نحو الاتفاق على مفاهيم الأمن

دليل عن التحقق والامتثال

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الأمم المتحدة

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COMING TO TERMS WITH SECURITY: A Handbook on Verification and Compliance

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UNITED NATIONS

COMING TO TERMS WITH SECURITY

A HANDBOOK ON VERIFICATION AND COMPLIANCE

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UNITED NATIONS INSTITUTE FOR DISARMAMENT RESEARCH

THE VERIFICATION RESEARCH, TRAINING AND INFORMATION CENTRE

COMING TO TERMS WITH SECURITY:

A Handbook on Verification and Compliance

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The United Nations Institute for Disarmament Research (UNIDIR—an intergovernmental organization within the United Nations—conducts research on disarmament and security. UNIDIR is based in Geneva, Switzerland, the centre for bilateral and multilateral disarmament and non-proliferation negotiations, and home of the Conference on Disarmament. The Institute explores current issues pertaining to the variety of existing and future armaments, as well as global diplomacy and local entrenched tensions and conflicts. Working with researchers, diplomats, Government officials, NGOs and other institutions since 1980, UNIDIR acts as a bridge between the research community and Governments. UNIDIR's activities are funded by contributions from Governments and donors foundations. The Institute's web site can be found at URL:

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Coming to Terms with Security:

A Handbook on Verification and Compliance

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United Nations Institute for Disarmament Research
Geneva, Switzerland
and
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London, United Kingdom

NOTE

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PREFACE

There is general acceptance by the international community not only that verification of arms control and disarmament agreements can work technically, but that it can work politically. Good verification and compliance arrangements can significantly increase the confidence of parties to an agreement that giving up a type of weapon or other military capability will enhance rather than damage their security. The involvement of parties in monitoring activities and in the management of verification organizations also gives them a stake in the future of their treaty and embeds them further in the international community. While not without its costs, verification and compliance instruments are a security bargain compared to the costs of weaponry and armed forces and the damage they can wreak in armed conflict.

When States generate the political will necessary to negotiate an arms control or disarmament treaty, whatever its nature, they now have a wealth of experience and numerous models to draw on in developing an appropriate, effective and efficient verification and compliance system. This volume is designed to assist such efforts. It seeks to provide, for layperson and expert alike, a guide to the basics of verification and compliance in the field of arms control and disarmament. It is intended to be a companion volume to *Coming to Terms with Security: A Lexicon for Arms Control, Disarmament and Confidence-Building* published by UNIDIR in 2001. Like that volume it is intended as a handbook for officials involved in arms control and disarmament activities, as well as students, researchers and journalists. Also like its predecessor, it does not purport to be exhaustive. Rather, it provides the basic information that is essential to understanding the role of verification and compliance, as well as initiating the reader into specific verification and compliance arrangements and regimes. Like the first volume it also explains key terms and concepts. Finally, it directs the reader to sources of additional information and analysis. This handbook may be used either as a reference book, a training manual or as a lexicon. It may be read from cover to cover, drawn from à la carte or treated as a dictionary.

The book is a collaborative project between UNIDIR and the Verification Research, Training and Information Centre (VERTIC) in London. Funding for the work was received from the Government of the United States of America, which is most gratefully acknowledged. UNIDIR and VERTIC are grateful to Mike Yaffe of the US State Department for conceiving of the idea and supporting the project through its various stages.

Jane Boulden, a Visiting Fellow at Oxford University, was commissioned by VERTIC to produce the initial drafts, which she ably did with the assistance of John Russell, Arms Control and Disarmament Research Assistant at VERTIC. In November 2001 a workshop was held in London to consider an early draft version, attended by UNIDIR and VERTIC staff and experts on arms control and the Middle East. We are grateful for the participation, in particular, of Dr Gershon Baskin, Co-Director, Israel/ Palestine Center for Research and Information, Jerusalem, Israel; Dr Anoush Ehteshami, Professor of International Relations and Director of the Institute for Middle Eastern and Islamic Studies, University of Durham, UK; and Emily Landau, Director of the Arms Control Regional and Security Project at the Jaffee Center for Strategic Studies (JCSS), Tel Aviv University, Israel.

We are also grateful to all the staff of UNIDIR and VERTIC who contributed to the project, including, at VERTIC, Oliver Meier and Angela Woodward, and at UNIDIR Steve Tulliu and Anita Blétry.

Discerning readers may note some definitional and conceptual differences between this volume and its predecessor. This is partly the result of further reflection and the luxury that authors of a second volume have in being able to correct, clarify and elucidate. It also reflects the fact that arms control and disarmament has no governing body which rules on such matters. Quite the contrary, treaty negotiators tend to use whatever terms and concepts seem appropriate and have the best chance of attracting consensus, rather than those that might be logical, consistent with previous practice or elegant.

UNIDIR and VERTIC are under no illusions that this will be the last word on verification and compliance but on the contrary hope that it will be a stimulus to discussion and further research. Above all, we hope that it

will assist those charged with negotiating and implementing new arms control and disarmament agreements for a new century.

Patricia Lewis
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London

June 2002

NOTE FOR READERS

Bolded terms indicate that they are defined in the Annex on Key Terms and/or dealt with elsewhere in this volume. ***Bolded and italicised*** terms indicate that as well as looking for information in this volume the reader should also consult the first volume, *Coming to Terms with Security: A Lexicon for Arms Control, Disarmament and Confidence-Building*, for more detail.

CHAPTER 1

VERIFICATION

WHAT IS VERIFICATION AND WHAT IS ITS ROLE?

Verification is the process of gathering and analyzing information to make a judgement about parties' **compliance** or non-compliance with an agreement. It aims to build confidence between the parties, assuring them that their agreement is being implemented effectively and fairly. In addition to enhancing the credibility of the agreement, successful verification may help increase trust between the parties more generally.

The promise of a credible **verification regime** can be an incentive to countries to sign an agreement in the first place, while a demonstrably effective one can be an incentive for additional countries to join. An effective **verification system** may, however, also be a disincentive to a small number of States that may not intend to honour their treaty commitments or which fear the **intrusiveness** that verification sometimes requires.

A verification system cannot, however, legally verify compliance by States that have chosen not to become party to a treaty. It also cannot substitute for credible treaty compliance or **enforcement** measures. Like compliance and enforcement, verification is reliant on continuing political, financial and technical support from treaty parties. Verification is also only as good as the tools it is provided with. As military technology and technology that might be used for both peaceful and non-peaceful purposes (dual-use) constantly advances, verification is dependent on advances in monitoring and other relevant technologies and techniques in order to remain effective.

HOW DOES VERIFICATION ACHIEVE ITS OBJECTIVES?

Verification achieves its objectives by three means:

- detection;
- deterrence; and
- confidence-building.

Detection

A verification system aims to detect non-compliance. The detection capabilities of a verification system depend on the capabilities of the monitoring means and the speed and skill with which data from such means and other sources can be collected and analyzed. The effectiveness of such elements depends partly on how much the treaty parties are prepared to pay. It also depends on the level of **intrusiveness** of the detection methods that the parties agree on. Usually in arms control and disarmament agreements there is a rule of reciprocity: while each party wants the maximum intrusiveness into other parties' affairs, it must accept that this is only likely to occur if it accepts equal intrusiveness.

The degree of certainty of detection that a system aims for will depend on how dangerous non-compliance is considered to be. For most treaties dealing with arms and armed forces, serious non-compliance will be regarded as a threat to national security. Detection must therefore not only be relatively certain but must occur early enough to allow for a response, either individually or collectively, by the other treaty parties. Ideally, warning signs of potential non-compliance should be detected before an act of non-compliance has occurred. However, even detection of non-compliance after the event is essential and can be helpful in mounting a response.

Monitoring is a crucial part of verification: it is the means by which information is obtained for verification purposes. Monitoring may be done by technical devices and/or by human inspectors. It may seek to obtain a particular type of information, as in the case of **seismic monitoring** for detecting underground nuclear tests, or, as in the case of remote on-site video cameras, it may seek to detect any activity that is potentially non-compliant. It may be done remotely or on-site, continuously or periodically, depending on the requirements of the particular treaty.

Deterrence

In theory, the more effective a verification system, the more likely it is to deter parties from even contemplating a deliberate violation. Verification systems do not need to be one hundred per cent effective to provide a significant level of deterrence: just as parties to a treaty are unlikely to be absolutely certain that all other parties are complying fully, a non-compliant State can never be completely certain that its actions will go undetected. Nor can such a State be certain how long its actions will go undetected, even if initially they are not noticed. The simple fact that a verification system exists will provide some level of deterrence. The more layered the verification system and the more sources of information available to it, the greater the deterrent effect. Information from various sources can provide a picture of compliance (or non-compliance) that is greater than the individual pieces of information separately and thus increase the level of uncertainty in the mind of the violator about being detected. This is known as synergy. The deterrent effect of a verification system is also increased if the compliance provisions are credible and likely to lead to sanctions or other responses to non-compliance.

Deterrence depends crucially on parties not wanting to incur the disapproval of other States and the international community and any action that might be taken to punish them. If a party does not care about getting caught and is willing to bear the consequences, then the verification system can do little to deter them. This is why early detection of preparations for a violation is important. It is also why States must have other measures in place in case deterrence fails, such as compliance and **enforcement** measures, mutual assistance in case of attack, and alternative means of defence.

Demonstrating Compliance

As well as detecting non-compliant States and deterring potential non-compliers, a verification system also plays the positive role of permitting compliant parties to demonstrate their compliance in an open, official, systematic and continuing way. This not only helps allay unnecessary doubts and suspicions, but encourages other States to do the same. Some treaties include specific **confidence-building measures**, whether compulsory or voluntary, to enhance this confidence-building effect. More generally, cooperation and interaction between States parties within a

verification regime (for example through the exchange of sensitive information) can itself help to build confidence among them.

On the other hand, there is a danger, in relatively rare cases that a non-compliant State may attempt to use the verification system to claim a "clean bill of health" and thereby attempt to establish a false sense of confidence in its compliance. Verification bodies and States parties need to be alert to this type of misuse of the verification process.

ARE THERE PRINCIPLES OF VERIFICATION?

The international community has attempted to agree on some verification principles. The 1978 Tenth Special Session of the ***United Nations General Assembly***, the first devoted to disarmament, established the following three as part of its statement of principles for disarmament generally (see Final Document of the Tenth Special Session, General Assembly resolution S-10/2, UN document A/RES/S-10/2, 30 June 1978):

> Disarmament and arms limitation agreements should provide for adequate measures of verification satisfactory to all parties concerned in order to create the necessary confidence and ensure that they are being observed by all parties. The form and modalities of the verification to be provided for in any specific agreement depend upon and should be determined by the purposes, scope and nature of the agreement. Agreements should provide for the participation of parties directly or through the United Nations system in the verification process. Where appropriate, a combination of several methods of verification as well as other compliance procedures should be employed. (Paragraph 31.)
>
> In order to facilitate the conclusion and effective implementation of disarmament agreements and to create confidence, States should accept appropriate provisions for verification in such agreements. (Paragraph 91.)
>
> In the context of international disarmament negotiations, the problem of verification should be further examined and adequate methods and procedures in this field be considered. Every effort should be made to develop appropriate methods and procedures which are non-discriminatory and which do not unduly interfere with the internal affairs

of other States or jeopardize their economic and social development. (Paragraph 92.)

In 1988 the ***United Nations Disarmament Commission (UNDC)*** agreed on 16 Principles of Verification (see Annex 1) which built on these three. By this time these principles had been well practiced and were largely accepted by the international community.

While the United Nations principles do not represent any significant innovation, the fact that United Nations members were able to agree and endorse them, is strong evidence of the extent to which verification had by that stage become an accepted and necessary part of arms control and disarmament. However, applying all of them fully and at once is impossible. Some of the principles are contradictory, while others are difficult politically. There must be compromises or trade-offs between them if verification is to function effectively and efficiently.

WHAT IS TRANSPARENCY AND WHAT IS ITS ROLE?

Transparency means openness. Transparent information is that which is not classified or withheld from public view, but which is freely available to all parties. Transparency of information, whether raw, processed or analyzed, is essential for effective verification. The degree of transparency naturally exhibited by States varies widely: some States are quite open, while others are secretive. Verification systems aim to increase the transparency of those States with low levels of existing transparency, including through voluntary measures such as declaration of additional information. Verification systems may also take advantage of the vast amount of information now available about all States from open sources such as the Internet, the mass media, academia and **non-governmental organizations**.

There are certain circumstances, however, in which maintaining the non-transparency or confidentiality of certain information contributes to the success of verification. For example, where industrial or commercial facilities are involved in the verification process, maintaining the confidentiality of **commercial proprietary information** may be critical. Only if confidentiality is maintained will companies be willing to permit an international organization or its **on-site inspectors** to have access to their

facilities and records. Similarly, governments do not want verification systems to acquire confidential and secret information that is not relevant to treaty compliance, especially information relevant to national security or defence.

A trade-off must often be made between the confidentiality needs of governments and industry and the verification system's need for information to verify compliance. In some cases this problem is dealt with by strictly limiting the distribution of data gathered during the verification process to the relevant parties or to a designated international body. Within an international verification body itself there will be procedures for handling the confidentiality of certain types of information. Another option is to limit the capabilities of the **monitoring** equipment being used. Some treaties also establish procedures to prevent on-site inspectors having access to equipment or facilities that are irrelevant to treaty compliance. Such **managed access** techniques may, for instance, permit equipment to be covered with shrouds or certain computers to be switched off during inspections. Inspectors may be permitted access only to designated areas of a site, perhaps on the basis of random selection.

