

# Activities to Further Nonproliferation and Encourage Confidence Building Measures on the Korean Peninsula

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## **Abstract**

In the post-summit climate a number of confidence building measures (CBMs) are available. Most importantly, at this time the necessary political will exists to improve the North-South situation. Official announcements since the summit have created CBM opportunities in the area of trade and economic cooperation, where cooperation on pragmatic technical goals could confirm the promise of the summit agreements. It is also appropriate to consider CBMs that might set the stage for progress toward chemical and nuclear nonproliferation goals. Measures that might draw the DPRK into the Chemical Weapons Convention would address a continuing imbalance in North-South treaty participation. Training and treaty compliance preparations for the CWC could be useful starting points. It may also be time to revive the 1992 Denuclearization Agreement. Here also, training and planning procedures are the most likely near-term activities. In addition, involving the DPRK in the Asia Pacific Nuclear Transparency Project, under the auspices of the Council for Security Cooperation in the Asia Pacific (CSCAP), has the advantage of using a broad regional cooperation to defuse potential North-South sensitivities in the nuclear area. Finally, the conventional force situation offers prospects for CBMs that rely on military-to-military cooperation in training and workshop participation. The measures suggested might set the stage for actual force reduction or arms control measures agreements at future summits.

## **Introduction**

Ideas about nonproliferation and possible confidence building measures take on added significance in these months after the historic meeting between President Kim Dae-Jung and Chairman Kim Jung-Il. It is appropriate to both re-examine previous proposals and look for new ideas in this critical time. This paper may stimulate some useful discussion and assist the Korean reconciliation process.

This paper reflects the approach to confidence building measures (CBMs) and regional security that has been developed at the Cooperative Monitoring Center of Sandia National Laboratories. As part of a U.S. Department of Energy (DOE) laboratory, the CMC looks at security and proliferation problems around the world from a technology viewpoint. Over several decades the U.S. DOE laboratories have developed many technologies to support global and East-West treaties and agreements. Following the end of the Cold War, the CMC has studied the application of these technologies to regional and bilateral problems, such as the situation between the Republic of Korea and the Democratic Peoples' Republic of Korea.

Technology by itself is of no value without political will to solve problems and reduce conflict. Fortunately, the Koreans may be at a turning point now where the political will exists and concrete applications are being sought.

Before looking at specific measures and opportunities, it may be useful to make one distinction between the Western experience in CBMs and Asian approaches to security issues. In the East-West confrontation of the Cold War, CBMs were formulated to control opportunities for accidental conflict and to build consensus that conflict could be managed. This reflected the operational approach to reducing tensions through concrete measures. In Asian society, agreement frequently comes from the top and consensus building in the lower echelons may be less important in setting new policy. Therefore,

measures that the West would think of as CBMs, really function as agreement confirming measures (ACM) in Korea. Measures may function more as confirming progress than as initiating improvements. While this difference may seem to limit some CBM opportunities, the ACM path may allow progress in some areas with a greater sense of political endorsement.

This paper identifies opportunities in four areas:

- Trade and the Economy
- Compliance with the Chemical Weapons Treaty (CWC)
- Nuclear Nonproliferation
- Conventional Forces

Because the recent summit has resulted in a number of pronouncements of trade and economic cooperation, that area is most fitting for agreement confirming measures. A number of pragmatic options are available. The Chemical Weapon Convention (CWC) has great significance for nonproliferation of weapons of mass destruction globally. Although the DPRK has not signed this Convention, lack of participation has not yet become highly politicized. Suggestions here aim at encouraging and helping the DPRK prepare to sign and participate in the CWC. In contrast, the DPRK record in compliance with the Nuclear Nonproliferation Treaty (NPT) has been a very sensitive topic since 1992. Reviving the South-North Denuclearization Agreement and eventually bringing the North into participation in a Track II, non-governmental nuclear transparency project may provide a useful path toward decreased nuclear concerns. Finally, the perennial confrontation in conventional forces offers some opportunities for confidence building measures also.

