BALUSA VII

INDIA AND PAKISTAN: OPPORTUNITIES IN ECONOMIC GROWTH, TECHNOLOGY, AND SECURITY

"THE ROLE OF TECHNOLOGY IN INDIA-PAKISTAN AGREEMENTS"

A Report of the Albuquerque/Balusa Group

by
Shirin Tahir-Kheli

PREFACE

The seventh meeting of the BALUSA group comprising senior leaders and officials from India, Pakistan, and the United States was held on March 8-12 in Albuquerque, New Mexico. We are most thankful to the W. Alton Jones Foundation for its continued support of the project. We also want to acknowledge the help of the Cooperative Monitoring Center, Sandia National Laboratories for hosting the meeting and for presentations on the role of technology in support of India-Pakistan agreement.

The latest encounter, summarized in the rest of the report, also provides the occasion for some reflections about the diplomacy of the Indo-Pakistani conflict.

Three phases may be discerned:

(1) Diplomacy begins when the alternatives are too bloody-minded to contemplate. In this sense, it is the very absence of other options that stimulates diplomacy although that will not be the real preference, which remains victory over the other side, at least at the outset of the process.

(2) Once the process begins, governments will still try to find and exhaust alternatives to it. Because diplomacy is not the preferred option but rather the one chosen by default, the parties, once engaged, will also be seeking ways to disengage, constantly revisiting other options in the hope of finding the route to victory.

(3) When the search for alternatives other than diplomacy stalls the process (as it will), it restarts as a consequence of a clarifying act of violence: something big enough and bad enough to remind the parties of the reason why they chose diplomacy, that is, the disasters that follow from any other option.

To put this in context, the Indians and Pakistanis agreed to participate in the BALUSA initiative at one level because of the functional imperative. Those at the top, however, remained more interested in "alternatives," that is, victory. Now following the nuclear blasts, the clarifying act of violence, they have reverted to phase one again. Quick progress "top down" will be vital to avoid another cycle of phases two and three, with the attendant risks. That is possible only if the leaders truly recognize the benefits of better relations.

We submit this report in the hope that it will add to the momentum for breaking the cycle of hostility at last.

Harvey Sicherman, Ph.D.
President

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The seventh meeting of the BALUSA group was hosted by the Cooperative Monitoring Center of the Sandia National Laboratories in Albuquerque, New Mexico from March 8-12, 1999. The focus of each of the previous meetings of the group has varied. The March 1999 meeting focused on existing technologies which could be used or adapted for use in implementing a range of agreements between India and Pakistan. Work on these types of technologies for verification of potential agreements already exists and can be adapted for use in the subcontinent by the two countries.

The following participated in the meeting:

The Honorable Shahid Khaqan Abbasi
Syed Babar Ali
Bharat Bhushan
General Mahmud Ali Durrani
Salman Haidar
Air Chief Marshal S.K. Kaul
Shaharyar Khan
General Satish Nambiar
Makhdoom Shah Mahmood Qureshi
C. Raja Mohan
Toufiq A. Siddiqi
Shirin Tahir-Kheli

Also participating in the meeting as presenters and hosts were:

George Baldwin	**Daryl Drayer**	**Ray Prior**
Kent Biringer	**Debbie Evanko**	**W.P.S. Sidhu**
Tom Budge	**Bill Hale**	**Mike Vannoni**
Tim Crawford	**Karl Horak**	**J.D. Yuan**
Matthew P. Daley	**Keith Nakanishi**	
Patricia Dickins	**Arian Pregenzer**	

This report is based primarily on the discussions of the BALUSA group which preceded the larger meeting on the Role of Technology.

In addition to the above and members of the BALUSA group, **His Excellency Dr. Omar Zawawi, Advisor to the Sultan of Oman and host of the March 1998 meeting of the BALUSA group meeting in Muscat, Oman,** attended the first day of the meeting. In his opening remarks, Dr. Zawawi conveyed the greetings of His Majesty the Sultan of Oman to the BALUSA group and spoke of the "surge of hope" in the region following the visit of the Indian Prime Minister to Lahore in February 1999 (hereafter referred to as the Lahore Summit). He forecasted that the benefits to the two countries and to all their neighbors flowing from a productive peace between India and Pakistan was likely to be "astounding".