From a verification point of view the preferred approach is to maximize transparency for verification purposes and provide for protection of information, systems and facilities as necessary within that context.

WHO DOES VERIFICATION?

Verification may be done by States parties both individually and collectively. Cooperative verification is more likely to be successful in building trust, since it will engage the parties in joint activities, ranging from basic **data exchanges** to managing sophisticated **monitoring technologies** and **verification organizations**.

Verification may be carried out unilaterally by the parties themselves, using their own national capabilities, often known as **national technical means (NTM)**. States may establish their own national agencies to handle such matters. Verification may be also carried out cooperatively by the parties to an agreement. This can range from observation of each other's military manoeuvres to the establishment and operation of an international verification organization. However, even when cooperative or other

multilateral verification mechanisms exists, many States, especially those with sophisticated technical capabilities, will want to maintain their own national capacity to verify, to their own satisfaction, the compliance of other States.

Verification Organizations

Institutions may be established by the parties to a treaty to establish and help manage the treaty's verification and compliance system. Such institutions may be modest, low-key and have a limited role. An example is the tiny ***Agency for the Prohibition of Nuclear Weapons in Latin America (OPANAL)***, which is essentially a clearing-house for information on the treaty. There are other regional organizations that are more substantial, including the ***Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC)***, the ***European Atomic Energy Community (EURATOM)*** and the Conflict Prevention Centre of the ***Organization for Security and Co-operation in Europe (OSCE)***.

A recent trend in multilateral arms control and disarmament treaties is the establishment of large verification organizations. These are permanent institutions with a technical secretariat employing international civil servants. The principle examples are the ***International Atomic Energy Agency (IAEA)***, the ***Organisation for the Prohibition of Chemical Weapons (OPCW)*** and the ***Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)***. They also include an **executive body** to provide oversight of the verification system and a **conference of States parties** to provide broad policy guidance (both bodies also have a role in **compliance**). International verification organizations help make **verification techniques**, **technology** and data accessible to all parties, including those that have no capacity to carry out verification themselves.

Verification organizations are crucially dependent on the political, financial and technical support of treaty parties.

The Role of the United Nations

The role of the United Nations (UN) in verification is a varied one.

The United Nations General Assembly (UNGA) in New York may pass non-binding resolutions relating to verification and compliance. It may also

initiate studies. In 1990 it authorized the establishment of a group of governmental experts to examine verification "in all its aspects". It produced a report, *Verification in All its Aspects: Study on the Role of the United Nations in the Field of Verification* (UN document A/45/372, 28 August 1990). The Assembly established a second group of experts in 1993 to revisit the issue, especially in light of the changes that had occurred since the end of the Cold War. This group's report was published in 1995, as *Verification in All its Aspects, including the Role of the United Nations in the Field of Verification* (UN document A/50/377, 22 September 1995). Beginning in 1980, in a unique move, the General Assembly in effect established a verification mechanism for a multilateral agreement, the 1925 ***Geneva Protocol*** banning the use of chemical and biological weapons. Some multilateral treaties explicitly task the General Assembly, usually along with the ***Security Council***, with addressing **compliance** issues.

The United Nations Secretary-General has been given a permanent role in verification by some treaties. The ***Landmine Convention***, for example, gives him a role in receiving annual compliance reports by States parties and in organizing **fact-finding missions**. The Department of Disarmament Affairs (UNDDA), at United Nations headquarters in New York and in Geneva, carries out these duties for the Secretary-General, as well as promoting and advancing the study of verification through publications and conferences. It also promotes transparency and openness in military matters that are vital to effective verification. The Department is responsible for the collation of information for the **United Nations Conventional Arms Register** and the confidence-building measures for the 1972 ***Biological Weapons Convention***.

The Conference on Disarmament (CD), the single multilateral forum devoted to negotiating disarmament agreements naturally also negotiates the accompanying verification and compliance arrangements. Sometimes it establishes verification sub-groups, like the Ad Hoc Group of Scientific Experts (GSE), which helped devise, both before and during the CD negotiations, the multilateral verification regime for the 1996 ***Comprehensive Nuclear-Test-Ban Treaty (CTBT)***.

The United Nations Disarmament Commission (UNDC), which is composed of all United Nations members, meets annually in New York to discuss and produce reports on disarmament issues, which normally

include consideration of verification and compliance. In 1988 it agreed on 16 Principles of Verification (see Annex 1).

The United Nations Institute for Disarmament Research (UNIDIR) undertakes studies on verification and verification-related issues as part of its brief to research disarmament questions.

The ***United Nations Security Council***, the only United Nations body that is able to make binding, enforceable decisions, is able to impose unilateral disarmament measures and accompanying verification arrangements on States. It is also able to establish verification bodies, the two examples to date being the ***United Nations Special Commission (UNSCOM)*** and the ***United Nations Monitoring, Verification and Inspection Commission (UNMOVIC)***. It is also empowered to impose sanctions, including the use of military force, for violations of arms control and disarmament agreements.

The Role of Industry

Civilian industry may be involved in research, development and production of weapons, weapon systems and/or weapons components or it may be involved with **dual-use technologies** or **materials**. It may therefore have an important role in verification, in cooperation with governments and international verification organizations and be critically affected by the way in which verification is conducted. Industry will often have concerns about verification that need to be taken into account. Such concerns may include fears about the effects of adverse publicity as a result of inspections being conducted at their facilities, fears about loss of **commercial proprietary information** and concerns about both the real **costs**, for example, of providing information for verification purposes and hosting **on-site inspections,** and the opportunity costs (the cost of not being able to devote the time and resources diverted to verification to what industry would view as more "productive" activities). It is vital that industry be involved at an early stage of **negotiations** on verification in order that their concerns be addressed and, if possible, allayed.

A variety of steps can be taken to deal with industry concerns. **Trial inspections** can help allay fears about the potential **intrusiveness**, cost and disruption of on-site inspections. Managed access techniques may meet concerns about the loss of proprietary information. The chemical industry's

experience of verification of the 1993 ***Chemical Weapons Convention (CWC)*** has, for example, been good and initial industry fears have not been realized. In some instances industry can benefit from the inspection process by publicizing the fact that they have been successfully inspected and have cooperated fully in the process. For example, chemical facilities can advertise the fact that they have been deemed compliant through the ***CWC*** process, thereby contributing to their respectability.

The Role of Non-Governmental Organizations

Increasingly, non-governmental organizations (NGOs) play a role in **monitoring** compliance with international treaties, a development made possible by technical and political changes. On the technical side, the information revolution, including the use of the Internet, has radically altered the ability of NGOs to gather, analyze and distribute verification data. At the same time, the **sensor** revolution is democratizing access to previously classified technologies such as high-resolution **satellite** imagery. Politically, globalization has strengthened the importance of transnational relations. The international arena now includes thousands of non-governmental and research organizations that are involved in all aspects of international life and that monitor State compliance with a wide variety of international obligations—whether States want them to or not.

Compared to States or international verification organizations, NGOs are less constrained by questions of diplomacy or bureaucracy. They are able to publicize information immediately. On the other hand, since NGOs rely almost entirely on **open sources** their information may be inaccurate or incomplete.

Landmine Monitor, a global consortium of NGOs which monitors compliance with the ***Landmine Convention*** banning landmines is the best example of civil society monitoring of an arms control agreement. Landmine Monitor has researchers in every country gathering facts about States' compliance, whether they are a party to the treaty or not. The results of these and other monitoring and research activities are compiled annually in the *Landmine Monitor Report*, which is published widely and made available to State parties at their annual meetings and to the public via the Internet. Such reports may include substantiated allegations of non-compliance.

HOW IS VERIFICATION NEGOTIATED?

The negotiation of verification and compliance arrangements for an arms control or disarmament agreement normally occurs as part of the negotiations on the treaty as a whole. It can sometimes, however, occur afterwards. Verification is just one of many issues that the negotiating parties must deal with. Agreement on verification is often, however, critical to achieving agreement on the whole treaty. If States are not comfortable with the level of certainty associated with the verification provisions, or regard them as too intrusive or expensive, they are much less likely to agree to the overall terms of the agreement.

As the terms of an agreement are being negotiated each party will be making a determination about the verification requirements that it believes are necessary. That determination will be based on a trade-off between the measures it wants employed to determine the compliance of other parties and those it is willing to accept being used to verify its own compliance. As in all negotiations, the parties do not perceive the same level of risk or draw the same conclusions from a cost/benefit analysis. They also bring different assets to the negotiating table in terms of their own **national technical means** and the technical, financial and other support they can offer.

While logically the verification arrangements should be designed to match the scope of the envisaged treaty, sometimes the **intrusiveness** and **cost** of proposed verification arrangements causes negotiators to re-think the scope of the limitations being considered. For example, it is almost always easier to verify a complete ban on a weapon system or activity than to verify limits on them. When there is a complete ban, the existence of any prohibited activity or weapon is automatically a violation. The fact that zero missiles would be easier to verify than allowing a small number to remain, encouraged negotiators to ban all intermediate-range nuclear missiles under the 1987 ***Intermediate-range Nuclear Forces (INF) Treaty***. Similarly, in the case of the ***CWC,*** because it is impossible to keep track of every chemical that might be used for chemical weapons it was agreed to divide the potential problem chemicals into three different schedules and apply different levels of verification to each.

Verification arrangements are generally designed to be non-discriminatory—what applies to one party should apply to all. Sometimes this principle will necessitate applying verification measures of equal

intrusiveness to all treaty parties regardless of the risk that they will violate the treaty's obligations. The added effort and expense may be a small price to pay for achieving a non-discriminatory regime and therefore final agreement on a treaty.

One of the keys to successful verification is the clarity of the treaty's definition of the items and activities to be verified, the verification processes and the outcomes or "products" of the verification system. Arms control treaties, therefore, generally include extensive lists of definitions and other details. Clear definitions make an important contribution to verification by minimizing the potential for ambiguities to undermine confidence in it or provide an opening for non-compliance. However, in some instances, because of a lack of time during the "end game" of the negotiations, agreement on the details is postponed until implementation or preparatory work for implementation of the treaty begins. Sometimes leaving the detail until later may facilitate agreement on a treaty. This may, however, jeopardize the treaty's implementation.

Negotiations on verification arrangements may be strongly influenced, both politically and substantively, by the successful implementation of agreements that precede them. The successful implementation of the **verification system** for the ***INF Treaty*** provided a verification model that could be drawn on by the negotiators of the 1991 first ***Strategic Arms Reduction Treaty (START I)***.

How Much Verification Is Enough?

The question of how much verification is enough cannot be answered in a general way; no one verification model will fit all circumstances. The answer will be determined by how much verification the parties determine is sufficient in their particular circumstances. This varies with the political situation in which the agreement is negotiated and the type of agreement that is sought. This in turn depends on the type of military capability being banned or limited, the likelihood that a party will try to cheat and the severity of the consequences if cheating occurs. It also depends on the level of trust that already exists between the parties.

As a general rule, one hundred percent verifiability is not achievable. It is also unnecessary. Even low levels of verification can effectively deter a

potential violator by creating uncertainty about whether cheating will be detected or not. At the very least, verification raises the costs and risks involved in any attempt to cheat. The key test is whether the verification system has a reasonable chance of detecting a militarily significant violation in time for action to be taken. A determination of what is "militarily significant", will depend on the political relationship among the parties (such as whether they are enemies or allies) and the nature of the weapons and actions involved.

In situations where the parties consider each other enemies or where a high degree of mistrust exists, the burden on verification is considerable. Even small or unintentional violations could be interpreted as dangerous. In such cases the parties often desire a high level of verifiability, while at the same time, because of the sensitivity of the political and military situation, being concerned to minimize **intrusiveness** into their own military and security-related affairs. The knowledge that a strong verification system will be put in place can give States the necessary confidence to convince them to sign and begin implementing an agreement. At the other extreme, in situations where the parties have a good political relationship with each other and therefore a high degree of mutual trust, much less stringent verification will be deemed necessary. As verification systems are applied and confidence between the parties grows, they may decide to be less stringent about applying all of the verification provisions. Some of the monitoring provisions of some agreements, such as ***INF*** and ***START***, have a limited life-span to begin with.

As the product of negotiations between States, verification systems rarely satisfy all of them. They are inevitably the product of compromise. Two of the most important issues on which compromises must be found are: **financial costs** and **intrusiveness**.

FINANCIAL COSTS

Verification can be expensive. For each State party the costs of verification may include investment in its own **national technical means**, as well as its financial contributions to **bilateral** or **multilateral systems**. The more extensive and intrusive the verification, the higher the costs. There is a point, however, at which spending more on verification will bring only marginal gains in verifiability. For example, it would be extremely

expensive to continuously monitor every chemical plant in the world to ensure that it was not producing chemical weapons, even though relatively high levels of verification would be achieved. Much cheaper and sufficiently effective verification is possible through **declarations**, data analysis and **random inspections**.

The principle of non-discrimination in multilateral verification arrangements may also increase costs as it requires the application of the same level of verification to all parties, regardless of whether they are likely to be treaty violators or not. The basis for such a verification system is, therefore, not intentions but capabilities. The ***IAEA***, for example, devotes enormous resources to verifying that all ***non-nuclear-weapon State*** parties to the 1968 ***Nuclear Non-Proliferation Treaty (NPT)*** are using their nuclear facilities and materials for peaceful purposes, even though only a tiny minority might be likely to violate the treaty. Whatever its intentions, every party with **dual-use technology** has the potential to misuse its peaceful nuclear facilities.