## **Economic and Trade Opportunities**

### Links between North and South for Trade, Construction, and Industry

The joint communiqué of the June 13-15 summit<sup>ii</sup> specifically called for "balanced national development through economic cooperation." Subsequent press releases have prominently mentioned the possibility of establishing railroad links between the Koreas. Therefore, measures that could facilitate the railway links would seem to have high prospects for political acceptance. Two lines have been noted: Up the DPRK's western coast to Shinniuju and on the eastern coast to Wonsan. Ultimately, connection to the Trans-Siberian railroad could yield significant financial benefit to the R.O.K. by reducing transport costs to Europe by up to 30%.<sup>iii</sup>

However, simply connecting rail lines does not mean that shipments travel smoothly across the border. The border transit zones could become jammed with customs-delayed railcars, much to the frustration and financial loss of shippers. The U.S. has experimented with electronic customs forms over the Internet as a means for speeding shipments over the U.S./Mexico border. Although the U.S. and Mexico are on friendly terms, the presence of heavy trade in illegal drugs does make border crossing an ordeal for some shipments. An additional incentive for expediting cross-border shipping is the intense buildup of manufacturing units that straddle the U.S./Mexico border. As North and South Korea engage in cooperative economic construction, these motives could be equally important for the Korean peninsula.

In the conceptual U.S./Mexico system<sup>iv</sup>, customs inspectors would seal shipments at the factory of origin, placing an electronic seal on a container or a railcar. Then they would send the customs form to the border via an encrypted and authenticated Internet link. When the shipment arrives the paperwork would be already on hand, the electronic seal could validate that the shipment had not been tampered with, and the inspector could pass the container or railcar without actually opening it. Cooperation between North and the South Korea might involve adapting this computer-based system to Korean conditions. This could be a useful way to confirm the intent to increase trade and also set the stage for other cooperation.

## **Coastal shipping and fishing fleets**

Dr. Cheon Seongwhun of Korea Institute for National Unification, KINU, has pointed out opportunities in coastal shipping<sup>v</sup> and the fishing fleets. The tourist cruise ships to Mount Kumgang are escorted by each side's navy in their respective coastal waters. However, in case of an accident at sea, coordination of rescue efforts<sup>vi</sup> could be difficult, especially in a severe storm. Sandia has demonstrated a tracking system<sup>vii</sup> that could help both sides follow the cruise ship and acquire data on various safety-related systems. Using the commercial INMARSAT satellite system, the Hyundai Corporation in Seoul and the Committee for Peaceful Reunification of the Fatherland in Pyongyang could both have access to this information. Cooperation in setting up the sensors, purchasing the computers, and training the operators would be useful steps toward confirming economic cooperation agreements and should fit within the scope of the June communiqué.

Of course, the modern Hyundai cruise ships are not the most likely victims of an accident or storm, but rather the fishing fleets of the R.O.K. and the DPRK. Testing of the tracking and monitoring system on the cruise ship could provide the necessary technical experience to develop system for the fishing fleets. A benefit beyond safety would be that both sides could control their fleets better, helping to avoid inadvertent intrusion into exclusive economic zones. It is possible that this technical application could have averted some naval skirmishes in the past years.

## **Chemical Weapons Convention**

Assuming that the Agreed Framework proceeds on schedule, the possibility of a nuclear threat to the Republic of Korea will stay contained<sup>viii</sup>. However, considering the population density of Seoul and its proximity to the North-South border, the threat of a chemical weapon attack is still quite frightening as far as civilian casualties are concerned.

The Chemical Weapons Convention (CWC), which the Republic of Korea signed in 1993 and ratified in 1997, aims to prevent such a disaster by prohibiting production, retention, or transfer of chemical weapons.<sup>ix</sup> Unfortunately, North Korea is not among the 171 countries that have signed this convention. Clearly, it is in the interest of all Koreans (and the 37,000 U.S. troops) that the DPRK sign and ratify this important international convention.

It seems to be widely assumed that the DPRK has some chemical weapons capability. Many countries have conducted chemical weapon research, if not deployment of actual munitions. In fact, for a country in a tense military situation, some past interest in chemical weapons might even be a understandable activity from a historical perspective. Identifying measures that will help the DPRK prepare to sign the CWC may be a productive approach to engagement.

If the DPRK has had some CW program in the past, it may have real concerns about signing the CWC, even if those programs did not lead to deployed munitions or are no longer in operation. Under the CWC, requirements for declarations and subsequent inspections are quite exhaustive and rigorous. Declarations, routine inspections, challenge inspections, destruction of chemicals and facilities all require about 100 pages of text to describe; this is more than twice the length of the Convention itself. North Korea, reflecting on its confrontation with the International Atomic Energy Agency (IAEA) in the early 90's regarding nuclear declarations and inspections, may foresee great difficulties in showing compliance with the CWC - even if it has no current chemical weapon program.