Achievements of the Lahore Summit

At the very outset, all participants recognized that the opening provided by the Lahore Summit was positive in ending the negative rhetoric coming after the nuclear weapons tests of May 1998. The Summit demonstrated that finally political will existed in both countries for good relations. Improvement in ties was backed by major political parties and that the people of the two countries were ready and eager for forward movement. Worrying about uncertain political conditions with coalition government in India and the threat of derailment resulting from lack of support from some agencies in Pakistan, participants stressed the importance of keeping momentum in the process.

In the absence of immediate gains, all participants felt that a shift in attitudes was beginning to occur with more people in each country recognizing the gains accruing to each with the other and in the region as a result of a productive peace between India and Pakistan. In addition, there was greater recognition of the fact that destructive competition between India and Pakistan reduced the potential of both. Despite the negative rhetoric following the nuclear blasts in May 1998, the attitudes on arms control were changing with recognition that the very security of India and Pakistan in the future cooperation included the nuclear arena. Yet, the group noted that peace between India and Pakistan was a particularly fragile process. Important pockets of opposition to normalization remained within the establishments of both countries to include the security sector, bureaucracies, extremists, and some influential members of the press.

Thus, the group felt that the gains of the Lahore Summit needed to be translated into action in specific areas and the lines of communication strengthened. Against the backdrop of the nuclear tests, the Summit was a remarkable commitment to effect a sea change in the relationship.

Shaharyar Khan came to the Albuquerque meeting from his stint as Manager of the Pakistan Cricket Team which had just concluded a very successful test series in India. The tour took place in the shadow of threats from the right wing in India. However, the

team was met by Mr. L.K. Advani who welcomed them to India. The reception that the team received by the public was representative of the good will demonstrated towards the Pakistani players. Public support for better relations between the two countries was clearly visible reflecting none of the hostility that is often projected by the establishment and, sometimes, the press. However, the group recognized that positive feelings for those across the border are latent and that we are more used to seeing the focus on the negative issues.

Regardless of the pace of future progress, there is growing recognition that war as an instrument of national policy is now unthinkable. Hence, there is a consensus of major political parties that dialogue and a solution of outstanding problems is required. No one underestimates the hurdles that exist in the path of normalization. The process of normalization requires multi-party support as political parties in and out of power can easily scuttle progress. However, the need for a different future is largely accepted by many who were previously wary of any rapprochement, and the "tyranny of petty clerks" was being curtailed. Changing of the mindset for better relations between India and Pakistan has already begun even if it had a long way to go.

Military - to - Military Relations

Given that the Lahore Summit demonstrated political will for better relations, all participants felt that the key ingredient for further movement was the development of links between the military institutions of the two countries. Without some degree of normalcy in the relationship between the militaries of the two countries, participants stressed that normalization was impossible. Discussion of difficulties that exist in the development of such interaction was followed by recommendations of ways in which the process could be moved forward in support of the normalization process launched by the political leaders of both countries. Without such support, maintenance of momentum in normalization will be lost.

Contacts between the military establishments (even if they are private and informal) are necessary in gauging the limits of cooperation. Beyond that, the nuclear capabilities of both countries make it very important that the militaries directly discuss various aspects of the nuclear issue agreed to at the Lahore Summit involving nuclear safety and unauthorized use of nuclear weapons.

As a starting point, exchange of visits by teams from the respective National Defense Colleges is strongly recommended. Such an exchange can lead to direct contact and sharing of perceptions, which is badly needed in order to ascertain precisely what "minimum credible deterrence" means vis-à-vis threat perceptions in the India-Pakistan context.

Contacts between the two militaries are critical to the development of standard procedures for non-escalation and settlement of border/Line of Control issues. While some mechanisms already exist (e.g., hot lines for use by the DGMOs), these are insufficient.

