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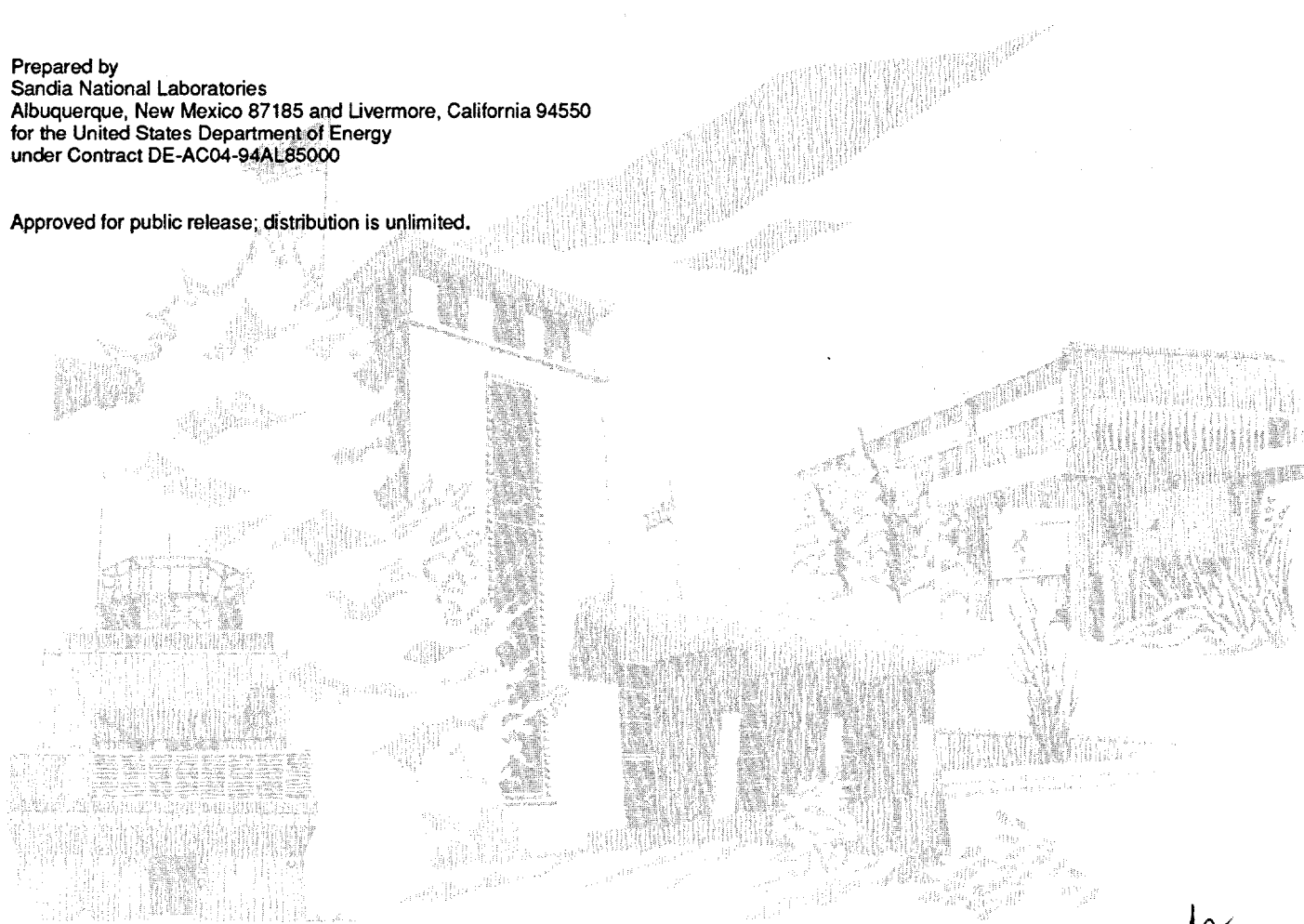# Enhancing Regional Security Agreements Through Cooperative Monitoring

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Enhancing Regional Security Agreements Through Cooperative Monitoring

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Abstract

Since the end of the Cold War, the international community has increased significantly the importance it places on regional security. 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, mass immigration, and ethnic antagonisms are more likely to escalate into regional wars. Regional wars can have global consequences, especially when the countries involved possess weapons of mass destruction. In the United States and Europe, there is a growing consensus that the openness provided by confidence-building and transparency measures plays an important role in enhancing security. This concept also has become part of regional security discussions in the Middle East, South Asia, and the North Pacific. Although many countries are uneasy with the concept that increased openness can enhance their security, they acknowledge the need to decrease regional conflict and appear receptive to considering new options. Recent progress in the Middle East peace process has accelerated discussions of potential regional confidence-building and transparency measures. The United States also is promoting a number of such measures between India and Pakistan.