### Declarations

There are two paths that the South might take to help the North prepare to sign the CWC, assuming that there is no current CW program in the North. The first is to share the experience in the South in meeting the declaratory requirements of the CWC. Keeping in mind that CWC declarations cover more than 100 chemicals, their inventories and production rates, the DPRK may face real administrative problems in

submitting complete and accurate declarations, even assuming the best of intentions. Meeting the declaratory requirements is something that the chemical industry of each signatory country has had to face. It is entirely possible that the business structure of a command economy has not provided North Korean chemical enterprises with the accounting and inventory infrastructure to comply with the CWC requirements. In the South, organizations like the Korea Specialty Chemical Industry Association (KSCIA)<sup>x[x]</sup> have already faced this challenge successfully. With 108 member companies manufacturing a myriad of chemicals for agriculture, industry and pharmaceutical use, the KSCIA might form a working group to transfer their experience in preparing declarations to a similar industry group in the North. It would not be necessary for KSCIA members to perform the North's declarations, or ever see any declarations themselves; their role would only be to train Northerners in how to comply with declaratory obligations.

## **Inspections**

The natural consequence of submitting declarations is to experience baseline inspections for the purpose of verifying the declarations. This is the step where the North ran afoul of the IAEA in 1992 after they had filed their NPT safeguards declarations. Perhaps the North never understood how sophisticated and effective an international inspection regime could be, having never participated in the IAEA process before. Now, however, the North may be very concerned about submitting to the inspection regime required by the CWC.

One way to encourage them would be to provide training in hosting inspections under the CWC regime. In the U.S., the chemical and defense industries realized that hosting an inspection was far more difficult than merely giving a guided tour to a group of visitors. They realized that hosting methods were needed to help them show compliance to the CWC, while at the same time, allowing them to protect unrelated economic, security, and engineering information.

One result from the U.S. preparations for the CWC was a computer-based, training simulation of an inspection, known as *Augmented Computer Exercise for Inspection Training (ACE-IT)*.<sup>xi[xi]</sup> Participants in an *ACE-IT* simulation can play roles as "inspectors" or "hosts" and negotiate an inspection within an accelerated time schedule. *ACE-IT* uses extensive still camera imagery, virtual reality displays, and the full suite of inspection processes to make an effective training tool. This kind of training could be performed at Sandia National Laboratories in the U.S., a neutral location, or even over the Internet. Maximum utility as a confidence building measure might come from mixing South and North participants into inspector and host teams in a joint workshop.

## **Nuclear Nonproliferation**

### Policy of Nonproliferation

Perhaps no country has more to lose by instability in the nuclear nonproliferation program than the R.O.K.. With a potential adversary only a few kilometers from Seoul, and with two powerful nuclear neighbors, proliferation would tend to worsen the R.O.K.'s security position.

The R.O.K. has abided rigorously by the principles of nonproliferation. Furthermore, R.O.K. has exceeded the requirements of the *Treaty on the Nonproliferation of Nuclear Weapons (NPT)*<sup>xii[xii]</sup> by agreeing to not engage in enrichment and reprocessing in order to obtain a similar promise from the North<sup>xiii[xiii]</sup>. We may not know for sure whether the North has adhered to this bargain for some time - not until delivery of the KEDO nuclear components occasion a renewal of IAEA inspections - but there are benefits in proceeding in good faith. That is, nonproliferation and R.O.K. security are better served by reviving the cooperation provided under the 1992 agreement, rather than by discarding it.

### 1992 Denuclearization Agreement - A Revival?

The specific denuclearization provisions prohibit weapons themselves and the capability to process weapons material:

"The South and the North shall not test, manufacture, produce, receive, possess, store, deploy or use nuclear weapons."

"The South and the North shall not possess nuclear reprocessing and uranium enrichment facilities."

While the first requirement actually prohibits nuclear weapons, it is the second requirement that provides a more readily verifiable condition: neither side shall have the facilities to produce weapons grade uranium or plutonium. Hence, the Agreement calls for mutual inspections of facilities:

"The South and the North, in order to verify the denuclearization of the Korean peninsula, shall conduct inspection of the objects selected by the other side and agreed upon between the two sides, in accordance with procedures and methods to be determined by the South-North Joint Nuclear Control Commission."