International verification agencies can be expensive to establish and maintain, but the costs are shared among the parties. Normally the United Nations system of assessed contributions, based roughly on the gross domestic product (GDP) of each State, is used to determine the amount that each must contribute. The creation of a collective organization may be less expensive for participating States than establishing and maintaining their own **national technical means**.

Ultimately parties must undertake a cost-benefit analysis of any proposed verification system. A difficulty is that while financial costs of verification are readily quantifiable and may often seem high to hard-pressed national treasuries, the political and security benefits of an effectively verified treaty, or alternatively the political and security costs of a poorly verified treaty, are less easily quantifiable. Preventing, in a verifiable fashion, the proliferation of weapons in one's region, and the possibility of having to engage in an arms race, needs to be factored into the equation. The cost savings from scrapping existing weapons should be taken into account in considering the costs of verification.

INTRUSIVENESS

By definition, verification involves gathering information about States' military plans, capabilities and activities and related (especially **dual-use**) capabilities. In carrying out verification tasks, a verification organization and/or the parties to an agreement will inevitably gather information unrelated to the agreement. For example, on a visit to a military base to inspect a particular weapon system inspectors may see other activities or weapons systems. **On-site inspections** of chemical factories to determine whether they produce chemical weapons will normally only see peaceful activities and may thus gather commercial information unrelated to treaty compliance.

Arrangements may be devised to minimize access, whether deliberate or inadvertent, to irrelevant information, while still permitting the purposes of the treaty to be fulfilled. Some treaties include provisions for such **managed access**. Parties may, for instance, be permitted to shroud or otherwise cover non-treaty items at facilities and provide the information required by inspectors using less intrusive methods. Some treaties give parties the right to veto individuals or those of a particular nationality on lists of prospective on-site inspectors. Technology can sometimes be used to avoid intrusive inspections by humans, but can also be more intrusive than inspections by humans. Inspectors from verification organization are usually under a legal obligation not to reveal sensitive information. In any case, in negotiating an agreement, parties need to find the best mechanisms for the verification task, while minimizing the potential for gathering information not relevant to the accord.

CHAPTER 2

VERIFICATION SYSTEMS, TECHNIQUES AND TECHNOLOGIES

VERIFICATION SYSTEMS

Every verification system should be designed to suit the needs of the treaty it is intended to verify. There is a basic framework incorporating various techniques that negotiators may draw on when designing a verification system. Depending on the nature of the verification task, some or all elements of the framework will be included. The relationship between the different mechanisms will also vary. The basic elements include:

- declarations of data—baseline, periodic and final;
- compilation, analysis and cross-checking of declared data and/or other information;
- verification of declared information, remote and/or on-site through continuous monitoring and/or on-site inspections;
- cooperative measures to make verification easier;
- clarification mechanisms in case of technical difficulties or ambiguities;
- fact-finding missions or challenge on-site inspections.

Each of these options has a specific function, but can support and reinforce the other elements. For example, the information acquired in **data exchanges** provides a basis for **on-site inspections**. Inspection results may be used to validate data provided, as well as providing new information to help complete the overall picture. New information may prompt the need for clarification or help determine that an ambiguous situation is treaty-compliant and does not need to be pursued. In the most sophisticated treaties, all of the elements will be used as part of a multi-layered, mutually reinforcing verification system whose product is greater than the sum of its parts.

A **technical secretariat** may be established to run the various parts of the verification system and ensure that data is collected, integrated and presented to the parties in a useful fashion, as well as ensuring that it is archived for future reference. Technical issues that arise in the verification process may be dealt with through direct exchanges between States or through a cooperative mechanism.

VERIFICATION TECHNIQUES

Verification techniques can be categorized as either passive or active, remote or on-site. Passive verification refers to the provision by a State party, either voluntarily or compulsorily, of information regarding its own compliance and implementation. Information/data declarations, exchanges and notifications fall into this category, as does the hosting by a State of fact-finding missions or on-site inspectors on its territory. Active verification refers to activities by State parties to verify the compliance of other or the activity of international organizations to verify compliance by all States parties. **Remote** refers to any **monitoring** that takes place at a distance from the object or activity being monitored, usually outside the territorial limits of the country being targeted. Remote monitoring may be done from space, in the air or on the ground at a distance. Methods include satellites, aircraft and remotely-located ground stations. It may also involve environmental monitoring to detect traces of illicit activities. **On-site** refers to any activity that occurs on the ground near the object or activity being monitored or verified. Such activities include **on-site inspections** and continuous **on-site monitoring**. **Fact-finding missions** fall somewhere between remote and on-site, although they may contain elements of both.

Information/Data Declarations, Exchanges and Notifications

Verification invariably requires parties to provide information (or data) relating to their compliance. This may be transmitted directly between the parties or via a treaty commission, international organization or the treaty depositary (the State, States or organization charged with receiving documents from governments indicating their signature, ***ratification*** or accession to a treaty). For example, the parties to the ***INF*** and ***START*** treaties use the United States/Russian ***Nuclear Risk Reduction Centres***. The parties to the ***Landmine Convention*** send their declarations to the United Nations Secretary-General, while the parties to the ***CWC*** use the **OPCW**. The

continuing revolution in **information technology (IT)**, permitting the rapid collection, transmission and analysis of large quantities of data has in many cases made verification much more manageable.

Declarations, **exchanges** and **notifications** are different ways of providing information relating to compliance. They tend to have different purposes and occur at different times in the life of a treaty. The terminology is used differently in different treaties: there are no universally agreed definitions. The following is therefore simply a guide to some useful distinctions.

Declarations

Declarations are often made when a treaty ***enters into force***, or sometimes even before to provide information on the situation or status of the party before the treaty provisions are implemented. This is sometimes called **baseline information** or data. Some treaties provide for the baseline figures provided by each party to be automatically accepted by the others, while other treaties allow for some negotiation about them or immediate verification, through **baseline inspections** to confirm their accuracy. Agreements that require the establishment of baselines require information to be provided periodically thereafter to confirm treaty compliance—either a change in the baselines or no change, depending on the terms of the agreement. For example, if the baseline figure for a troop reduction agreement is 35,000, and the treaty requires a reduction of 10 per cent each year for the next five years, subsequent data provided should confirm that. Some treaties require annual declarations or declarations linked to some other time schedule, such as the anniversary of the treaty's ***entry into force*** for each party.

Typical declarations provide information on the location, number, characteristics and status of **treaty-limited equipment** and details of restricted activities. Information about the location of associated facilities, materials and activity may also be required.

Data Exchanges

Data exchanges are usually provided for in **bilateral agreements**, or those involving a small number of parties, where information of the same type needs to be exchanged at the same time in order to boost confidence in compliance by all parties. The information provided by each State should confirm, on an ongoing basis, that it is complying. Analysis of the data may,

however, lead to questions about implementation or non-compliance which may require further investigation, including through **on-site inspection**.

Notification

Notification of different types of activities may be required by some treaties, either in advance or within a certain period after the event has occurred. Typical notifiable military activities are military exercises, movements and manoeuvres, the redeployment of and increase in the size of military forces, and the introduction of new weapon systems. Notifications contribute to **transparency**, preventing unnecessary alarm about activity that might otherwise be considered ambiguous or non-compliant. They also provide parties with an opportunity to prepare for **observation** and **monitoring**.

National Technical Means

National technical means of verification (NTM) are nationally owned and operated **technologies** and **techniques** used to monitor the treaty obligations of another State. NTM is also a euphemism for all sources of information available to a State, including information obtained by intelligence organizations using all of the methods at their disposal. National technical means are used for a variety of purposes, of which arms control verification is only one. For this reason, arms control negotiators have tended to avoid attempts to define NTM. States may use NTM to verify **compliance** with a treaty in the absence of other measures, or to supplement the level of reassurance they receive from a cooperative verification system. In some instances, States are permitted to submit information obtained from NTM to a **multilateral verification organization** to support a request for clarification of the activities of another State, including an **on-site inspection**.

NTM include **satellites**, high-altitude and other **aircraft** and **land-based remote detection** systems, electronic **signals intelligence (SIGINT)** and **electronic intelligence (ELINT)** collection systems, as well as systems that collect **open source information**. NTM, therefore, also may be assumed to include the facilities and personnel involved in collating, analysing and interpreting information from such technologies.

Arms control treaties sometimes specifically permit the use of NTM, but only "in accordance with international law", a phrase which is meant to rule out espionage. Some treaties even prohibit interference with NTM. The various **bilateral nuclear arms control agreements** between the United States and the former Soviet Union are examples. Although in the past NTM were the only means of verification available to States, they have now been supplemented by cooperative means, as arms control regimes have become more sophisticated. For most States the verification information they receive from multilateral means far exceeds that which they could obtain unilaterally. However, for the United States, NTM remain its primary source of verification information, while for other technically advanced States, notably France, Russia and the United Kingdom, NTM still play an important role in their national assessment of arms control and disarmament compliance.

For all these States NTM and multilateral, cooperative verification means are usually complementary. Some States may rely on the multilateral system for global coverage, while targeting their own NTM at certain States of concern or at their own region. Yet, even a country as technologically capable as the United States derives great benefit from participation in multilateral verification systems. For example, despite its own excellent seismic detection capabilities, the United States would be unable to match, without the investment of vastly more resources, the capabilities of the ***CTBT***'s ***International Monitoring System (IMS)***.

Increasingly there is a willingness for states to provide NTM-derived information for **multilateral verification** purposes. For example, the United States provided **satellite** photographs and other information from NTM to the ***United Nations Special Commission*** (***UNSCOM)*** on Iraq. In addition it allowed UNSCOM the use of an NTM technology, a **U-2** reconnaissance aircraft, to enable it to do its own information gathering. The provision of information from NTM in these situations, however, can create dilemmas for verification organizations as well as for the States involved. An international organization will not want to become reliant on one or a small number of countries, as this may compromise its impartiality. For their part, States need to take great care in revealing information obtained through NTM to avoid revealing confidential information about the scope and capabilities of its NTM.

Multinational technical means (MTM) is sometimes used to refer to internationally owned and operated instruments employed in the **monitoring** of multilateral treaties. The information from such systems is available to all parties, as well as the verification organization that manages the system and its **technology**. An example is the **International Monitoring System (IMS)** of the **CTBTO**. One of the advantages of MTM is that they encourage close cooperation between the parties. In addition, MTM are non-discriminatory—all parties may participate and all information derived from the system is available to all parties. Such systems may also provide parties with access to and familiarity with technology that would not otherwise be available to them.

Fact-Finding Missions

Fact-finding missions may be regarded as half-way between remote and on-site inspection. They are often included in treaties that are not adequately verifiable by remote means but which also do not appear to justify the expense and trouble of a permanent on-site inspection regime. Fact-finding missions are often used by the United Nations as an ad hoc means of determining the facts of a particular situation. If dispatched by the General Assembly it is not compulsory for States to cooperate with such a mission. If authorized by the Security Council cooperation is obligatory. Treaties often treat them as a more flexible and less demanding alternative to **on-site inspection**.

The methods employed for fact-finding missions may range from simply conducting interviews and gathering evidence outside the country concerned, in which case they may be regarded as **remote** verification, to **intrusive** inspections that differ little from the type of **on-site inspections** considered below. Unlike on-site inspections, however, fact-finding missions are essentially ad hoc events, usually only dispatched as a last resort when an accusation of non-compliance has been made and other means have failed to resolve the issue. Unlike on-site inspections, fact-finding missions cannot be routine or systematic.

On-site Verification

On-site activities fulfil a variety of verification functions and occur in a variety of ways. The two main types are:

- continuous on-site monitoring; and
- on-site inspections.

Continuous On-site Monitoring

Continuous on-site **monitoring** is used to monitor activities or facilities which, under the terms of a treaty, are subject to permanent **observation**. It may be carried out automatically by technical means or by personnel or by a combination of both. An example is **portal monitoring** for the ***INF*** and ***START*** treaties, which involved the permanent stationing of personnel and equipment at missile production facilities.

On-site Inspections (OSI)

On-site inspections involve the presence of personnel at inspection sites for limited periods. They are usually conducted by a team of inspectors who are trained, briefed and equipped for such a mission. On-site verification activities have become almost a routine part of arms control and disarmament verification. Basic procedures and techniques, as well as administrative and logistical precedents have been established. A substantial body of experience has developed which may be drawn on in establishing new inspection regimes.

On-site inspections are, however, normally not the only verification tool provided for by a treaty. They normally provide information that feeds into the verification process as a whole, supplementing or helping confirm data from other sources. For example, **routine inspection** may generate information which, in conjunction with data from an **information exchange**, may prompt a request for a **challenge inspection**.

A treaty will normally carefully detail the procedures to be followed for each type of inspection envisaged, including the way in which parties will be notified of an inspection, the rules and procedures for conducting the inspection, the length of time permitted for inspections, the rights and responsibilities of the inspected party and the rights and degree of access that must be given to inspectors.

Whether inspections are carried out by nationals of the parties, or by an international inspectorate, a treaty will normally provide details about how the inspectors are to be chosen. Normally the inspected State has the right to raise objections to individual inspectors before an inspection begins.

Usually there will be time limits or other limits to this process to avoid a party delaying an inspection for too long.

Some treaties provide for permanent inspectorates comprising full-time inspectors, trained and equipped to the same standards, who are ready to undertake inspections whenever required. At the other extreme, some treaties rely on inspectors being gathered together, briefed and dispatched at short notice, without and prior joint training or interaction. The names of such inspectors are usually drawn from a list of individuals nominated by States parties in advance, but they may not be able to participate when required due to other commitments. There are numerous possibilities for inspection regimes between these two extremes.