This paper proposes that strengthening regional capabilities for formulating and implementing arms control and confidence-building measures is a tangible method of enhancing regional security. It discusses the importance of developing a regional infrastructure for arms control and confidence building and elucidates the role of technology in facilitating regional arms control and confidence-building agreements. In addition, it identifies numerous applications for regional cooperative monitoring in the areas of arms control, resource management, international commerce and disaster response. The Cooperative Monitoring Center at Sandia National Laboratories, whose aim is to help individual countries and regions acquire the tools they need to develop their own solutions to regional problems, is discussed briefly. The paper ends with recommendations for establishing regional cooperative monitoring centers.

Since the end of the Cold War, the international community has increased significantly the importance it places on regional security. 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, mass immigration, and ethnic antagonisms are more likely to escalate into regional wars. Regional wars can have global consequences, especially when the countries involved possess weapons of mass destruction. In the United States and Europe, there is a growing consensus that the openness provided by confidence-building and transparency measures plays an important role in enhancing security. This concept also has become part of regional security discussions in the Middle East, South Asia, and the North Pacific. Although many countries are uneasy with the concept that increased openness can enhance their security, they acknowledge the need to decrease regional conflict and appear receptive to considering new options. Recent progress in the Middle East peace process has accelerated discussions of potential regional confidence-building and transparency measures. The United States also is promoting a number of such measures between India and Pakistan.

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 likely will remain important in many regions, it will not obviate the need for a strong indigenous infrastructure for both the development and implementation of region-specific options for confidence-building and transparency measures. This last point merits particular attention because of the many instances in which confidence-building measures are agreed upon but not formally implemented.[1]

Implementation of confidence-building measures strengthens existing agreements and sets 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. Where applicable, investing time and money in cooperatively monitoring the terms of an agreement can contribute significantly to its stability and hence its irreversibility. 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 responsibility for monitoring the terms of an agreement, regional parties should be involved.

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. Regional participation should translate into stronger agreements.

Although many countries have achieved significant technical capability, application of technology to cooperative monitoring of arms control or other agreements is often a new concept. Compared to the United States and Europe, most countries have very few arms control experts, even if those involved on the purely policy level are counted. As a result, 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 will require significant education and training.

Role Of Technology In Regional Security

Solutions to regional security problems are political in nature, not technical. Nevertheless, technically based cooperative monitoring has played an important role in facilitating political agreements in bilateral, multilateral, and regional contexts in the past. Examples include the withdrawal of Israeli troops from the Sinai region of Egypt in the mid-1970s, verification of arms control treaties between the U.S. and the Former Soviet Union, and current air quality monitoring along the U.S./Mexico border to determine the source and character of pollutants.

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

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acquired by the system. A cooperative monitoring regime also must include procedures for dealing with anomalous data or false positives. Such procedures are necessary for constructive problem-solving and are likely to involve human presence and activity.

Because of its sharability, the results of cooperative monitoring can have great utility in open discussions of compliance, but other information also may be important. Countries that participate in cooperative monitoring arrangements generally retain the right to make compliance decisions themselves, using all available information, including that collected from national technical means. Cooperative monitoring should be seen as a supplement, not a replacement, for a country's national capabilities.

Many of the technologies developed in the last decades to support cold-war objectives are neither export controlled nor classified and are applicable to a broad spectrum of regional arms control and confidence-building applications. Examples include detection and assessment technologies, such as unattended ground sensor systems, aerial overflight systems, and commercial satellite imaging systems; data security technologies, such as data authentication and tamper-indication systems; computer modeling and simulation capabilities; and data management, analysis, and fusion systems. Use of these technologies facilitates implementation of agreements by providing the capability to observe relevant activities, to define and measure agreed-upon parameters, to record and manage information, and to carry-out inspections.