Signed: Jan. 20, 1992  
In Force: Feb. 19, 1992

The R.O.K. Prime Minister and the DPRK Premier signed this agreement. Several analysts have suggested that this agreement needs to be reinvigorated by explicit endorsement by the very highest officials, President Kim and Chairman Kim. This may be necessary and should be considered if it would help facilitate the ideas discussed below. The Denuclearization Agreement could be a very useful vehicle for CBMs and has a high potential to further nonproliferation goals.

While recognizing that the R.O.K. has limited its technological base by depending upon other countries for fresh fuel and for reprocessing spent fuel (if that option ever becomes economical), let us consider two CBMs that the 1992 agreement might suggest.

1. **Training of inspectors** has been offered in 1993 by the U.S. to facilitate the 1992 Denuclearization Agreement. One class of R.O.K. nuclear engineers trained at Los Alamos National Laboratory (LANL) for inspections, but joint Nuclear Control Commission (JNCC) talks collapsed before inspections actually occurred. Over the intervening years, new approaches to inspection methods have been developed, particularly in response to the needs of the CWC.

Entry into Force of the CWC, has necessitated preparations for challenge inspections under conditions of "managed access". Because the 1992 agreement is concerned with inspections to assess capabilities, a second round of training might emphasize the development of managed access techniques. The goal would be to allow facility capabilities and use to be assessed without losing control of unrelated security or economic information. We could take advantage of the increased development of managed access techniques to train for inspections that are closer to the spirit of the "inspection of objects".

In fact, if the R.O.K. and U.S. had more experience with managed access in 1992, the results from the first meetings of the JNCC might have been better. The North offered inspectionsxiv[xiv] of Yongbyon and demanded permission to search U.S. bases for nuclear weapons. Since the U.S. had removed all nuclear weapons the previous year, perhaps a managed access arrangement could have protected military secrets and kept the Denuclearization Agreement alive. (Perhaps not, as the DPRK was on a collision course with the IAEA in any case.)

The inspections called for in the 1992 Agreement would still need bilateral negotiation through a South-North JNCC. A CMC role could be to convene a working group of R.O.K., DPRK, and U.S. experts to define (not negotiate) potential inspection modalities. The working group could be

considered as an informal (Track-II) preparatory step for the re-convening of the JNCC. At some stage these mutual inspections might require training for the inspectors, if only on how to behave during an inspection to avoid generating adversarial problems. The CMC could help here too, by organizing the training in collaboration with the training experts at SNL and LANL. The *ACE-IT* training simulation, developed for the CWC, would be a valuable workshop tool.

2. **Remote monitoring** of nuclear facilities affords an effective way to provide South-North transparency with low intrusiveness. These technologies could permit a limited stream of agreed-upon information to flow over secure Internet or telephone lines to provide assurance of safety and nonproliferation consistent with the 1992 agreement. Simple sensors could verify that a facility remained closed, or that operations from a facility were safe, or that spent fuel remained in a storage pond. Motion or radiation detectors could trigger video cameras so that events could be analyzed quickly without personnel actually being on-site.

Testing of remote monitoring technology is being carried out around the world by various engineering laboratories in cooperation with the IAEA.<sup>xv[xv]</sup><sup>xvi[xvi]</sup> The R.O.K. is participating in these tests in order to understand the technologies and to prepare for their eventual application under the IAEA safeguards program. The R.O.K. Ministry of Science and Technology has agreed that the IAEA and Sandia Laboratories will carry out field tests at Younggwang #3 and Wolsung #1 reactors.<sup>xvii[xvii]</sup>

The Korea Atomic Energy Research Institute (KAERI) will provide technical support to this project through their Remote Monitoring Lab at the Technology Center for Nuclear Control (TCNC). Encrypted remote signals will go to IAEA as well as KAERI for evaluation. The goal of the test system will be to track the movement of spent fuel from a CANDU-style reactor to the storage silos on site. This involves identifying each fuel assembly by radiation signature and video image and showing that the same assembly is tracked through various handling facilities.

In the long run, KAERI is also planning to create the capability for the central monitoring station to receive remote monitoring data from all R.O.K. facilities for national safeguards. This broad scope could be expanded to eventual DPRK nuclear facilities. A reciprocal South-North exchange of selected data might satisfy the inspection aspects of the Denuclearization Agreement.

