted for at the correct measurement points. A variety of techniques is used, such as the following:

- Photographic surveillance,
- Television surveillance,
- Sealing systems,
- Reactor power monitors,
- Underwater surveillance instruments,
- Radiation dosimeters,
- Bundle counter, and
- RECOVER system.

The analytical schemes applied to the non-nuclear material samples were especially developed to suit the need of the inspectors for rapid and selective measurements, without demanding the optimum performance in terms of precision.

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36   *IAEA Safeguards: An Introduction,* IAEA/SG/INF/3(1991)

Nowadays, a preliminary measurement was performed to screen the environmental samples for the presence of important components such as uranium, plutonium, or radio-nuclides, rather than a process sample:

- Non-nuclear materials: smears, vegetation, soil,
- Environmental: debris, trees, leaves, rocks, ores, water, and
- Materials of construction: graphite, steels, beryllium, lead.

Simultaneous analyses off-site are important. Two specific branches of the IAEA's Seibersdorf Laboratories (SAL: Safeguards Analytical Lab., PCI: Physics, Chemistry and Instrumentation Lab.) have been involved with the analysis of samples balong with the satellite data communications.[37]

Techniques applied at SAL:

- High-resolution gamma-ray spectrometry,
- Alpha-particle spectrometry,
- X-ray fluorescence spectrometry,
- K-edge densitometry (Hybrid XRF K-edge),
- McDonald/Savage potentionmetric titration,
- NBL modified Davies/Gray potentiometric titration,
- Optical emission spectrometry,
- Thermal ionization mass spectrometry, and
- Isotope dilution mass spectrometry.

Techniques applied in PCI:

- Neutron activation analysis,
- Gamma-ray spectrometry,
- X-ray fluorescence spectrometry,
- Conductivity and pH,
- Laser-excited optical fluorimetry,
- Inductively-coupled plasma atomic emission spectrometry, and
- Alpha-particle spectrometry.

The inspection technology for the CTBT monitoring is based on an international monitoring system, such as the following:

- All-ranges teleseismic monitoring,
- Radio-nuclide monitoring,
- Hydroacoustic monitoring,
- Satellite monitoring,
- Optical monitoring, and
- Electro-Magnetic Pulse monitoring.

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37   *IAEA Yearbook 1994*, IAEA. pp. E1-E19

Strengthening the International Safeguards System

During the past year, the IAEA's Board of Govenors devoted appreciable time to the consideration of various proposals put forth by the Secretariat. These proposals and the status of the Board's current consideration of them are outlined in this article. During its 24-26 February 1992 meetings, the Board deliberated upon proposals regarding:

- the use of special inspections,
- the early submission of information about plans to construct new nuclear facilities,
- the reporting and verification of the production, export and import of nuclear materials; and similarly,
- the reporting and verification of the export and import of equipment and materials specially intended for use in nuclear activities.

With respect to the matter of special inspections, the Board reaffirmed the IAEA's right to undertake special inspections in States with comprehensive safeguards agreements, when necessary and appropriate, and to ensure that all nuclear materials in all peaceful nuclear activities are under safeguards. The legal basis for the IAEA's right to conduct special inspections is set out in safeguards agreements concluded pursuant to documents INFCIRC/66 and 153.

The evaluation of the information provided under safeguards will enable the Agency to develop a more comprehensive understanding of a State's nuclear activities. This will be the *sine qua non* of the IAEA's enhanced capability to ensure a full and timely awareness of such activities. Such an "early warning" system would likely consist of four parts:[38]

- information gathering,
- information evaluation and analysis,
- information confirmation or non-confirmation, and
- information dissemination.

Safeguards agreements provide only for reporting of the export and import of certain nuclear material. Expansion of the existing requirements for nuclear material reporting to all nuclear material in all peaceful activities would provide assurance that nuclear material which is not currently subject to reporting, is used in accordance with a State's basic undertakings under a safeguards agreement.

Reporting by all States on the export and import of certain equipment and non-nuclear material would provide a greater measure of openness about nuclear activities. Hence, it would contribute to confidence in the peaceful use of such equipment and material, as well as associated nuclear material.

The IAEA safeguards system has evolved very significantly since the publication in 1961 of its first Safeguards Document. However, events of 1991 made it clear that the evolutionary development of safeguards approaches needs acceleration.

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38   David Fischer, Paul Szasz, *Safeguarding the Atom: A Critical Appraisal,* SIPRI, 1985..pp. 23-34.