Bi-annual meetings at the Army Headquarters level (Vice Chief of Indian Army and Chairman, General Staff in Pakistan) are needed to discuss force levels, nuclear and missile deployments, avoidance of the arms race, nuclear doctrine, and command and control measures.

Importance of Communications

Forward movement in implementing the decisions of the Lahore Summit requires concerted engagement. Foreign Secretary level talks are insufficient for breaking the log jam. Attention from the political leadership remains crucial for progress in India-Pakistan relations. Hence, lines of communication need to be strengthened. This goal is achieved by (1) appointment of a Special Emissary with close links and direct access to the Prime Minister in each country as an overseer of the normalization process (since the range of issues requires full time attention and cuts across various agencies) and (2) private discussions between the military establishments.

Cost of Conflict Study

The BALUSA group approved the framework for the study assessing the quantitative costs of conflict and the benefits of peace between India and Pakistan. The study directed by General Mahmud Durrani Durrani and Bharat Bhushan is now underway with completion slated for early 2000.

Maintaining the Momentum

Participants felt that the visit of then Prime Minister Atal Bihari Vajpayee to Lahore on February 21, 1999, and the positive results of the bus diplomacy needed to be followed up with additional steps for better relations. Hence, the discussion of the potential steps toward greater confidence building took place with the understanding that bold steps were urgently needed in order to preserve momentum. A list of specific measures which would help in that direction is given below:

Political

- <u>Maintain political oversight of the India-Pakistan normalization process under the direct supervision of the two Prime Ministers.</u>
- <u>Dialogue to continue with the appointment of "Special Political Emissary of the Prime Minister" or a "Minister for Reconciliation" from each side.</u>
- Recognizing that the Lahore Declaration and the Memorandum of Understanding binds the two sides to meaningful talks on all topics, including Kashmir, move on some 'Kashmir-related issues', such as:
    - Establish ground rules to make the LOC free of tensions
    - Reach agreement on the disengagement of troops in the Siachen

- Settle the Sir Creek dispute
    - Settle the Wullar/Tulbul navigation/Barrage issue
    - Cessation of cross-border terrorism and troop reduction

MILITARY/STRATEGIC/NUCLEAR

These have become ever more important in the aftermath of the 1998 nuclear tests, the 1998-99 missile tests and the political opening offered by the meeting of the two Prime Ministers in Lahore in February, 1999.

- <u>Urgently undertake military leadership interaction such as bi-annual meetings between the Indian Vice-Chief of Army Staff and the Pakistani Chief of General Staff to discuss force levels, nuclear and missile deployments, avoidance of arms race, nuclear doctrine and command and control measures.</u>
- Exchange visits of National Defense Colleges teams.
- Initiate immediate meetings, at the user level between the militaries in implementing key provisions of the Lahore Declaration calling for cooperation to reduce "the risk of accidental or unauthorized use of nuclear weapons and discuss concepts and doctrines with a view to elaborate measures for confidence building in the nuclear and conventional fields, aimed at prevention of conflict".
- Develop a clear procedure for non-escalation and settlement of border/LOC tensions.
- Exchange visits of Presidents/Prime Ministers to known nuclear facilities of the other side.
- Establish Joint Technical-Scientific Working Groups to meet as part of the existing agreement on Non-attack on Nuclear Facilities to include discussions on greater transparency between India and Pakistan on a range of issues outlined in the Lahore Declaration.
- Defense Attaches to attend each other's military exercises.
- Meetings of the heads of the respective Atomic Energy Commissions to discuss safety and security of the civilian nuclear sector.
- Use hot lines at the military level for regular and routine communication.
- Restrict the forward movement and deployment of strike forces.