### Regional Nuclear Transparency

Delivery of two, 1000 MWe (megawatt electric) light water reactors to North Korea under the 1994 Agreed Framework is intended to defuse the concern about proliferation in the North. Because the light water reactors change out fuel rods less frequently, and much more obviously, than do the originally planned, graphite-moderated reactors, this agreement greatly reduces proliferation concerns regarding the DPRK.

The reactors being built by the R.O.K. at Sinpo will be under IAEA safeguards and compliance with IAEA safeguards is the most important nonproliferation guarantee. Nevertheless, many observers would be more comfortable if the activities in the North were more transparent. Outside observers would like to be able to make independent assessments of nonproliferation and safety, supplemental to IAEA safeguards.

R.O.K. nuclear activities are increasingly transparent. Public tours are available at the Korea Electric Power (KEPCO) reactors and KEPCO maintains a large public information web-site, where data on daily operations and safety are available.<sup>xviii[xviii]</sup> The Korea Institute for Nuclear Safety (KINS) maintains a nationwide radiation monitoring system, known as *IERNet*, as part of their responsibility to help organize response to any nuclear emergency. KINS provides this data, updated hourly on their web-site, along with other public information.<sup>xix[xix]</sup>

Korean interests in nonproliferation and safety would both be advanced if the DPRK could be encouraged to emulate the R.O.K. transparency. A regional project in nuclear transparency under the non-governmental Council for Security Cooperation in the Asia Pacific (CSCAP) may be a good way to

approach this goal.xx[xx] CSCAP functions through the combined efforts of 17 member committees, meeting in five topical working groups. The DPRK also participates in CSCAP, as do both China and Taiwanxxi[xxi].

Under CSCAP auspices a working group of nuclear experts have directed the CMC at Sandia National Laboratories to build a transparency web-site.xxii[xxii] Los Alamos National Laboratory (LANL) contributes their experience in developing transparency in airborne radiation monitoring. Although this efforts is far from complete, the website already has descriptions of the nuclear industries of the Asia Pacific and information on technologies that might be useful for nuclear transparency.

The most important feature is that the web-site is beginning to provide a convenient, "one-stop shopping" access point to safety and operating data from the whole region. For example, with permission of the Korea Ministry of Science and Technology (MOST) the website links to data posted by KINS. KINS has also provided the site with descriptions of their safety program in Hangul and English. KINS and the Korea Atomic Energy Research Institute (KAERI) have been regular participants in the CSCAP working group directing this work.

In the future, every step in deepening and broadening R.O.K. and regional participation in the CSCAP web-site will help establish a tradition of transparency as a norm for the industry in the Asia Pacific. The CSCAP nuclear transparency working group plans to build on this tradition to include active DPRK participation as the KEDO project moves closer to delivery of the key nuclear components.

Eventually, it may be desirable to consider institutionalizing regional nuclear transparency to deepen, formalize and render permanent the safety and nonproliferation gains. The Korea Institute for Defense Analysis (KIDA) has suggested an ENTNEAxxiii[xxiii] institution (Enhancing Nuclear Transparency in Northeast Asia) as a formal body to assume responsibility for measures like those initiated by CSCAP. KIDA suggests that transparency that could significantly improve the nonproliferation situation will require more official management and cooperation in developing agreements.

## **Conventional Forces**

Discussion of North-South tensions sometimes focus exclusively on weapons of mass destruction and missile proliferation issues. However, conventional force capabilities on the peninsula are highly developed. In fact, with Seoul within artillery range of the North, missiles are somewhat beside the point.

In collaboration with analysts from the Korea Institute for Defense Analysis (KIDA) and the Korea Institute for National Unification (KINU) our organization has given some thought to conventional force CBMs. The CBMs mentioned below could be useful either as concrete tension reduction measures or as subjects for North-South military-military cooperation in training workshops.

### Cooperation in aerial observation

Cooperation in aerial observation could offer an opportunity to establish a useful tension reduction measure on the Korean Peninsula. Using the European *Open Skies Treaty*xxiv[xxiv] as a model, the R.O.K./U.S. side could propose a series of confidence building measures that offer tangible benefits to the DPRK with minimal risks to either side. The proposal would offer training in *Open Skies* methodology and could expand to include a unilateral offer of an aerial observation flight over South Korea.

The information obtained by the DPRK would supplement, or perhaps replace, what they already obtain through espionage and infiltration. Analysis would show what the R.O.K./U.S. have claimed all along: that alliance forces are in defensive positions and pose no offensive threat to the North. Thus, over-flight cooperation might reduce North Korean tensions and their perceived need to engage in provocative infiltrations.