Inspectors are normally accorded diplomatic rights and privileges to protect them from harassment by the inspected party. That party is usually obliged to provide assistance with entry, transport, accommodation, security, unimpeded import and export of inspection equipment and sometimes in providing inspection equipment itself. Inspectors are normally briefed by official representatives of the inspected party on arrival and, in return, provide them with a report on their departure. They may be accompanied by one or several representatives of the inspected party during their time in the country. During their inspection activity they are usually accompanied by both government officials and personnel of the facility being inspected.

The inspectors are expected to conduct their activities strictly in accordance with their mandate. Despite the use of the expression “anytime anywhere” to describe the ideal type of on-site inspection, this is rarely achieved or desirable. There are usually restrictions on the type of equipment inspectors can bring with them, the type of measurements and recordings they may make and the geographical limits and duration of their inspection. The practical difficulties of assembling, transporting and accommodating inspectors, especially when remote and inaccessible locations are involved, also prevent “anytime anywhere” being achieved.

After inspections are completed a report is provided to the organizing body and the inspected party. In the case of a **challenge inspection** a copy may also be provided to the party that requested the inspection. An inspection report or part of a report may be kept confidential to protect **commercial proprietary information** or national security information.

There are various types of on-site inspection.

Routine inspections are conducted according to a schedule provided to the inspected party in advance. They are therefore predictable and the inspected party may make advance preparations for them.

Short-notice inspections have an element of surprise, intended to enhance the **deterrent** effect of the verification regime. Since the State party receiving the inspection may only be notified just before the inspection team arrives, it has less time to hide any serious non-compliance if that is the State's intention. Short-notice inspections tend to be used as part of on-going verification and do not imply a charge of non-compliance.

Random inspections may also be designed to have an element of surprise. Alternatively, they may be used to permit fewer inspections to be conducted for the same **deterrent** effect, thereby saving time, money and inspection resources.

Challenge inspections are the most contentious type of inspection as they imply that a violation has or may have occurred. Their goal is to help provide evidence that will confirm or deny an allegation of non-compliance. In theory, the notification period for such inspections should be short, so that parties cannot remove or hide evidence. In practice, the speed with which an inspection can be mounted is limited by the need for approval to be granted for the inspection to proceed and the time required for inspectors to travel to the site, gain entry and establish themselves and their equipment. Although every State party is required to cooperate fully with a challenge inspection, it is likely to be such an unusual and politically contentious event that the receiving State may not fully cooperate in making the necessary arrangements. This may range from being overly legalistic to deliberately delaying or obstructing the inspection. The time between the request being made for a challenge inspection and the commencement of the inspection on-site is likely to be longer than **short-notice inspections** in a non-challenge environment.

Multilateral treaties normally require a treaty body to approve, or at least to decide not to oppose, a request for a challenge inspection. Voting rules are established for such circumstances: a "**red light"** system means that a challenge inspection will proceed unless a treaty body votes to stop it (hence the "red light"), while a "**green light**" procedure means that a

challenge inspection will not proceed unless a treaty body gives its positive endorsement. Depending on the treaty provisions, a party asked to receive a challenge inspection may or may not have the right to refuse the request. Even without such a right, there will be many points at which a receiving State can delay an inspection unless the rules are clear. Refusal to receive a challenge inspection may be regarded as an admission of non-compliance.

Challenge inspections can be open to abuse. A requesting party may hope to use such an inspection to discredit or embarrass another party or as a cover for seeking information not related to the treaty. Treaties may contain provisions to prevent frivolous or malicious challenge inspection requests. Financial penalties may be imposed for seeking an unjustified challenge inspection, including paying the costs of the inspection. A state making a frivolous challenge inspection request also leaves itself open to being similarly challenged.

In practice, challenge inspections have occurred infrequently and have not been abused by the parties to a treaty. The fact that the parties agree to include challenge inspections in the verification package is usually a strong indication of a determination to comply with the treaty. Challenge inspections are usually regarded as a verification tool of last resort.

Cooperative or Facilitative Measures

These are measures designed to make verification easier or more effective. They may be voluntary or legally required by a treaty. An example is the requirement in ***START I*** and ***START II*** for the parties, at each other's request, to open the roofs of their missile silos for a specified time to permit **satellites** to observe and count the number of missiles. Not only do such measures contribute to verification, but if carried out as agreed they also help engender an overall sense of confidence in the commitment of the parties to the treaty.

VERIFICATION TECHNOLOGIES

Technology plays a vital role in verification by permitting the rapid and systematic collection, collation, manipulation, analysis, storage, retrieval and dissemination of information. The extraordinary growth in computer power—a standard personal computer today is more powerful than the

computers used for designing the first nuclear weapons—has had a significant effect on verification. In determining the role of technology, negotiators must balance its advantages and the disadvantages as well as considering questions of availability, utility and cost.

Technical means may produce enormous volumes of data which, despite the availability of computer-based analytical tools, ultimately need to be analyzed by skilled human analysts if they are to be used for verification. Technology-based monitoring can also generate unnecessary false alarms about non-compliance unless systems are in place to screen and analyze data carefully. The country with the most advanced technical means of verification, the United States, finds it a continuing challenge to effectively use, in a timely fashion, all of the data it collects. **Tamper-proof mechanisms**, redundancies and back-up systems also need to be considered to prevent a party tampering with or deactivating monitoring technology placed on its territory.

Technology does have advantages over human **inspectors**. It can operate continuously and at a constant level of **observation**. Its data is readily comparable. It can be limited to detecting treaty-relevant information, while ignoring other types of information. The ***INF Treaty***, for example, permitted an x-ray to be taken of missile canisters to determine the type of missile inside, but the machinery was set to a certain resolution so that sensitive design information could not be obtained.

Inspectors on the other hand need to be especially recruited, trained and deployed and can be expensive to maintain continuously in the field. Their expertise, skills and dedication can vary considerably. They can also obtain information not related to the treaty that might be highly sensitive to the inspected party. On the other hand, the ability of inspectors to see the broader picture and discover information that they have not been briefed to expect can be an advantage to verification in keeping the inspected party uncertain as to what might be detected.

Some States parties may be concerned about equality of access to verification technology. This may be overcome by restricting the system to commercially available, “off-the-shelf” technology or by making all the technology to be used available to all parties.

Cost must also be taken into account. High technology tends to be expensive to purchase and maintain, although costs tend to fall rapidly once a particular technology comes into general use. In addition, specialized personnel training may be needed to install, operate and maintain particular types of technology and to analyze the resulting data. This is labor-intensive and therefore expensive. Stringent requirements for ready data availability and reliability (such as a requirement for a real-time, 24 hours a day, 7 days a week continuous data stream) and authenticity (including data security systems) tend to drive up costs considerably.

The main verification technologies being used or under consideration or development and the kinds of verification situations in which they may be useful are outlined below.

Space-Based

Monitoring by **satellite** from outer space is one of the most useful **remote monitoring** tools. One of the major advantages of satellites is that their use does not need permission of the State that is being monitored. They are also flexible: their operators can determine the timing and type of monitoring they want to carry out. Since the first successful launch of the first reconnaissance satellite by the United States in 1960, there has been a steady growth in the capabilities of space-based monitoring. In addition to optical (photographic) capabilities, satellites can now carry an array of **sensors**, including radar and multi-spectral sensors that can detect heat, soil disturbances, aerosols and gases.

Most satellites are owned and operated by just a handful of States exclusively for their own purposes, including as part of their **national technical means** of verification. Such States may choose in particular instances to provide limited amounts of information from their satellites for **bilateral** or **multilateral** verification purposes.

Increasingly, any State wishing to acquire satellite capabilities can pay for design, construction and launch services either commercially or from other States. They will still, however, need technical expertise to design and build the satellite sensors themselves (for security reasons) and have the capability to receive, record and analyze the data.

Commercial companies with their own satellites or with access to data from government-owned satellites, are increasingly selling images on the commercial market with resolutions below one meter for almost any part of the Earth's surface. Prices for such images are decreasing as competition increases. States and organizations without the enormous technological and financial resources needed for developing their own systems can thus now have access to satellite monitoring. Some challenges will remain. Receiving a continuous stream of images is still expensive and commercial data is currently restricted to photo images rather than the full spectrum available to the most highly sophisticated satellite operators. Recipients still need to determine which images are required and must have the specialized capability for analyzing and interpreting them. Finally, satellites are not suitable for all verification purposes, such as detecting facilities hidden underground or small-scale activities in large building complexes. States may employ deliberate concealment techniques, such as working at sites only at night to conceal activity or hiding illicit activities among legal ones.

Aerial

Aerial surveillance, using aircraft or helicopters, can be a more powerful verification tool than satellites due to their closer proximity to the ground. Like **satellites** they can employ cameras, a wide variety of **sensors** and other monitoring equipment. Aircraft can be used, for example, to monitor military exercises, troop movements, troop numbers and equipment and activities at bases and facilities. A possible disadvantage, depending on the sensitivity of particular sites, is that information irrelevant to the verification purpose may be also gathered. Aerial surveillance is also limited by the fact that the permission of the State being overflown is required. Provision for aerial surveillance for arms control verification purposes, therefore, needs to be negotiated as part of an agreement. Aerial surveillance occurs as part of the 1970s ***Sinai Agreements*** between Egypt and Israel. Significant mutual aerial surveillance opportunities are available under the 1992 ***Open Skies Agreement***.

High altitude aircraft, which in theory also need overflight permission but in practice rarely seek it, can also be useful for verification but are currently owned an operated only by the United States and Russia. The U-2, which has been operated by the United States since the late 1950s, played a crucial role in the discovery of Soviet nuclear installations in Cuba

in 1962. As noted, the United States provided ***UNSCOM*** with a U-2 aircraft for monitoring Iraq.

Unmanned aerial vehicles (UAVs), also known as Remotely-Piloted Vehicles (RPVs), have several characteristics that make them useful for **monitoring** arms control and disarmament agreements. Since they are pilotless there is no concern for the loss of military personnel over potentially hostile territory. UAVs can carry a wide variety of **sensors**, provide high-resolution coverage, cover large and remote areas and can fly continuously for long periods. In addition, their onboard sensors can provide all-weather day-and-night surveillance, and send real-time information to ground stations or satellites. UAVs may be particularly useful for atmospheric monitoring, border monitoring, landmine detection, and **on-site inspection** support. They could be especially useful for collecting air samples to detect testing or use of radiological, nuclear, chemical or biological weapons. The one major drawback is that they are still expensive and require considerable expertise to operate.

Ground-Based

Ground-based technologies are also common in verification regimes, either for **remote** or **on-site monitoring**. The data from remote monitoring technologies can either be read periodically by humans on site or may increasingly be transmitted to central data processing and analysis centres by landline or satellite. The best example of a remote ground-based monitoring system, incorporating a suite of monitoring technologies which transmit data via satellite to a central location is the **CTBTO**'s **IMS**, which provides data to an **International Data Centre (IDC)** in Vienna, Austria.

A wide variety of sensor technologies is available for verification purposes on-site, providing continuous on-site monitoring without the need for human intervention except to periodically check that the equipment is functioning properly and has not been tampered with (although in some cases this can be done remotely). **Ground-based sensors** can identify the movement of equipment, such as tanks or other vehicles, or personnel by detecting weight on the ground, vibrations, shifts in the magnetic or electrostatic fields or optical signatures. Such sensors can be used to monitor military facilities, military activities such as exercises, entry and exit points, ceasefire lines, buffer zones and demilitarized zones. New technologies allow ground-based sensors to detect only relevant changes in

the area being monitored. Ground sensors of various types are used in monitoring the buffer zone between Egypt and Israel established by the ***Sinai Agreements***.

Other technologies, such as x-ray machines to determine the contents of containers or canisters require the on-site presence of humans to operate and maintain. Portable or hand-held detection devices are also being increasingly developed—in addition to the traditional Geiger counter for detecting radioactivity. New devices that detect the presence of chemical or biological weapons or their components, conventional explosives and landmines are adding to the potential capabilities of **on-site inspectors**. **Environmental sampling** technology, used to determine what a facility or plant is producing by detecting environmental traces in its effluent or atmospheric discharges, is also reaching new levels of sophistication. Robots, including miniature robots, are being envisaged for dangerous verification tasks such as determining the use of chemical or biological weapons. Such new technologies may not always be usable for verification purposes because their **intrusiveness** is judged to be too great or because they are not available "off the shelf" to all treaty parties.

Ground-based monitoring can be facilitated by the use of increasingly sophisticated **tags** and **seals**. Tagging involves giving each **treaty-limited item** a unique tag that specifies that is permitted under an arms reduction treaty. Critical to the success of tags is a high degree of certainty that they have not been duplicated or tampered with. Tagging is used for treaties where numerical limits on weapons, rather than outright bans, are to be verified. Any untagged item discovered is automatically a violation. This shifts the burden of verification: instead of **on-site inspectors** having to count every treaty-limited item to make sure that the limits are not exceeded, they simply need to ensure that each item they come across anywhere is tagged. This permits random sampling techniques to be employed. Tags with in-built **global positioning system (GPS)** receivers have been developed, permitting the exact location or movement of tagged items to be monitored. Improvements are also being made to ensure that tags are unable to be reproduced or tampered with.