ECONOMIC

- Establish Business Councils in Bombay and Karachi.
- Emphasis on trade liberalization and the induction of only a negative list of items not to be traded rather than the present system of listing items allowed for trade.
- Encourage greater collaboration in Agro-Business between the provinces of Punjab in both countries with the participation of the private sectors in each country.
- <u>Enhance energy cooperation to build a joint natural gas joint pipeline, the sale of excess electricity by Pakistan to India and the creation of a South Asia Electricity Grid.</u>
- <u>Begin joint infrastructure projects with an emphasis on roads, railroads,</u>

<u>communications through joint ventures.</u>

♦ **Allow goods to be transported via roads** recognizing that technology for monitoring trade by vehicular traffic already exists.
♦ **Speed up processing of goods and people** at customs check-posts.
♦ **Hold Special Pakistan Trade Fairs in Delhi, Bombay and Chennai to create interest and opportunities for Pakistani products in India** (important in balanced trade between India and Pakistan).
♦ Encourage participation in each other's trade fairs.
♦ **Undertake joint ventures** focused on technology, particularly software development.

PEOPLE - TO - PEOPLE

♦ **Remove City-Specific restrictions on visas.**
♦ **Open visa offices in Karachi/Lahore and Bombay/Chennai.**
♦ **Allow land crossings and increase frequency of trains** and increase number of border crossings.
♦ **Fund large number of academic/student exchanges.**
♦ **Establish a Newspaper Editors Round Table** to meet bi-annually involving both the English and the vernacular press.
♦ **Availability of each other's newspapers** in the other country.

TECHNOLOGY FOR USE IN INDIA-PAKISTAN AGREEMENTS

An extensive discussion of the full range of existing technologies that could be used to oversee India-Pakistan agreements was undertaken at the meeting. Presentation by experts was followed by discussion on the applicability of these technologies for the subcontinent. The following is taken from the discussion of where existing technologies might help promote confidence between India and Pakistan through joint work:

♦ Weather forecasting and establishment of a joint weather monitoring system.
♦ Monitoring of the international border.
♦ Anti-Drug efforts.
♦ Customs control, particularly if the level of road traffic for trade increases.
♦ Water Management, including flood control, trans-border river pollution control; monitoring of water levels and water flows in agreement on Wullar Barrage/Tulbul issue.
♦ Electronic Monitoring of Maritime borders to eliminate the possibility of arrest of respective fishermen of each country when they unknowingly cross the maritime border.
♦ Environmental Management, including: Air Quality Management; Nuclear Pollution; Forestation; Harbor and Coastal Pollution; Protection of Natural Habitat and wild life protection in ecologically sensitive areas.
♦ Seismology because both countries are earthquake prone. Cooperation in the joint use of agreed facilities; setting up of regional seismology groups with expertise in data interpretation (useful as a CBM as both countries pledge no further nuclear testing).

Overview of Cooperative Monitoring Concepts and the CMC

Kent L. Biringer
Sandia National Laboratories[1]
Cooperative Monitoring Center

INTRODUCTION

International relations are often devoted to establishing agreements that define, control, or regulate issues of potential conflict. These agreements span a full range of national and international issues from resource allocations to national security. The scope of these agreements can vary from bilateral arrangements to global treaties or control regimes. In many cases, elements of the agreement are monitored to verify compliance or increase confidence among parties that the terms of the agreement are being met.

With the end of the Cold War, increasing political and diplomatic attention has been devoted to addressing issues of conflict and potential agreement in many regions of the world. Some of this attention results from concerns over the proliferation of weapons of mass destruction (WMD) that include nuclear, chemical, and biological weapons and their means of delivery. Balanced reductions of nuclear arsenals as well as enhanced protection, control and accounting of nuclear materials represent elements of these security challenges. Elimination of chemical and biological weapons arsenals are also within the WMD concerns. Approaches are needed not only to slow proliferation, but also ultimately to address the root causes of national desires to acquire WMD. The effort to address the motivation for proliferation needs to include regional security, confidence building and arms control.

Conventional military imbalances, territorial disputes and political instabilities as well as pressure over natural resources and the environment offer potential for conflict or promise for cooperation. A range of technologies exist that can be used to monitor borders, commerce and the environment. They can contribute to compliance determination with formal agreements or be used as confidence building measures (CBMs) among nations.

The Cooperative Monitoring Center at Sandia National Laboratories was created to address regional security issues that may motivate countries to acquire weapons of mass destruction. The CMC assists political and technical experts worldwide to acquire the technology-based tools they need to assess, design, analyze, and implement nonproliferation, arms control, and other cooperative security measures.