Aerial observation can be proposed as a process with several steps that could build a cooperative relationship with North Korea. Three options are described below; however, there are other possible variations:

- 1) North Korean and South Korean teams could be invited as observers in a European flight. In this step officers from the R.O.K. and DPRK could develop a shared understanding of how aerial observation missions are negotiated and carried out. This stage merely provides a common technical and procedural background and does not obligate either party to further actions. Hungary and Romania have an agreement for bilateral flights<sup>xxv</sup>[xxv] with photographic systems (not the full suite of permitted sensors under *Open Skies*) and could invite Korean teams to fly with them. As a result of such experiences, the entities of Bosnia Herzegovina have now agreed to develop their own aerial observation agreement.
- 2) North and South Korean teams could participate in an Asian-context, aerial observation workshop. Staging the workshop in Kazakhstan and inviting some other Asian participants could remove the "European precedent" aspect that North Korea may find objectionable, and defuse the North-South emphasis. Other countries that could be invited could include the Central Asian states, India and Pakistan, or other Former Soviet Republics that might be interested in *Open Skies*.

The Association Institute of Nonproliferation (AIN) in Kazakhstan has already expressed interest. Furthermore, the AIN participated in tests of the DOE's *Airborne Multisensor Pod System* (AMPS)<sup>xxvi</sup>[xxvi] in 1997 and has experts who could contribute to the technical aspects of the workshop.

- 3) The R.O.K./U.S. side could unilaterally offer North Korea an observation mission over South Korea. Using the *Open Skies* model, this would involve flying an agreed-upon sensor system over a negotiated flight path with officers of all parties on board. For simplicity, and to avoid technological intimidation, the sensor system should be confined to the visible photographic mode with 30cm resolution. The R.O.K. and U.S. have suitable, multi-passenger observation craft such as the P-3, or potentially the U.S. *Open Skies* aircraft, a modified C-135, could be used. Another option would be to utilize a helicopter and a hand-held digital camera, which the U.S. has demonstrated<sup>xxvii</sup>[xxvii] can also provide satisfactory images.

A feature of this offer might be to fly in a neutral, third party aircraft. However, third party options are somewhat limited due to logistical considerations. Canada, with traditional strong interests in the Korean peninsula, and Russia with low cost equipment, are top choices.

A South Korean over-flight might be first conducted as a one-time demonstration. If the experience proved to be favorable, a formal agreement could then be developed. The role of the third party and their aircraft could be formalized as necessary at that time and dedicated equipment could be purchased for regular use later.

Over time, successful unilateral flights might be extended to bilateral flights over the entire peninsula. It may be expected that, due to existing satellite coverage, the R.O.K./U.S. would not gain significant new information; however, the additional step in cooperation would be significant. These bilateral flights might focus on resource management, disaster relief, and agricultural topics in order to provide concrete incentives for DPRK participation.

In the longer term, other countries in this region have expressed an interest in becoming a party to a regional aerial observation agreement. Twice the U.S. has briefed the Japanese government on *Open Skies*, placing the U.S. *Open Skies* aircraft on exhibit there. In addition, an aerial observation CBM served as the centerpiece of the U.S. presentation to the ASEAN Inter-Sessional on Regional Defense Security in Kuala Lumpur in November 1998.<sup>xxviii</sup>[xxviii]

#### Joint Testing of Border Monitoring Sensors

The CMC and the Korea Institute of Defense Analyses (KIDA) studied the potential cooperative application of sensors to monitor the DMZ.xxix[xxix] Focusing on early warning of a major intrusion from either side, motion, magnetic and intrusion sensors could trigger video cameras. Images and sensor data would go automatically to guard stations on both sides of the DMZ. The monitoring system might allow both sides to avoid confrontations by means of reducing the need for foot patrols inside the DMZ. Ultimately, perhaps troop concentrations could be lowered when the reliability of sensors had achieved suitable levels.

The results of the study have been published by the CMC and KIDA, presented at the Canada-Korea Bilateral Workshops, and briefed to organizations with contacts in the DPRK. North Korean visitors to the CMC have been quite interested in the technology; however, further discussions will be necessary to ensure that they understand the cooperative aspect of the suggested application. In regional workshops at the CMC, Chinese and Japanese visitors have expressed unofficial interest in helping with field tests to demonstrate and develop a conceptual monitoring system.