Tamper-proof seals can help ensure that certain equipment has not been used or moved or that rooms or buildings have not been entered. Seals are used by the ***IAEA***, for instance, to ensure the containment of nuclear materials under **safeguards**. A number of different types of seals are

available, including those using a fiber-optic random pattern that changes if tampered with or special adhesives that disintegrate if disturbed. Like tags, seals can make continuous monitoring unnecessary—periodic inspection to ensure that the seals are intact is sufficient. Technological advances permit both types of systems to be monitored at a distance to ensure their integrity and viability.

CHAPTER 3

COMPLIANCE

WHAT IS COMPLIANCE?

When a party is abiding by its obligations under an agreement it is said to be in compliance. The word "compliance" is also used to describe the process used to deal with questions relating to compliance, including those raised by a verification process. Such questions include:

- a suspicion of non-compliance;
- an allegation of non-compliance; or
- a finding of non-compliance.

There are various types of non-compliance that a compliance process will be expected to deal with. Some non-compliance will result from genuine misunderstandings or disagreements about a treaty's terms.

A compliance process should enable the parties to successfully address all types of compliance issues and be able to take action or recommend the taking of action to deal with them. In particular, it should be able to:

- distinguish between genuine *allegations* of non-compliance and those based on ambiguous or misleading information or which are made for political or other purposes;
- determine that actual non-compliance has occurred;
- differentiate between minor (sometimes known as "technical" non-compliance) and substantial non-compliance;
- determine what non-compliance is unintentional and what is deliberate.

The process should help ensure that minor violations, ambiguous situations, ill-founded suspicions and frivolous allegations do not become

major political issues that undermine the treaty, as well as ensuring that significant violations are dealt with firmly and effectively.

Verification and compliance processes cannot always be clearly separated. A **verification mechanism** may be used to verify ongoing compliance by parties. It should also be able to inform or trigger a compliance process, as well as providing information to confirm or refute an allegation of non-compliance. **On-site inspection** techniques used regularly in ongoing treaty verification in one context (such as the taking of samples) may be used in other contexts during a fact-finding mission or challenge inspection to prove or disprove an allegation of non-compliance.

Above all, verification and compliance processes should be mutually reinforcing. If conducted well, they should give States increasing levels of confidence about treaty implementation and about the commitment of other parties to fulfilling their obligations. As in the case of an effective verification system, the existence of a credible compliance system can be an incentive to States to join a treaty (although in a small number of cases it may be a disincentive).

WHO DEALS WITH COMPLIANCE ISSUES?

Treaty compliance bodies vary widely. Some are part of elaborate verification and compliance regimes, while others are simple discussion forums. **Bilateral** and **multilateral** compliance differ considerably in their purpose and their ability to deal with compliance problems.

Bilateral Arrangements

The outstanding examples of bilateral compliance bodies, involving just two States, are those established by United States/Russian bilateral arms control agreements. These generally envisage a forum of the two parties' representatives to deal with all implementation issues, including questions of compliance. They may also be empowered to amend the treaty, add protocols or reach agreements on how to interpret treaty provisions. Such bilateral bodies, comprising diplomats and technical support staff, hold their meetings in private, away from the public and the media, in order to encourage frank and open exchanges. Some meet regularly, others only as required. Examples are the **Special Verification Commission** established

for the ***INF Treaty*** and the **Bilateral Implementation Commission** established by the 2002 **Moscow Treaty**.

Since such organs only involve the two parties that have signed the treaty, they serve only as a forum for each to hear the other's assessment of compliance, including accusations of non-compliance by the other side. If the relationship between the two sides is poor or if they are they unable to reach consensus on a non-compliance issue, they can be deadlocked. If a case of non-compliance arises which cannot be resolved cooperatively by the two parties, it is left to the other party to take unilateral measures, which may include withdrawing from the treaty.

Multilateral Arrangements

In the case of multilateral agreements, compliance questions tend to be handled by the same **executive body** that oversees implementation of the treaty as a whole. In the case of the ***CWC*** and the ***CTBT*** this body is known as the **Executive Council**. The **Board of Governors** of the ***IAEA*** plays the same role in relation to nuclear safeguards under the ***NPT*** and regional ***nuclear-weapon-free zones***.

Compliance processes for multilateral arms control and disarmament treaties normally proceed through a series of steps of increasing political seriousness. Minor or "technical" infringements may be raised directly with the party by officials from the technical secretariat. More serious questions about non-compliance, drawing on information from the multilateral verification system, may be raised by the head of the verification organization, either directly with the party or through the executive body. In other cases, it is only a State party that may raise such concerns, either on the basis of information from the multilateral system, the State's own **national technical means** or a combination of both.

The multilateral treaties tend to encourage, in the first instance, direct dialogue to resolve compliance issues. This may be done directly through meetings between the accusing and accused parties, through the **good offices** of the head of the verification organization, or using treaty forums. The aim is to resolve matters cooperatively and amicably and in the least threatening and **intrusive** way. If the issue is not resolved, an investigation might be undertaken, either in cooperation with, or independently of, the party concerned. Many treaties provide for an **on-site inspection**, as a last

resort, if the non-compliance issue cannot be resolved by other means. Such inspections must be approved, or at least not blocked by, a vote of the treaty's governing body. There are various models for the voting requirements on such occasions. Normally a State has no right to refuse a request for a **challenge on-site inspection** that has been mandated by an executive body. Refusal of a compulsory on-site inspection may itself be considered a treaty violation, as well as being regarded as an implicit admission of guilt.

When the executive body is unable to agree that a violation has occurred, or when the matter is judged so politically important that the views of all parties must be sought, the conference of States parties (either in special or ordinary session) may be asked to make a decision.

As a last option, after all other treaty processes have been tried without success, some treaties provide for a compliance issue to be passed to either the ***United Nations General Assembly*** or the ***United Nations Security Council*** or both. This may occur when the States parties cannot reach agreement on the non-compliance allegation or on the appropriate response to a proven non-compliance case. It may also occur when the non-compliant State ignores the compliance measures taken against it by the treaty parties and refuses to come into compliance with the treaty. If a State party believes that a serious treaty violation is a danger to international security it can bring the matter to the attention of the ***United Nations Security Council*** at any time.

Under the ***CWC***, for example, if a non-compliant State does not respond as required, the Conference of State Parties may refer the issue to the General Assembly and the Security Council. Under the ***BWC***, for which there is no dedicated international verification organization, any State party may lodge a complaint of non-compliance directly with the Security Council. In urgent cases, such as a major "break out" from a treaty, such as the use of a banned weapon of mass destruction, treaties may also provide for the matter to be directly referred to the United Nations Security Council. In the case of some regional agreements, such as those establishing ***nuclear-weapon-free zones***, cases of non-compliance may be referred to regional bodies.

Table 1 gives an overview of the compliance provisions of the major multilateral arms control treaties.

Table 1: Dispute Settlement, Enforcement and Special Compliance Provisions of Major Multilateral Arms Control and Disarmament Treaties

Treaty	Major prohibition	Dispute settlement	Enforcement	Special compliance
Geneva Protocol (1925)	Use of chemical and bacteriological weapons	None	None	None
Antarctic Treaty (1959)	Any measures of a military nature in Antarctica	Consultation referral to ICJ	"Appropriate efforts" by States Parties	None
Partial (Limited) Test Ban Treaty (1963)	Nuclear weapons testing in the atmosphere, outer space and under water	None	None	None
Outer Space Treaty (1967)	Nuclear weapons in outer space; military use of celestial bodies	Consultation	None	None
Non-Proliferation Treaty (1968)	Proliferation of nuclear weapons	IAEA Statute provides for mandatory referral to ICJ and access to ICJ advisory opinions	- request by IAEA to remedy non-compliance - curtailment or suspension of assistance - return of materials and equipment - suspension of privileges and rights of membership - report on non-compliance to Security Council and General Assembly	- safeguards regime administered by IAEA - assistance/ exchanges in peaceful uses of nuclear energy

Seabed Treaty (1971)	Nuclear weapons on ocean floor	Consultation	Referral to Security Council	None
Biological Weapons Convention (1972)	Production and stockpiling of biological and toxin weapons	Consultation	Referral to Security Council	- any necessary domestic measures - investigations may be carried out by Security Council - assistance to victims
Environmental Modification Treaty (1977)	Military or other hostile use of environmental modification (ENMOD) techniques	Consultation (e.g., formation of Consultative Committee of Experts)	Referral to Security Council	- any necessary domestic measures - Consultative Committee of Experts, formed on request - exchange of information - assistance to victims
Moon Treaty (1979)	- any hostile act on, or using, the moon - placing nuclear weapons on or in orbit around the moon	- consultation - peaceful methods - assistance from UN Secretary-General	None	None
Inhumane (or Conventional) Weapons Convention (1981)	Uses of certain conventional weapons, e.g. mines, booby traps and incendiary weapons against civilians)	None	None	Education of armed forces

Celestial Bodies Agreement (1984)	Moon and other celestial bodies used only for peaceful purposes	- consultations - peaceful means - assistance of UN Secretary-General	States Parties to ensure that national activities carried out in accordance with treaty	Reporting of activities to UN Secretary-General
Chemical Weapons Convention (1993)	Development, production, stockpiling, use and transfer of chemical weapons	- clarification and consultation - ICJ referral - ICJ advisory opinions	- request measures to redress non-compliance - referral to Security Council - recommend collective measures	- mandatory penal legislation - compliance promoted by Organisation for the Prohibition of Chemical Weapons (OPCW) - national authorities
Comprehensive Nuclear Test Ban Treaty (1996)	Nuclear tests and other nuclear explosions in all environments	- consultation and cooperation - referral to ICJ	- request to State Party to take measures to redress - Conference of States Parties to take the necessary measures to ensure compliance - suspend rights and privileges - referral to UN	Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) to ensure implementation of treaty provisions - national implementation measures - national authorities
Landmines (Ottawa) Convention (1997)	Bans use, stockpiling, production and transfer of anti-personnel mines	- consult and cooperate - Security Council may exercise good offices - fact-finding	Special Meeting of States Parties may request party to take measures	- fullest possible exchange of information - assistance for mine victims - national measures including penal sanctions

WHAT HAPPENS IF NON-COMPLIANCE OCCURS?

Prior to the development of treaty-specific compliance systems, States used standard diplomatic tools, on an ad hoc basis, to respond to cases of non-compliance. The aim would be to send a signal about the situation, both to the State in question as well as to the wider international community, and to exert pressure for the situation to be rectified. These tools are still available and may be used by individual States or groups of States against a non-compliant party. The options include: diplomatic protests, recall of diplomatic representatives, restrictions on State visits or other official visits, suspension of bilateral development assistance or military cooperation, or trade or other types of sanctions.

In addition to these responses, **multilateral** treaties envisage a range of steps to penalize a non-compliant State and induce it to return to compliance. One sanction is the denial of treaty benefits, such as membership of treaty bodies, the receipt of official verification data, the right to nominate nationals for employment by treaty bodies and economic and technical assistance. Under the ***IAEA* Statute**, for example, when a situation of non-compliance is not fully corrected within a reasonable time, the ***IAEA*** Board of Governors may curtail or suspend technical assistance provided by the Agency or by its members and demand the return of materials and equipment.

Referring a compliance issue to the ***General Assembly*** or the ***Security Council*** is no guarantee of action. The resolutions of the General Assembly are not legally binding, although they do carry some political weight. The Security Council's decisions are binding on all United Nations member states. The Council has a variety of options for dealing with a non-compliance issue, including authorizing **fact-finding missions** and the imposition of **sanctions** of various types and the use of force to enforce compliance. However, draft resolutions may be vetoed by a permanent member. Moreover, many Security Council resolutions are, in practice, ignored. Economic sanctions can be of limited value in enforcing compliance in the case of arms control and disarmament as they usually take too long to have an effect. The use of force is considered a last resort and is rarely used.

To date neither the Assembly nor the Council has been extensively involved in arms control and disarmament compliance questions, either at

the behest of treaty parties or on their own initiative. One exception was the United States use of the Council in 1993 to substantiate its allegations (through the use of **satellite** imagery) that North Korea was violating the ***NPT*** and its ***nuclear safeguards agreement*** with the ***IAEA***. Ultimately the Council did not act on the non-compliance issue. The issue was dealt with through a quadripartite arrangement between North and South Korea, Japan and the United States. Verification of the accord was delegated to the IAEA. Another exception, although not in the context of a multilateral arms control agreement, was the Security Council's imposition of sanctions and authorization of the use of force to bring about Iraqi compliance with resolutions requiring it to eliminate its nuclear, biological and chemical weapons and long-range missile programmes and capabilities.

HOW ARE COMPLIANCE DISPUTES SETTLED?

Provisions for the settlement of compliance disputes are included in many treaties. Disputes could include those arising when a party challenges a finding of non-compliance against it or disputes the nature and/or severity of penalties or sanctions imposed on it. Other disputes may revolve around treaty interpretation. The most common treaty provision urges parties to "consult and cooperate" to resolve disputes. Other peaceful means of dispute settlement are sometimes explicitly mentioned. The 1959 ***Antarctic Treaty*** lists "negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement or other peaceful means of their own choice".

Some treaties suggest that parties refer disputes that they are unable to resolve among themselves to the ***International Court of Justice (ICJ)***. Of the multilateral disarmament bodies, only the ***IAEA*** **Statute** requires mandatory referral of unresolved disputes to the ICJ. In other treaties, such a referral needs the consent of both parties. Some nations, however, have agreed generally to the "compulsory jurisdiction" of the Court with regard to other States who have agreed to such jurisdiction. This means that if a case is brought against such a State it would be obliged to come before the court and to accept its verdict.