BUILDING CONFIDENCE

Efforts to build confidence among nations can take many forms. The overall objective is to move from conditions of minimal confidence between nations to conditions that achieve higher levels of trust and cooperation. Minimal confidence is characterized by distrust, lack of

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communication, public resistance to cooperative efforts, and lack of infrastructure within the governments for promoting cooperative agendas. The infrastructure needed consists of political, diplomatic, military and technical components.

The goals of confidence building are to achieve conditions of mutual trust, open communication and dialogue among parties, public acceptance and support for cooperative efforts, and an established infrastructure for addressing issues of concern. Successes along this spectrum of confidence building have been numerous over the past decade. These include improved interactions between U.S./Russia, NATO/Warsaw Pact countries, and Argentina/ Brazil. There are many elements that can contribute to confidence building. They vary from cultural exchanges and increased trade to technical exchanges and security agreements. This presentation focuses on the role that monitoring technology can play in building confidence among nations on a number of issues of regional and global concern.

COOPERATIVE MONITORING CONCEPT

Cooperative monitoring is the obtaining and sharing of agreed information among the parties to an agreement. It makes use of technologies that are shareable among all of the parties to the agreement. The data collected as part of a cooperative monitoring agreement are equally accessible to all of the parties to the agreement. Finally, cooperative monitoring includes procedures for addressing anomalies in the monitoring information. In that way, questions or issues can be resolved to avoid escalation of concerns that could lead to conflict.

There are many examples of cooperative monitoring systems, including formal treaty verification systems as well as less rigorous confidence-building measures. The systems may consist of inspections or sophisticated sensor and data processing equipment accessed remotely. As described later, these systems are not limited to arms control or military applications, but also may monitor a wide range of other regional concerns including natural resources, commerce and trade, the environment, or emergency response issues.

Cooperative monitoring systems supplement rather than replace other national means of data collection, including intelligence means. Ultimately, the entire set of shared and private data forms the basis of making national treaty compliance determinations.

A FRAMEWORK FOR COOPERATIVE MONITORING

In each case, establishment of a cooperative monitoring regime is a process. There is no single monitoring solution. A framework in which to consider the application of cooperative monitoring begins with a context for undertaking CBMs. The context has several elements that include the subject of interest, the scope of the agreement, and purposes for which an agreement is being considered.

A desire for improved relations will eventually lead to specific agreements that form the basis for establishing monitoring regimes. The agreements, whether formal treaties or less formal CBMs, have certain objectives and provisions intended to achieve the goals. Some of these provisions have specific measurable or observable parameters. These may include objects, activities, processes, or movements. Signatures are the specific characteristics of the item, object, or

process being observed. They may include optical characteristics, thermal profile, chemical composition, acoustic patterns, isotopic composition, or other measurable quantities associated with the observation. These signatures allow sensor systems to detect and classify differences between the items observed.

Once the objectives and provisions of an agreement have been determined and the monitoring parameters defined, a wide range of monitoring system options using different types of technology are possible. Other factors such as cost, manpower, redundancy, timeliness, data and hardware security, power requirements, sensor function and display, environmental conditions and vulnerability need to be assessed. In addition, the level of access or intrusiveness permitted under the terms of the agreement will affect the types of possible monitoring systems.

There are feedback loops within the framework as well. Understanding monitoring options and limitations may result in a need to modify the original agreement to establish provisions that can be monitored.

MONITORING APPLICATIONS

Monitoring systems can be utilized for many applications related to arms control and nonproliferation. These include nuclear weapon and material controls, agreements on conventional military forces, limits on strategic delivery vehicles, and chemical and biological weapons agreements.

Nontraditional security topics also present an opportunity for cooperative monitoring. An example is the allocation of natural resources, such as water. Cooperative monitoring and management of pollution, commercial trade, energy resources, and manmade and natural disasters may provide opportunities for initiating dialogue on regional cooperation. Agreements on topics such as these can help reduce tensions that could lead to war or weapons proliferation. Monitoring may also present an opportunity to engage parties in a dialogue and build familiarity with the concept of cooperative monitoring on topics that are less contentious than security topics such as military forces or nuclear programs.