Additional safeguards measures are necessary to provide assurance that undeclared nuclear material and nuclear facilities do not exist in States which have entered into comprehensive safeguards agreements. Such measures must be introduced at an early date. Substantive progress has been made in considering various additional safeguards measures. This progress is the result of coordinated effort involving Member States, international consultants, the Standing Advisory Group on Safeguards Implementation (SAGSI), and the Secretariat.

Safeguards Elements of Cutoff Convention

From the identified diversion signatures a list of appropriate safeguards/verification techniques is provided. These are defined into three generic types of methods, varying from the least to the most intrusive:

- Technical Means[39],
- Routine Inspections, and
- Special Inspections[40].

The technical means are non-intrusive methods and comprise reconnaissance satellite systems using either photographic, infrared, radar or electronic sensors, and radar and acoustic systems. Chemical and radio-nuclide environmental detection and monitoring methods and non-technical intelligence collection and analysis means are also defined as technical means.

The routine inspection techniques include existing, or potential, IAEA safeguards (e.g., on-site surveillance, containment and accountancy) which require the presence of a resident or non-resident inspector, using either off-site or on-site equipment to facilitate inspections using non-destructive or destructive analysis. Sampling, which involves off-site analysis, is considered to be destructive analysis.

Special inspections are as defined in INFCIRC/153, and would in principle include both destructive and non-destructive analysis techniques. A descriptive qualitative assessment is provided of the effectiveness of verification methods, for a given facility diversion.

Technological developments and safeguards instrumentation for the fissile material Cutoff Convention, are changing the way inspectors are able to verify nuclear materials at many facilities around the world. Many new instruments ranging from advanced video monitoring systems to miniature detectors and analyzers already are in place. Behind the development of many of these new safeguards instruments are a number of factors. They include:[41]

- Technological advances in computer-related fields, such as micro-processing and electronics, and specific areas of instrumentation,

39   These are also referred to in the literature as National or International Technical Means. For the purpose of this report, the ownership of the verification technique is not a concern.

40   These are also sometimes referred to as unannounced inspections.

41   *IAEA Safeguards Implementation at Nuclear Fuel Cycle Facilities*, IAEA, Vienna, 1985. pp. 22-68.

- Technical developments in the nuclear industry, and
- Efficiency improvements and efforts to reduce the costs of safeguards implementation.

Specially, recently a number of new instruments have been approved for use or have entered the final stage of development. They include:[42]

- Core discharge monitor (CDM),
- Miniaturized gamma detector probes (CdTe),
- Spent fuel attribute tester (SFAT),
- High count-rate gamma spectroscopy system (HCRS),
- Multi-camera optical surveillance system (MOS),
- Generic review station (GRS), and
- In-situ verifiable seals (COBRA, ARC).

IX. CONCLUSION: ONLY VERIFICATION OF NUCLEAR NON-PROLIFERATION CAN SECURE THE FUTURE

Over the past 30 years, efforts toward preventing the proliferation of nuclear weapons to further countries have been rather successful, a fact frequently overlooked. The number of States having overt nuclear-weapons programs has stayed at five. A few others are thought to have the capability of assembling nuclear weapons in a short time, if they do not already have them.

Historically less successful have been attempts to halt vertical proliferation — to reduce the number of nuclear weapons among the five declared nuclear-weapon States. Of late, the situation is changing, The United States and Russian Federation are moving to make very substantial cuts to their tremendous nuclear stockpiles, which no longer are menacingly targeted at each other. One can even hope that the prevailing climate will lead all nuclear weapon states to more deeply question the need for the costly nuclear tests they have conducted at the rate of one every nine days since 1945.

On various fronts, international efforts to fortify the nuclear non-proliferation regime are responding to challenging conditions. A combination of factors are at play, and solutions must address a range of interests. But the global climate is right for sowing seeds of constructive change. Ultimately, international efforts to make the nuclear non-proliferation regime more effective show signs of bearing fruit.

The international climate should enable us radically to strengthen safety in the relations between States and reap the benefits from it. Effectively verified nuclear disarmament and non-proliferation are essential parts of that safety. As a matter of course, the IAEA can play a significant role in the new international safety regime.

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42   *IAEA Safeguards Guidelines for States' Systems of Accounting for and Control of Nuclear Materials*, IAEA, Vienna, 1985. pp. 9-12.

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