WHAT ABOUT COMPLIANCE BY INDIVIDUALS?

National compliance measures are all those taken by a treaty party to ensure that nothing is done within their territories to violate the treaty or undermine compliance with it. Such measures include:

- legislation passed by a legislative body to make a treaty part of domestic law, including penal sanctions for infringements by individuals, companies or other organizations;
- additional legislation or regulations adopted to ensure compliance;
- special government bodies established to ensure that the law is carried out.

Not all treaties require domestic implementing legislation. Those that do so vary in the extent of their requirements. One of the strongest requirements is found in Article VII of the ***CWC***, which requires States parties to prohibit "natural and legal persons" from undertaking any of the activities prohibited by the treaty, including by enacting penal legislation. The CWC also requires States to inform the ***OPCW*** of the legislative measures taken. This provides the organization and other parties with an opportunity to examine the legislation to ensure that it is up to the desired standard. Under the ***Landmine Convention*** states are required to "take all appropriate legal, administrative and other measures, including the imposition of penal sanctions". States are required to report these measures to the United Nations Secretary-General.

Some States are required by their own constitutional arrangements to pass national legislation to incorporate treaty provisions into domestic law, whether or not such legislation is specifically mandated by the treaty concerned. States may also extend their jurisdiction to include crimes committed by their nationals abroad (extraterritorial jurisdiction). Some treaties also require States to prohibit activity on territory under its jurisdiction or control, which may being the activities of foreign nationals within their domestic law.

Just as verification systems cannot prevent non-compliance by a party which is determined to violate an agreement, compliance mechanisms also provide no guarantee that other parties will act on credible evidence of non-compliance. Compliance mechanisms can only provide a framework for dealing with non-compliance. For a variety of reasons, ranging from

political expediency to an inability to agree that an intentional violation has occurred, parties may choose not to fully utilize the compliance mechanisms and thereby allow non-compliant situations to go unaddressed. Alternatively, a collective decision by the parties may be undermined by the refusal of some to implement it. This is not the fault of compliance systems themselves. Rather, it demonstrates that compliance systems supplement and support political decision-making but do not replace it.

In recent decades there have been increasing efforts by the international community to hold individuals accountable for actions that violate international agreements. The 1998 Treaty of Rome provided for the establishment of an International Criminal Court (ICC). With the entry into force of the treaty in early 2002, it is expected that the court will be established in The Hague shortly. The court will hear cases involving individuals accused of war crimes, genocide and gross violations of human rights, but only when their national governments are unable or unwilling to bring them to trial. While the remit of the court does not yet specifically extend to significant violations of arms control and disarmament agreements, such as the use of a nuclear or biological weapon that causes mass casualties, this may be considered by the court as falling within one of the other areas of its jurisdiction.

CHAPTER 4

MULTILATERAL VERIFICATION

The following two chapters examine existing models of verification. Most of these verify compliance with treaties. Also included are arrangements which do not qualify strictly as verification, since they do not aim to determine compliance with legal obligations. However they have some of the characteristics of verification as they provide for **declarations of data** or **on-site inspection** or **observation** of activity which may have a confidence-building effect between the States involved. Such arrangements may be precursors to the **negotiation** of verifiable treaties or agreements.

Since an understanding of the treaty verification provisions in each case requires an understanding of the terms of the treaty, a basic description of these is given. For more detail readers should consult Volume I in this series, *Coming to Terms with Security*.

CONVENTIONAL WEAPONRY AND ARMED FORCES

United Nations Register on Conventional Arms

The ***United Nations Register on Conventional Arms*** was created by United Nations General Assembly Resolution 46/36L on 9 December 1991. It is a **transparency** and **confidence-building measure** rather than a **verification regime**. All United Nations member States are invited to submit data annually on the number of items imported and exported in seven military equipment categories: battle tanks, armored combat vehicles, large calibre artillery systems, combat aircraft, attack helicopters, warships, and missile systems. The collected data is made publicly available by the United Nations Secretary-General in an annual report. Since the establishment of the register a total of 147 member States have provided

information at least once. Every year (except 1998) the number of States submitting data to the register has exceeded 90, although key States in regions such as the Middle East have not submitted any.

The register does not include any provisions for verifying the data submitted. However, by increasing the level of transparency the register facilitates the verification of other agreements, such as regional arms control agreements and **peace agreements**. The information on exports and imports provides States, as well as interested groups such as non-governmental organizations, with the ability to cross-check details of declared imports against declared exports. The register also gives them the ability to gain a sense of overall trends in arms accumulation. This knowledge may help reduce tensions in a particular region by indicating that States are not accumulating excessive arms. The information could provide early warning of an unusual accumulation of arms by a particular country or in a particular region, providing an opportunity for political discussion and negotiations to deal with the situation before it escalates.

Confidence- and Security-Building Measures in Europe

A comprehensive regime of confidence- and security-building measures is now in place in Europe which, while not strictly constituting a **verification system**, does contribute to enhancing confidence between States in terms of their general military behaviour as well as helping verify their compliance with conventional arms reduction treaties.

In the early 1970s member States of the ***Conference on Security and Co-operation in Europe (CSCE) (later the Organization for Security and Co-operation in Europe (OSCE))*** negotiated measures to reduce the risk of surprise attack and military confrontation in central Europe. The 1975 ***Helsinki Final Act*** provided for military **confidence-building measures (CBMs)**, such as mandatory notification, twenty-one days in advance, of military manoeuvres involving 25,000 or more troops; voluntary pre-**notification** of other major military exercises; and the voluntary hosting of **observers** at major military exercises. While these were not strictly verification measures, they could be used to support verification measures for a future regional conventional arms agreement.

In 1986 the ***Stockholm Document*** strengthened and expanded the terms of the Helsinki Final Act. This was the start of the "Stockholm process"

which demonstrated the evolutionary possibilities of a confidence-building process. It also laid the groundwork for the 1990 ***Conventional Forces in Europe (CFE) Treaty*** which would actually reduce conventional arms in Europe. By introducing such measures as mandatory on-site inspections of some military activities it also began to blur the distinction between CBMs and verification.

Under the Stockholm Agreement States agreed to the following CBMs:

- 42 days' advance notice of military activities involving more than 13,000 troops or 300 tanks;
- mandatory invitation of **observers** to military activities involving more than 17,000 troops or 5,000 amphibious or airborne paratroopers;
- the right to request ground **on-site inspection** and/or **aerial observation** of an exercise (no State was required to accept more than 3 inspections per year);
- one year's advance notice of manoeuvres involving more than 40,000 troops and two years' advance notice of manoeuvres involving more than 75,000 troops;
- an annual exchange of calendars giving the schedule of military exercises.

CSCE/OSCE member States negotiated four further CBM agreements called the ***Vienna Documents*** of 1990, 1992, 1994 and 1999. These agreements incorporated and expanded the measures contained in the Stockholm Document. The new measures were:

- an annual **information exchange** on military forces;
- notification of major weapon deployments and military budgets;
- **short-notice on-site inspections** to verify compliance; and
- creation of a Conflict Prevention Centre to act as a "clearing house" for these activities and to facilitate clarification of unusual military activities and to monitor implementation of the agreements.

Under these agreements **on-site inspections** of treaty-limited military activities can take place on 36 hours' notice, but may last no longer than 48 hours. **Evaluation visits** to assess the accuracy of the information provided in the **information exchanges** on military forces and military plans are also permitted. The number of such visits that a State must accept each year is based on the number of active military formations (armies, corps and

divisions and their equivalents) and units (brigades, regiments and their equivalents). Each State is obliged to receive a maximum of 15 visits a year and no more than two visits a month. The agreements provide detailed instructions as to how the inspections and evaluation visits are to be carried out, including: the designation of points of entry; the composition of the inspecting teams; the equipment they may use; and the duties of the receiving State.

Conventional Forces in Europe (CFE) Treaty

The ***CFE Treaty*** was signed in November 1990, just as the Cold War came to an end, by the 22 States that were then members of the North Atlantic Treaty Organisation (NATO) and the Warsaw Pact. It established upper limits on five categories of conventional weapons in Europe. A follow-on agreement on military personnel, known as ***CFE 1A***, was signed in 1992. In May 1992 the ***Tashkent Agreement*** established maximum levels for each of the new CFE parties that resulted from the dissolution of the Soviet Union and extended the treaty's inspection requirements to them. In November 1999 a further agreement, the ***Adapted CFE Treaty*** modified the original CFE agreement to eliminate the reference to the division of Europe into two blocs and established new national reductions or ceilings for all of the parties. Geographically, the treaty covered the area from the Atlantic Ocean to the Ural Mountains known as the Atlantic to the Urals (ATTU) zone.

The CFE Treaty establishes a multi-layered verification structure. It includes the standard clause protecting the right of States to use **NTM** in a manner consistent with international law and prohibiting deliberate concealment measures that impede verification by NTM.

Information Exchange

The treaty requires an extensive **information exchange** regarding military matters. Agreement by States to this unprecedented **transparency** represented a major political change for the European States. The provisions for the exchange are outlined in a Protocol on Notification and Exchange of Information. The first set of information was required within 90 days of the treaty's signature. Updated information was required 30 days after the treaty entered into force and on 15 December every year thereafter. In addition, each party was required to provide updated

information to the other parties confirming that its mandated reductions had been achieved.

The information required in the information exchanges included:

- details of the command organization for land forces, air forces, and air defence aviation forces down to the level of brigade/regiment level;
- information on the overall and zone-by-zone holdings of each category of weapon limited by the treaty;
- for each unit on the party's command organization chart, information on location, numbers, and types of **treaty-limited equipment (TLE)**, as well as **look-alike (LAL) items**;
- information on the location, number, and types of **LALs** not in service with conventional forces;
- information on which treaty-limited items were located at which declared sites;
- information on the location of sites from which armaments and equipment had been withdrawn.

Inspections

The treaty provides for four different forms of on-site inspection: **declared site inspections**; **certification inspections**, **reduction inspections** and **challenge inspections**. Each party has the right, regardless of whether it was originally a NATO or Warsaw Pact State, to inspect all other parties within the **area of application**. No party can conduct more than five inspections annually on the territory of a State that belonged to its own group.

The number of inspections a State is obliged to accept is determined by taking into account two factors: the number of **objects of verification (OOV)** the State possesses within the treaty's zone of application and the timeframe for achieving reductions. The more OOVs a State has, the more inspections it must accept. OOVs include formations or units with treaty-limited equipment or armaments, any designated permanent or military storage site, and reduction sites. For the 120-day **baseline** period, the number of inspections each State was obliged to accept was 20 per cent of the number of OOVs in their possession. For example, if they had 500 tanks, they were obliged to accept a maximum of 100 inspections. For the three-year reduction period, the number was reduced to 10 per cent. For the 120-day residual level evaluation period at the end of the 3-year

destruction period, during which the parties had the right to verify that the reduced levels had been achieved, the percentage figure rose to 20 per cent. For the remainder of the treaty's duration after the residual level evaluation period the quota was reduced to 15 per cent of the number of remaining OOVs.

Declared site inspections are designed to determine which category and how many **OOVs** are located at each declared site. They take place at facilities which contain one or more OOVs and are mandatory. Inspectors must arrive at a designated **point of entry**. Within one to 16 hours of arrival the inspecting team must announce the location of the first inspection site. The inspected party must transport the inspecting team to the site within 9 hours of the inspection site being designated. Once at the site, the inspection team is given a briefing, including a detailed site diagram. Within half an hour of receiving the diagram, the inspecting team must announce the OOV to be inspected.

Certification inspections are designed to certify that multi-purpose attack helicopters and combat-capable aircraft had been reconfigured into support helicopters and trainer aircraft. They were not included in the overall inspection quotas but were mandatory. The party undertaking the certification was required to provide 15 days' notice of the location and time of the planned certification process. Inspecting teams could include members of more than one member State but the inspected State was not obliged to accept more than one inspection team at a time at a given site.

Reduction inspections are intended to ensure that the reduction process is being carried out according to the terms of the treaty. These inspections are also mandatory. As with **certification inspections**, they do not count against the overall inspection quota. The basic approach of these inspections is similar to that of certification inspections.

Challenge inspections permit parties to inspect, at **short notice**, any weapons or activities at declared sites which they have concerns about. They are conducted at short notice, minimizing the likelihood that the inspected party can conceal illicit weapons or halt illicit activities. The specifics of the inspection request must be made between one and 16 hours after the arrival of the inspecting team at a **point of entry**. In contrast to the other types of CFE inspection, a request for a challenge inspection may be refused. A refusal can only be made within two hours of receiving

notification of the specified inspection site. The refusing State must provide reasonable assurances that the specified site does not contain **treaty-limited items**. If the inspection request is granted, the inspecting party must be transported to the site within nine hours.

Challenge inspections are limited by a quota system based on the number of **declared site inspections**. In the 120-day baseline period, the three-year reduction phase and the residual level validation phase, States are obliged to accept challenge inspections numbering 15 per cent of the number of their declared sites. For the remaining life of the treaty, the quota is 23 per cent.

Inspection Modalities

Each inspection team may have a maximum of 9 inspectors, divided into 3 sub-teams. Inspectors from parties other than the party conducting the inspection may be included. A practice has also developed of always including representatives of at least one NATO country and one former Warsaw Pact country in each team.