EXTENT AND TYPE OF MONITORING

There is no single way of monitoring. The extent of monitoring required will vary with the application and constraints. Generally, an increase in monitoring will lead to increased confidence that the agreement terms are being met. Political circumstances, specific monitoring requirements and system design will all shape the monitoring design required to achieve various levels of confidence. However, in no case will confidence from monitoring reach 100 percent. All systems are subject to some uncertainty. However, by including redundancy, utilizing different sensor phenomenologies, performing vulnerability analyses, and having extensive coverage, high levels of confidence can be achieved. It should be noted that confidence is as much a political issue as a technical one. The political tone set by national leaders, along with their willingness to provide needed openness, is critical to the technical contribution made by cooperative monitoring systems.

Many monitoring options, from limited monitoring provisions to extensive technical monitoring options, can be incorporated into the terms of an agreement. Human inspectors are a key element of many agreements. Baseline inspections may be included to establish and confirm initial agreement declarations. Agreements may also require regularly scheduled inspections or less frequent challenge inspections if there are concerns or there is evidence of treaty-prohibited activities. Other inspections, known as elimination inspections, may be required to ensure that items to be eliminated under the terms of the agreement have been destroyed or otherwise eliminated. Finally, permanent manned or unmanned monitoring may be possible under terms of an agreement. This monitoring may take place within a facility or outside from the ground, air, or space. Each monitoring option represents a different level of intrusiveness.

COOPERATIVE MONITORING TECHNOLOGIES

Many technologies can be used in cooperative monitoring agreements. Obviously, the specific objects to be monitored and controlled and the provisions of the agreement will establish the best choice of technologies.

Physical security sensor systems are designed to control, monitor, and record movements of vehicles, people, or objects. These may include sensors based on seismic, acoustic, magnetic or infrared technologies. They may also include video systems that can provide a means for identifying objects. Deployments may include exterior applications such as building perimeters, borders or border crossings to detect and characterize vehicle and personnel movement. They may also include interior applications in factories, storage facilities or offices.

Access control technologies limit timely access into secured or controlled facilities. In its simplest form, access control can be simply a locked door to an off-limits area. With increasing levels of sophistication, access control can include more complicated locking mechanisms that require codes, cards, or unique signatures associated with those who are permitted access.

Tags and seals are useful in arms control as well as many commercial applications. A tag is affixed to the object of interest to uniquely identify the item. A seal is used to authenticate whether an item previously closed or inspected has been opened or altered. Passive tags and seals have a unique identifier that is inspected periodically to confirm item identity or integrity. Active tags and seals transmit data about the condition of the seal to allow continuous status checks of the item being monitored. By adding satellite communications and global positioning system receivers, it is possible to track the status and position of monitored shipments of equipment or materials in near real time, anywhere in the world.

Satellite imagery is one way in which wide-area monitoring can take place. While satellites have long been available to only a few countries, extensive opportunities now exist for using the growing sources and capabilities of commercial satellite imagery. Cooperative opportunities exist to share information, conduct joint analyses and provide ground truth needed to permit better interpretation of imagery for cooperative agreements. Commercial satellite imagery has been particularly useful for environmental monitoring and land use planning and characterization.

Imagery from aircraft can also be used in the monitoring of agreements. Sensors based on aircraft can be quickly dispatched to monitor terms of an agreement and can achieve higher resolution than is available from space-based platforms. However, they must have permission to fly over or near the objects of interest. Optical, infrared and radar sensors have all been applied in international aerial monitoring regimes.

Seismic monitoring has been used for decades to measure underground nuclear testing and earthquakes. Seismic sensors placed in the ground record the patterns of earth motion created by explosions or earthquakes. On a smaller scale, seismic sensors can also be used to measure localized ground motion caused by vehicles on roads or people walking along paths. These smaller scale systems are useful as part of the physical security technology described earlier.