The critical point is that a test of equipment does not commit the DPRK or R.O.K to reduce troop presence during the test. A test is just a way to gain operational experience, identify equipment problems, train Korean technicians and engage Korean engineers in the process. To emphasize this distinction, we might consider tests away from the DMZ itself, but in a terrain that presents the environmental and operational problems realistically. A test in the Republic of Korea may be too sensitive.

## Conclusions

In the post-summit climate a number of confidence building measures are available. Most importantly, at this time the necessary political will exists to confirm the promises of cooperation and coexistence. Official announcements have created immediate opportunities in the area of trade and economic cooperation, where cooperation on pragmatic technical goals could confirm the promise of the summit agreements.

Although discussion at the summit of nonproliferation goals has not been elaborated in the press, it is appropriate to consider measures that might either draw the DPRK into the Chemical Weapons Convention or revive the 1992 Denuclearization Agreement. The measures suggested here aim at enabling DPRK participation in the CWC and reviving the Denuclearization Agreement. Involving the DPRK in the CSCAP nuclear transparency project has the advantage of using a broad regional cooperation to defuse potential North-South sensitivities in the nuclear area.

Finally, we have looked at the situation of conventional forces on the peninsula. The summit does not appear to have touched on this topic. At this point, the prospects for CBMs in conventional forces would seem to emphasize military-to-military cooperation in training and workshop participation. Actual force reduction or arms control measures would require a summit agreement in the future. The measures suggested here might set the stage for a fundamental agreement at some later summit.

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- [1] Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under Contract DE-AC04-94AL85000. The Cooperative Monitoring Center helps political and technical experts from around the world acquire the technology-based tools they need to participate in arms control, nonproliferation and other security measures.
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- [7] J. Lee Schoeneman and Eric Fox, "Authenticated Tracking and Monitoring System (ATMS)," Sandia National Laboratories, VST-071, February 1996.
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- [11] "Augmented Computer Exercise for Inspection Training (ACE-IT)," CMC Fact Sheet at <http://cmc.sandia.gov/facts/ace-it/index.html>.
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- [18] The KEPCO radiation data is at <http://www.kepco.co.kr/nuclear.html>.
- [19] The *IERN*et radiation data is at <http://iernet.kins.re.kr/cgi-bin/iernet>

- [20] CSCAP was established in 1993 by two dozen research institutes from 10 countries. It has now grown to seventeen committees. For a history and current description of CSCAP activities, see the web page maintained by the Research School of Pacific and Asian Studies, Australia National University at <http://www.cscap.org>. Other CSCAP reports are available at [http://cmc.sandia.gov/Nuc\\_Trans/CSCAP/writeup.html](http://cmc.sandia.gov/Nuc_Trans/CSCAP/writeup.html).
- [21] By agreement with CSCAP/China, CSCAP/Taiwan representatives participate in working groups but not the plenary meetings.
- [22] The web-site is available at [http://www.cmc.sandia.gov/Nuc\\_Trans](http://www.cmc.sandia.gov/Nuc_Trans).
- [23] Man-Kwon Nam and Sung-Tack Shin, "ENTNEA: A Concept for Enhancing Nuclear Transparency for Confidence Building in Northeast Asia," CMC Occasional Paper, Sandia National Laboratories SAND98-0505/12, June 1999. Also available electronically at <http://www.cmc.sandia.gov/issues/papers/index.html>.
- [24] *Open Skies, Arms Control, and Cooperative Security*, Eds. Michael Krepon and Amy Smithson (St. Martin's Press, New York, 1992).
- [25] Marton Krasznai, "Cooperative Bilateral Aerial Inspections: The Hungarian-Romanian Experience," in *Open Skies, Arms Control, and Cooperative Security*, Eds. Michael Krepon and Amy Smithson (St. Martin's Press, New York, 1992), p. 137.
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- [27] Paul D. Rockett, Sandia National Laboratories, private communication, 1999.
- [28] William J. Wynne, Defense Threat Reduction Agency, private communication, 1999.
- [29] Michael G. Vannoni, Ruth A. Duggan, Man-Kwon Nam, Kwang-Keun Moon, and Myung-Jin Kim, "Confidence Building on the Korean Peninsula: A Conceptual Development of Limited-Force Deployment Zones," Sandia National Laboratories SAND97-0583, April 1997.