Inspectors are expected to respect the laws and regulations of the inspected State. The inspected State is expected to grant them certain privileges and immunities according to the Vienna Convention on Diplomatic Relations. They are permitted to spend a maximum of 10 days in the country being inspected and a number of different inspections may be carried out during that time. Inspectors may spend no more than 48 hours at any declared site. During a **challenge inspection**, inspectors may spend no more than 24 hours inspecting a specified area. No more than two inspection teams may be in an inspected State simultaneously.

A Protocol on Inspection outlines the types of equipment that inspectors may use during an inspection. The party being inspected has the right to shroud individual items of sensitive equipment at a site and to deny access to sensitive points, although in such situations it must declare whether the sensitive point or equipment contains any **treaty-limited item**. If such items are present, the inspected party must take steps to satisfy the inspecting team that no more than the declared items are present.

To assist the tracking of individual pieces of equipment, the treaty requires that a working register of serial numbers of equipment subject to reductions be kept at each reduction site and that the register be available

to inspectors. In addition, inspectors are permitted to record serial numbers or place special marks on equipment before reduction occurs and to check these numbers and marks after the reduction process.

Aerial Inspections

The treaty also provides for aerial inspections. The numbers and details were left for further negotiation, in the expectation that the ***Open Skies Treaty*** would be used for this purpose. That treaty was signed in 1992 and entered into force in 2002.

Joint Consultative Group (JCG)

The treaty establishes a Joint Consultative Group to provide a forum for parties to:

- address **compliance** questions;
- resolve ambiguities, differences of interpretation and disputes about treaty implementation;
- resolve disputes;
- handle the updating of lists of equipment and existing types;
- deal with administrative issues such as the distribution of **on-site inspection** costs;
- establish ways of ensuring that information provided under the treaty is not misused;
- consider "extraordinary" issues.

The JCG meets twice yearly. Additional sessions can be convened at the request of one of the parties. The proceedings of the JCG are secret unless decided otherwise. Procedural and administrative details regarding the operation of the JCG, including distribution of the costs, are dealt with in a protocol to the treaty.

Open Skies Treaty

The Open Skies Treaty is not an arms control agreement, since it does not prohibit or restrict a type of weaponry. Rather it aims at increasing **transparency** and **building confidence** among its member States. The information obtained as a result of the treaty may be used by any party to verify compliance with any arms control or disarmament treaty, or any other type of treaty.

Signed in March 1992 by 25 NATO and Warsaw Pact members, the treaty gives each party the right to undertake short-notice **aerial surveillance** flights over the territory of any other party. The treaty applies to the territory of all of the parties, from the west coast of North America to the east coast of Russia, referred to as "Vancouver to Vladivostok". While the original treaty signatories were members of NATO and the Warsaw Pact, the treaty provides that six months after ***entry into force*** any member of the ***OSCE*** may apply to accede. Thereafter, any State that is "able and willing" to contribute to the objectives of the treaty may apply to accede. The Open Skies Consultative Commission (see below) will consider such applications.

Each party has an annual quota of flights that it has agreed to receive. This is known as its **passive quota**. Each State party has the right to conduct up to the same number of overflights over the territory of the other parties. This is called its **active quota**. No State can request to conduct more than half of another State party's passive quota of overflights. The passive quotas are established roughly on the basis of territorial size. The treaty also allows States to form groups to undertake overflights together, with quotas adjusted accordingly. The data gathered during each overflight is made available to all parties.

Aircraft undertaking the overflights may be equipped with four types of **sensors**:

- optical panoramic and framing cameras;
- video cameras with real-time display;
- infrared line scanning devices; and,
- sideways-looking synthetic aperture radar (SAR).

These are all subject to "performance limits". For cameras and video cameras the permitted resolution is 30 centimetres. For infrared devices the maximum resolution is 50 centimetres, while a ground resolution of three metres is permitted for the SAR.

The treaty provides extensive detail as to how the sensors are to be installed and operated and specifies how and on what material the data from these sensors can be recorded. In order to ensure equality of access and capabilities all of the permitted sensors must be commercially available to all parties. The treaty further provides for a three-year phase-in period

after entry into force in which infrared imaging is prohibited unless agreed by the observing and observed parties. These parameters may be changed through negotiation in the Open Skies Consultative Commission.

The regulations for the conduct of the overflight are also detailed. A party requesting an observation flight must provide the party it intends to overfly with 72 hours' notice of the arrival of its aircraft at a designated airport (the **point of entry**). The party to be overflown must acknowledge receipt of the notification within 24 hours. On arrival the inspecting party must submit a plan of the flight path to the inspected party. The flight must occur within 24 hours of submission of the plan. The party being overflown has the right to inspect the aircraft to be used to ensure that the sensors are of the correct type and are correctly installed. In addition, the party being observed has the right to have two monitors and an interpreter on the flight.

The country being overflown has the right to insist that its own aircraft be used for any overflight. While this would give the overflown State greater assurance that no illicit observation was being conducted during the flight, it would need to have an aircraft constantly on standby for this purpose.

The treaty established an **Open Skies Consultative Commission** to deal with questions of implementation and **compliance**, and to devise measures to improve the effectiveness of the regime. The Commission operates on the basis of consensus. It began functioning 60 days after the treaty was signed and meets in regular session four times a year.

In addition to its treaty maintenance role, the Commission may consider requests from any of the organs of the ***OSCE*** for extraordinary observation flights to assist that organization in its crisis management and conflict prevention tasks. Such flights require the consent of the State being inspected and the resulting data will be made available to the requesting body. The Commission may also consider proposals for extending the treaty's provisions to include environmental monitoring.

To help sustain the momentum towards a **multilateral** Open Skies regime and to contribute to better relations between them, Hungary and Romania signed their own **bilateral** version of an Open Skies treaty on 11 May 1991.

Landmine Convention

The ***Landmine Convention (also known as the Ottawa Convention or Land Mine Ban Treaty)***, was opened for signature on 3 December 1997 and entered into force on 1 March 1999. It prohibits parties from using, producing, acquiring, stockpiling and transferring anti-personnel landmines or assisting, encouraging or inducing others to engage in prohibited activities. The treaty also requires that existing anti-personnel landmines be destroyed, regardless of whether they are stockpiled or emplaced.

The treaty contains modest verification provisions. It requires States to report annually on their **compliance** with their legally-binding obligations and additional information on landmine-related activity to the United Nations Secretary-General, the treaty's **depositary**. Data to be supplied includes: an account of **national implementation measures** (including legal and administrative); numbers and types of stockpiled landmines; the locations of mined areas; the numbers and types of mines retained for permitted purposes (development and training in mine detection, clearance and destruction techniques); details of the destruction of mines and **decommissioning** of production facilities; status of mine destruction programmes; the numbers and types of mines destroyed; the technical characteristics of all mines produced; and measures undertaken to warn populations of mined areas. These data declarations are made public on the website of the United Nations Department for Disarmament Affairs.

The treaty has procedures to permit a State party or parties to pursue a suspected case of non-compliance. Any State party may submit to any other State party, through the United Nations Secretary-General, a "Request for Clarification". The State party to which the request is directed must reply within 28 days. If the requesting party does not receive a timely or satisfactory reply, it may submit the matter to the next scheduled meeting of the parties, request the **good offices** of the Secretary-General in resolving the dispute, or propose a Special Meeting of States parties. If, within 14 days, one-third of the parties agree, such a meeting must be convened within another 14 days. It needs a quorum of a majority of member States. Such a meeting may dismiss the matter by a majority of States present and voting.

If further clarification is sought, the meeting may authorize a **fact-finding mission**. Its mandate is to be decided by majority vote. Such a

mission is to be carried out by up to nine experts drawn from a list maintained by the Secretary-General and based on names submitted by States parties. The team must provide at least 72 hours' notice before entry into the territory of the State to be inspected. It may bring equipment for gathering information and remain in the territory up to 14 days, but for no more than seven days at one site without agreement. Provision is made to protect the rights of the party being inspected. The details, including the extent of access to be granted, are to be negotiated between the visited party and the fact-finding mission. The fact-finding mission must report its findings, through the Secretary-General, to a Meeting of States Parties. The meeting may, by two-thirds majority request the State party concerned to take measures to address the compliance issue or suggest other ways of resolving it, including "the initiation of appropriate procedures in conformity with international law". This is generally taken to mean the imposition of some form of **sanction** (such as suspension of treaty benefits) or referral of the matter to the United Nations Security Council or ***International Court of Justice***.

The Landmine Convention is the best example of a treaty in which civil society plays a notable role in **monitoring** compliance. A global coalition of **non-governmental organizations**, mostly those involved in the International Campaign to Ban Landmines (ICBL), established a network called **Landmine Monitor** in June 1998. It produces an annual report that details all aspects of compliance with the treaty by all countries, whether they are party to the treaty or not. Landmine Monitor also keeps a watch on compliance by non-State actors. Although Landmine Monitor is not officially connected with the treaty it is permitted by the States parties to present its reports to their conferences and inter-sessional consultations. Such reports, especially those containing details of alleged non-compliance, have considerable credibility and impact among States parties.

Peace Agreements and Processes

Verification arrangements are increasingly included in peace agreements or processes designed to end conventional armed conflict within or between States. Peace accords can include a variety of military measures involving conventional weaponry and armed forces that require verification:

- a ceasefire;

- troop withdrawals;
- cantonment of troops;
- demilitarization of certain areas;
- demobilization of troops;
- reductions in arms and equipment;
- reintegration of troops into a new armed force.

Sometimes these measures are combined with political measures, which also require verification and monitoring, such as the holding of elections and the transition to democratic governance.

The verification tasks may be assigned to the United Nations, regional organizations, ad hoc groups of States (sometimes called "coalitions of the willing"), a single State, or even the former belligerent parties themselves or a combination of any or all of the above. Some of the verification tasks assigned to United Nations troops as part of United Nations peace operations are summarized in Annex 1.

In spite of the trend towards greater use of verification measures in peace agreements, experience still remains limited, especially compared to the wealth of verification experience in arms control and disarmament. Following are examples of peace agreements in which verification has played a significant role.

Sinai Agreements and the Egypt-Israeli Peace Treaty

In the 1970s the two Sinai disengagement agreements between Israel and Egypt, along with the ***Egypt-Israeli Peace Treaty***, established a **third-party monitoring** system that has been operating ever since.

The 1974 Separation of Forces Agreement (Sinai I) created a temporarily stable arrangement: the Israelis withdrew to defensive positions averaging 20 kilometres from the Suez Canal and a thin buffer zone with adjacent limited force zones was established. A significant breakthrough was the acceptance by the parties of **third-party monitoring** by the United Nations and the United States. A United Nations peacekeeping force, the second United Nations Emergency Force (UNEF II) performed **on-site inspections** and general **observation**, while the United States performed periodic aerial surveillance.

The 1975 Interim Agreement between Israel and Egypt (Sinai II) provided for Israeli withdrawal from the Giddi and Mitla passes in exchange for **monitoring** of the passes by the United States in combination with permitted **NTM**. United Nations peacekeepers performed **observation** and **on-site inspections** of garrisons in the limited forces zones along the entire line of confrontation, while the United States established a **sensor** system to monitor access to the passes. The United States also performed aerial surveillance of all the zones established by the treaty, probably by U-2 high-altitude reconnaissance aircraft. Israel was permitted to retain control of an **electronic signals intelligence** station in west-central Sinai, while Egypt established its own station nearby. Both countries were permitted to fly reconnaissance missions over territory under their control up to the centre of the buffer zone. Although no information from these activities was exchanged by the parties, they constitute what might be described as "cooperative **NTM**" or "self-verification", which can be viewed as a precursor to **cooperative monitoring**.

To accomplish its ground-based monitoring the United States, through its Department of State, established a Sinai Support Mission, which in turn deployed a Sinai Field Mission (SFM). The SFM was responsible for overseeing the setting up and running of the electronic **sensors** in the **buffer zones** and the surveillance stations. Private contractors, the E-Systems Corporation, were hired to do the work. The SFM established four sensor fields which monitored a total of 620 square kilometres. In addition the SFM monitored the Israeli and Egyptian monitoring stations and its own security perimeter. Sensors alert the operators, who characterize the intrusion and report their findings. Optical and night vision devices are also used, as well as multiple sensor types, including **seismic**, acoustic, magnetic, strain, infrared and video.

The Protocol to the 1979 Egypt-Israeli Peace Treaty (the Camp David Accord), which brought about a phased Israeli withdrawal from the Sinai, built on the verification model established by Sinai II. While the **monitoring** system for the passes was closed in 1980 and the SFM ceased with the completion of Israel's withdrawal in April 1982, the **Multilateral Force and Observers (MFO)** was established in the same month to monitor the new situation through **observation** posts, mobile and foot patrols, and a maritime patrol. Force levels are verified by **aerial reconnaissance**, which generally occurs prior to an **on-site inspection**. The MFO is also responsible for monitoring the operation of Egyptian and Israeli surveillance

installations. Three-member teams of inspectors, including a representative of the party being inspected, carry out inspections of the installations. Members of the team carry out their own count of **treaty-accountable items**. A formal debriefing occurs after the inspection is complete and a final consolidated report is compiled. This reduces the likelihood of possible disputes about the inspection after its completion.

The MFO remains in place today. Along with the monitoring arrangements for Sinai I and II, it is an example of successful third party involvement in the verification of a peace agreement, as well as of the use of private contractors in such work.

Arms Control and the Dayton Peace Accords

The Dayton Peace Accords, signed by Bosnia and Herzegovina, Croatia and the Federal Republic of Yugoslavia on 14 December 1995, ended the armed conflict in the former Yugoslavia. In Annex 1B the parties agree to undertake negotiations, under the auspices of the ***OSCE***, on three sets of instruments: an agreement on **confidence- and security-building measures**, a sub-regional arms control agreement, and a regional arms control agreement.