Technology has other benefits as well. The availability of standardized monitoring systems to all parties to an agreement can remove personal bias 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 help achieve commitment to the terms of an agreement and contribute to an atmosphere of mutual trust and peaceful resolution of conflict. In addition, the presence of foreign inspectors at sensitive facilities is considered unacceptably intrusive in some countries. The use of remote monitoring technology sometimes can reduce the frequency of inspections, thereby decreasing the intrusiveness of the monitoring regime.

Applications For Regional Cooperative Monitoring

Sources of regional conflict are not limited to military force imbalances or territorial disputes. Indeed, some analysts believe that tensions over environmental degradation and competition for resources may be at the top of the security agenda in the coming decades. This point has been made recently by several authors, notably by Thomas F. Homer-Dixon.[2] If these issues are the subject of future regional agreements, cooperative monitoring likely will play a role in their implementation. Cooperation in solving resource and environmental problems may be perceived as less threatening than cooperation to reduce military threats. Consequently, some regions may be willing to consider confidence-building measures for non-military matters in the near term, which could be an important first step in building an infrastructure for broader cooperation. Similarly, for regions ready to discuss military confidence building, openness regarding *conventional* military issues may be the only viable first step, even when nuclear, chemical, or biological weapons are the primary concern.

Table I lists several regional confidence-building applications that are amenable to cooperative monitoring. Since one objective of confidence building is to reduce regional tension and the underlying motivation to acquire weapons of mass destruction, confidence-building measures for conventional forces and other applications can be regarded as contributing to long-term nonproliferation efforts.

Table I. Applications for regional confidence-building and transparency measures that are amenable to cooperative monitoring			
MILITARY APPLICATIONS			
Nuclear	**Conventional**	**Delivery Systems**	**Chem/Bio**
Fissile material production cutoff	Demilitarized force zones	Missile non-deployment	Production facility closure
Reactor closure	Arms limitations	Missile destruction	Secure storage
Nuclear weapon-free zone	Pre-notification of military exercises	Missile production limitations	Destruction (agent and munitions)
Material disposition and safeguards	Peace-keeping exercises	Missile test restrictions	
Weapon dismantlement			
Test limitations			
Weapon safety and security			
OTHER APPLICATIONS			
Resources	**Environment**	**Commerce**	**Disasters**
Deforestation and desertification	Industrial air and water pollution	Item tracking for export control	Emergency response
Water scarcity	Oil spills	Border security	Disaster prediction
Fisheries depletion		Smuggling	

Importance Of Communication, Education, And Training

As regions debate the merits of increased openness, communication, education, and training about the use of monitoring systems and technologies should be encouraged. Understanding the capabilities and limitations of monitoring technologies can assist decision-making both before and during the negotiating process. Potential verifiability may be an important consideration, even before an issue is placed on the table for discussion, and the availability of technical expertise during the negotiation process can be critical for obtaining meaningful

agreements. After an agreement is reached, significant input from technical experts often is required to work out the details of associated monitoring protocols or agreements.

The work of the Group of Scientific Experts (GSE) at the Conference on Disarmament (CD) in Geneva illustrates the importance of communication with technical experts at the pre-negotiation stage of an agreement. Long before there was a negotiating mandate for a nuclear test ban at the CD, scientists from all participating countries collaborated on the technical issues associated with sharing seismic data internationally. Now that a comprehensive test ban is being negotiated, the work of the GSE will provide valuable information about the structure of the verification regime. Collegial relationships that developed among participating scientists during previous collaborations will ease implementation of any agreed-upon system.

Scientists and technologists also benefit from communication with the policy community. Knowledge about the issues involved in a particular discussion, including the inevitable political sensitivities, will help focus technology programs on relevant problems. Because of the significant lead-times that can be associated with implementing or developing technical systems, early involvement by the technical community can be crucial.

Educating regional parties about a range of verification and monitoring technologies and training them both to use the technology and to design systems of technologies for particular applications also is important. Not only is familiarity with technology needed during the negotiation and implementation phase of an agreement, it will be needed to maintain technical systems after implementation. Thorough understanding of 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 to be able to depend on its own cadre of technical experts.

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.

Trial confidence-building measures or "verification experiments" can provide a good context for training. Such experiments involve participants directly with monitoring procedures and technologies needed to implement a variety of agreements. These experiments can consist of both field exercises and simulations. Field exercises could include visits to potentially relevant facilities or areas, such as shut-down nuclear reactors or missile test sites. If the facility is already being monitored, it could provide valuable insight into the attributes of a monitoring regime for a regional application.