Countless other technologies may be useful for cooperative monitoring. Geographical information systems can be used to evaluate facilities subject to on-site inspections and then to plan and track inspections carried out at the facility. Other computer software tools are useful in providing training on how to host or conduct inspections given the specific constraints of treaties such as the Chemical Weapons Convention. Still others can be used to cooperatively design the layout of monitoring sensor systems and model their expected performance. These examples do not exhaust the monitoring possibilities. Other example sensors systems include those for chemical and nuclear materials, and a wide range of environmental monitoring technologies that could support specific applications. Collectively, these and other technologies provide information, which leads to insight on issues of concern between nations.

Individual components need to be integrated into an operational system. This introduces an additional set of design and cost considerations, including the need to communicate between sensors, to transmit data to a monitoring station, and to provide power for the system. Software to manage the sensors and data is another important element in system integration. Data security is also essential. Data authentication provides a means for ensuring that data have not been altered. Data encryption provides codes that scramble the information and require decoding to read the data. System performance and reliability measures, maintenance efforts and expense, and environmental operating conditions also help establish criteria for appropriate monitoring system design and choice of components.
A complete system design and evaluation also must include an assessment of system vulnerabilities. Many analysis tools can assist in analyzing the weaknesses of monitoring system designs.

THE COOPERATIVE MONITORING CENTER
Since the early 1960's the laboratories of the United States Department of Energy have played a significant role in the development and implementation of monitoring technologies in support of international treaties and agreements. These agreements include those for limitations of nuclear testing, elimination of intermediate range ballistic missiles, support of the International Atomic Energy Agency as well support for environmental agreements. In 1994 a program was initiated to make available to other nations some of the technology and experience gained by the United States in developing agreements during the Cold War. The Cooperative Monitoring Center (CMC) at Sandia National Laboratories in Albuquerque, New Mexico was created to address

regional security issues that may motivate countries to acquire weapons of mass destruction. The CMC assists political and technical experts worldwide to acquire the technology-based tools they need to assess, design, analyze, and implement nonproliferation, arms control, and other cooperative security measures. Technologies demonstrated at the CMC are unclassified and exportable. The U.S. Department of Energy (DOE) provides primary CMC funding, with additional support provided by the U. S. Department of State.

Strategic initiatives at the CMC include global nuclear materials management, a stable transition to smaller nuclear arsenals with Russia, regional security and nonproliferation concerns, multilateral arms control, and resource management and environmental security. In collaboration with other laboratories, institutes and agencies, the CMC conducts projects in technology development, issue analysis, design concepts, technology training, field experiments and technical collaborations. Representatives from nearly 80 countries have visited the CMC for discussions on cooperative monitoring concepts, technologies, and applications. Programs of regional focus address Russia and the former Soviet Union, Northeast Asia, South Asia, the Middle East and Latin America.

A wide range of technologies is demonstrated at the CMC. Working with technical, military, policy and diplomatic experts from around the world the CMC explores ways that technologies can be used to monitor agreements and build confidence between nations. Emphasis is placed on monitoring options rather than prescriptive solutions to regional problems. The need to build infrastructure required for evaluating and implementing these cooperative measures is also stressed.

The visiting scholars program brings together international researchers to perform analyses on regional issues of interest to themselves and the CMC. These studies seek to identify ways in which cooperative technologies can be applied to permit implementation of regional treaties or agreements. Some CMC studies have brought together researchers from different sides of an issue such as India and Pakistan or Israel and Jordan. A series of CMC Occasional papers have been produced.

SUMMARY
Cooperative monitoring holds the promise of utilizing many technologies from conflicts of the past to implement agreements of peace in the future. Important approaches to accomplish this are to develop the framework for assessing monitoring opportunities and to provide education and training on the technologies and experience available for sharing with others. The CMC at Sandia National Laboratories is working closely with agencies throughout the federal government, academics at home and abroad, and regional organizations to provide the technical tools needed to assess, design, analyze, and implement these cooperative agreements. In doing so, the goals of building regional confidence and increasing trust and communication can be furthered.