Simulated exercises, modeled on the traditional "war-gaming" approach, also could provide a context for thinking through options for monitoring regimes. A "model text" of a cooperative agreement could be presented and participants divided into groups and tasked with developing monitoring options. In developing a model text, it would be important to incorporate as much historical detail as possible to provide a realistic setting. It also might be important to place the hypothetical agreement in a neutral or imaginary location, rather than in the participant's region, thereby removing political sensitivities from the discussion and allowing the group to focus on technical issues.

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 building in areas such as arms control, resource management, and environmental monitoring. 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 demonstration capabilities include technologies for detection and assessment, data authentication and tamper-indication technologies, scale models of portal monitoring, seismic monitoring for underground nuclear tests, commercial satellite and aerial overflight imagery and analysis, pollution dispersion modeling and visualization, remote monitoring 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 interested 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.[3] 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 and a delegation from South Korea. During 1995, academics and scientists from the U.S., Israel, and Russia will collaborate with Center experts on formulating options for monitoring regional agreements and for storing excess fissile material in Russia.

The establishment of an analytical framework for discussing cooperative monitoring has been a primary objective of the Center's approach. This framework includes at least five elements: establishing the objectives of a potential agreement, identifying observables relevant to achieving those objectives, analyzing signatures of the observables, formulating monitoring options, and describing implementation procedures. This approach is option-oriented, not prescriptive. For example, if a region wants to reduce threats from missile programs, there are a number of potential agreements: an agreement to notify missile test launches; an agreement to limit the range of missiles; an agreement to not deploy missiles within a specified distance of a border; or an agreement to cease missile production activities. Each potential agreement has a different set of relevant observables and associated signatures. In addition, given a particular set of observables and signatures, there are numerous options for monitoring the agreement, with widely varying degrees of intrusiveness. 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.

Establishing Cooperative Monitoring Centers In The Region

Establishing regional cooperative monitoring centers is needed to reach a wider audience. If located in less technologically sophisticated countries, regional centers also could increase the technical confidence of these countries, making them fuller participants in regional security discussions. The centers could support collaborative projects on potential regional confidence-building measures and monitoring, both for arms control and environmental applications.

Development of expertise in technical monitoring ultimately will lead to more regional independence and self-determination in establishing and implementing regional agreements.

Several regional initiatives already exist for cooperation on both arms control and environmental issues. In the Middle East, establishing a regional crisis prevention or regional security center is under discussion in the official multilateral process. Such a center could assume many of the functions of a cooperative monitoring center, as discussed in this paper. Egypt has proposed setting up a regional center for coordinating marine disaster and emergency preparedness in the Gulf of Aqaba, and Jordan has proposed establishing a regional center for environmental education. Efforts also are underway to encourage regional collaborations on water quality, sewage and waste management, and prevention of further desertification.[4] In Northeast Asia, where rapid industrialization is stressing the environment, there is discussion of developing common monitoring methodologies and techniques for studying acid rain and the ecosystem impact of continued growth. If conditions between North and South Korea continue to improve, implementation of their agreed confidence-building measures might become a priority.

Regional cooperative monitoring centers could play a major role in implementing many future agreements. Data from sensors used to monitor the terms of an agreement could be transmitted to regional centers, which could become centers for data acquisition, integration, and analysis. Because of the rapid pace of security discussions in the Middle East and other regions, serious planning should begin now to ensure the readiness of the technical capabilities needed to support a transition to peaceful relations.

Acknowledgments

Endnotes

1. For example, North and South Korea agreed on a set of confidence-building measures in 1991, which were not implemented at the time of the North's withdrawal from the Nonproliferation Treaty. Elsewhere, an agreement between India and Pakistan similar to the U.S./Russia Incidents at Sea Agreement has not yet been fully implemented.

2. "Environmental Scarcities and Violent Conflict," *International Security*, Vol. 19, No. 1, pp. 5 - 40, Summer 1994 and "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security*, Vol. 16, No. 2, pp. 76 - 116, Fall 1991.

3. Libya, Iraq and Iran are noteworthy exceptions.

4. Joel Peters, *Building Bridges: The Arab-Israeli Multilateral Talks*, Royal Institute of International Affairs, Great Britain, 1994.

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