The Agreement on Confidence- and Security-Building Measures in Bosnia and Herzegovina, was concluded between the Republic of Bosnia and Herzegovina, the Republic of Croatia and the Federal Republic of Yugoslavia on 26 January 1996. The agreement is modeled on the ***Vienna Documents*** and requires States to participate in an **information exchange**, providing details of their military organization, military personnel and major weapon systems. A **baseline** exchange of information is followed by annual exchanges of information every 15 December. Annual **notifications** are required of plans for deployment of major weapon systems. The parties are also required to provide information about new weapons systems and mount a demonstration of the new system within 90 days of deployment commencing. Notification of certain types of military activity and activities above levels defined by the agreement is required 42 days in advance. Constraints are also imposed on certain types of military activities, including limits on the number of times some activities may be carried out. Geographical limitations on military activity are also established. States carrying out activities requiring notification are required to invite the other parties to send unarmed **observers** to **monitor** it. The agreement requires

troops and heavy equipment to be withdrawn to **cantonments** or other **designated sites**, with removal permissible only for exercises.

Verification of the agreement occurs through **on-site inspection**, **observation** and **monitoring**. It is carried out by the parties to the agreement, assisted by the Personal Representative of the Chairman of the ***OSCE***, who designates additional inspectors from certain OSCE countries. The agreement establishes a Joint Consultative Commission, comprising representatives of each of the parties. For the first two years of the agreement the Personal Representative chaired the Commission. Thereafter, each of the parties has chaired the Commission in turn.

The Agreement on Sub-Regional Arms Control was signed on 14 June 1996 by the Republic of Bosnia and Herzegovina, the Republic of Croatia and the Federal Republic of Yugoslavia. It entered into force on 1 November 1997 and is of unlimited duration. The agreement is based on an acceptance of the need for "balanced and stable defence force levels at the lowest numbers consistent with the respective Parties' security". Copying the limits and structure of the ***CFE***, it establishes ceilings on five categories of weapon systems: battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters.

The reductions necessary for reaching the prescribed ceilings were to occur in two phases, ending 16 months after the signing of the agreement. To achieve the ceilings the parties could either export surplus weapons or destroy them (at specified sites, according to procedures specified in the agreement). Aircraft numbers could be reduced by reclassifying them according to agreed procedures. Weapons exported were subject to mandatory inspection by the other parties. The reduction process and **certification** of reclassified combat aircraft was also subject to **monitoring**.

Now that the agreed levels of weaponry have been achieved, **on-site inspections** are permitted to verify that they are maintained. The agreement created a Sub-Regional Consultative Commission to oversee the implementation process, composed of a representative of each party. The chairmanship rotates among the parties and decisions are by consensus.

The Concluding Document of the Negotiations under Article V of Annex 1-B of the General Framework Agreement for Peace in Bosnia and Herzegovina was the third arrangement marking the fulfillment of the arms

control requirements of the Dayton Accords. Signed on 18 July 2001, it outlined a series of voluntary **confidence-building measures**, including increased military contacts between the parties and joint training exercises.

Decommissioning in Northern Ireland

As part of the peace process elaborated in the 1998 Good Friday Agreement between the British and Irish governments and the nationalist and loyalist political organizations of Northern Ireland, an Independent International Commission on Decommissioning was established to verify the **decommissioning** of paramilitary weapons. Unlike many such bodies, the Commission is not representative of the parties in conflict, but is composed entirely of foreigners: it is chaired by retired Canadian General John de Chastelain and has two other members, a Finn and an American, in addition to support staff. It has offices in Dublin and Belfast.

The modalities for verifying decommissioning were laid down in legislation passed by the British Parliament in 1996. The methods include transferring weapons to the Commission or a designated person for verified destruction; the provision of information to the Commission to permit it to uncover weapons and verifiably destroy them; or destruction of weapons by those holding them, with subsequent Commission verification. Other methods could be used providing they conform to the legislation. Most importantly, the legislation provided reassurance to the belligerent parties that the decommissioning process would not expose members of the paramilitary organizations to prosecution.

The Commission began its work by seeking to consult the various paramilitary groups on the arrangements to be made for decommissioning, but with mixed results. To date three acts of verified decommissioning have occurred. A small loyalist paramilitary group handed over a small quantity of weapons for verified destruction by the Commission in December 1998. In October 2001, and again in April 2002, the best-armed paramilitary force, the Irish Republican Army (IRA), announced that it had undertaken acts of decommissioning which had been verified by the Commission in accordance with an agreed scheme. To date, the details of both the decommissioning and verification of IRA weapons have been kept confidential on the grounds that revealing them might inhibit further acts of decommissioning. It is therefore unclear how much weaponry was involved and what methods of destruction and verification were used. The

Commission has declared that it is satisfied that the decommissioned weapons have been put verifiably beyond use.

It remains unclear whether the decommissioned weaponry is the same as that which had previously been internationally verified as having remained unused and in secure storage. Before the IRA undertook any decommissioning, an interim arrangement was agreed whereby two respected international statespersons, Cyril Ramaphosa, former Secretary-General of the African National Congress, and Martti Ahtisaari, former Finnish Prime Minister, were asked to verify that a certain number of weapons were in secure, tamper-proof storage and had not been used. Two visits were conducted to secret destinations, with the **inspectors** blindfolded and sworn to secrecy about the weapons' locations. While the inspectors were able to reassure themselves that the weapons they had viewed had not been tampered with, the drawbacks of such a technique are apparent. The process was not transparent, the location of the arms caches and quantity of arms inspected could not be revealed and there was no indication of what proportion of the total IRA arsenal was being inspected. This process also had the disadvantage of being conducted outside the auspices of the Independent Commission which had been charged with overseeing the decommissioning process.

Despite some of the drawbacks indicated, the Northern Ireland decommissioning process is a good example of the role that outsiders can play in creating the necessary procedures and helping provide the necessary confidence to allow verification to proceed.

NUCLEAR WEAPONS

Nuclear Safeguards

Nuclear safeguards are a form of verification designed to check compliance with undertakings by States not to acquire nuclear weapons. They are required by various treaties and administered by a **multilateral** verification organization and two regional bodies.

International Atomic Energy Agency (IAEA) Safeguards

Under the 1968 ***Nuclear Non-Proliferation Treaty (NPT), non-nuclear-weapon States*** are prohibited from receiving, developing,

manufacturing or otherwise acquiring nuclear weapons. The ***nuclear-weapon States*** parties (defined by the NPT as those having exploded a nuclear device before 1 January 1967)—China, France, Russia, the United Kingdom and the United States—are prohibited from transferring nuclear weapons to other States or assisting them to acquire nuclear weapons by other means. Together, these measures are intended to halt horizontal proliferation—the spread of nuclear weapons beyond those States that already possess them. The treaty recognizes the rights of all parties to conduct research into, produce, and use nuclear energy for peaceful purposes. In addition, nuclear-weapon States are required to undertake negotiations in good faith on measures relating "to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control".

Rather than establishing a new **verification organization**, the NPT took advantage of an existing agency, the International Atomic Energy Agency (IAEA), created in 1957 to promote and assist States in the peaceful uses of nuclear energy. The IAEA has a Board of Governors, which acts as its **executive body**, a Secretariat headed by a Director-General and a General Conference that meets once a year.

The NPT requires each non-nuclear-weapon State party to sign a comprehensive or **full-scope safeguards agreement** with the IAEA which imposes IAEA safeguards on all nuclear material used by that State. The aim of safeguards is to verify that such material is not diverted to nuclear weapons or other nuclear explosive devices. Nuclear-weapon States are not subject to comprehensive safeguards agreements, although all five have placed some or all of their non-military nuclear activities under safeguards to demonstrate their willingness to undertake some verification burden.

The safeguards system is not intended to detect every diversion of fissile material, but rather to achieve "timely detection" of significant diversion. All facilities handling such material are subject to monitoring. The primary tool of the system is nuclear material accounting, comprising declarations by States parties of their facilities and materials and auditing checks and on-site monitoring and inspections to verify the information declared. Each State or group of States is required to establish and maintain a State System of Accounting and Control (SSAC) of nuclear materials based on rules and procedures established by the Agency. The SSAC has two

principal objectives: one is the national objective of providing for detection of nuclear material losses or unauthorized use or removal of nuclear materials in the interest of public health and safety as well as for economic reasons. The second is the international objective of providing the essential basis for the application of IAEA safeguards.

Safeguards agreements are tailor-made agreements negotiated between the Agency and each State or group of States. The basic structure and content of comprehensive safeguards agreements between the IAEA and States are described in IAEA document INFCIRC/153 (Corrected). The safeguards system is designed to ensure a minimum level of **intrusiveness** for the nuclear industry, while achieving the verification goal. The IAEA must keep the information it obtains secret and only use it internally to fulfil safeguards requirements.

Three types of **on-site inspection** are provided for under IAEA safeguards: **ad hoc**, **routine** and **special**. **Ad hoc inspections** are used to verify the information contained in initial declarations and subsequent changes. **Routine inspections** verify on an ongoing basis the location, identity, quantity and composition of all nuclear material subject to safeguards. **Special inspections** are intended to be used when there is uncertainty about a State party's compliance or allegations of non-compliance. The right to special inspections has only been invoked once, in 1993, in relation to North Korea.

Until recently, the IAEA only sought to verify the non-diversion of declared material. It did not attempt to detect undeclared clandestine activities. The revelation that Iraq had a significant clandestine programme aimed at producing nuclear weapons, along with allegations about a similar attempt by North Korea (both States were NPT parties) exposed the weaknesses of existing safeguards. The result has been the development of a plan for a strengthened safeguards system to augment the IAEA's ability to detect secret nuclear weapons programmes connected with declared and undeclared facilities.

Some of the improvements have been or are being put in place by the IAEA and States parties. Other improvements depend on each State concluding an ***Additional Protocol*** to its existing safeguards agreement. Under the protocol States are required to supply the IAEA with information about all nuclear-related activities, not just those relating to the production

and processing of nuclear materials. The protocol also permits **complementary access** inspections, a new category somewhere between **special inspections** and **routine inspections**, during which the agency may request access to undeclared locations, for example to conduct **environmental sampling**. Inspectors will also be able to see all parts of declared sites and demand access to buildings on such sites to assist them in resolving inconsistencies in the information that they have.

EURATOM and ABACC Safeguards

Two regional agencies also oversee implementation of measures relating to the non-proliferation of nuclear weapons. The ***European Atomic Energy Community (EURATOM)***, a regional agency created in 1957, comprises members of the European Union. The EURATOM safeguards system is very similar, although not identical, to the ***IAEA***'s. Like the IAEA's, it is based on **materials accountancy** and **on-site inspections**. The IAEA and EURATOM conduct joint inspections, collaborate in developing, testing and implementing new methods and techniques and have a liaison committee to ensure coordination and cooperation. The IAEA, however, remains the final decision-maker on substantive **compliance** questions.

In 1991, Argentina and Brazil entered into a **bilateral** nuclear inspection agreement which established a Common System of Accounting and Control of Nuclear Material (SCCC) administered by the **Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC)**. ***ABACC*** undertakes **monitoring** and **on-site inspections** to ensure that all nuclear materials and facilities in the two countries are used exclusively for peaceful purposes. It collects information from the parties on their nuclear facilities and materials and on transfers of nuclear materials out of or between facilities. Shortly after the bilateral agreement was signed, Argentina, Brazil and ABACC entered into a quadripartite agreement with the IAEA for the application of **full-scope safeguards**. This agreement was modeled on the ***EURATOM*** agreement with the IAEA and entered into force in 1994. ABACC implements the safeguards, but the IAEA is responsible for oversight of **compliance**.

Nuclear Test Bans

The various constraints on nuclear testing provide for a variety of verification means.

Partial Test Ban Treaty

The Partial or Limited Test Ban Treaty (PTBT or LTBT) is a **multilateral** treaty that entered into force in 1963. It prohibits nuclear weapons tests in the atmosphere, in outer space, and under water. It has no **verification system** of its own. Each party relies on its **NTM** to verify **compliance**.

Threshold Test Ban Treaty

In 1974, the Soviet Union and the United States signed the Threshold Test Ban Treaty (TTBT) which established a 150 kiloton "threshold" limit on the size of underground nuclear explosions. This treaty also relies on **NTM** for verification.

Peaceful Nuclear Explosions Treaty

The Peaceful Nuclear Explosions Treaty (PNET) was signed by the Soviet Union and the United States in 1976 and limits the yield of nuclear explosions conducted for peaceful purposes (peaceful nuclear explosions or PNEs) to 150 kilotons per explosion. The PNET requires the two parties to participate in an **information exchange** about their PNEs. For the first time in a Soviet-United States treaty it provided for **on-site inspection**. It was not until December 1990 that the TTBT and the PNET achieved ***entry into force***, after the two parties signed new protocols to both treaties dealing with verification concerns. These new protocols permitted each side to use in-country **seismic monitoring** technologies as well as on-site inspections for tests with planned yields greater than 35 kilotons.

Comprehensive Nuclear Test Ban Treaty

The Comprehensive Nuclear Test Ban Treaty (CTBT) bans all nuclear explosions in all environments. Although opened for signature in September 1996, at the time of writing it has not yet gained ***entry into force***.

To help implement and verify compliance with the treaty, a **Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)** will be established in Vienna, Austria. The organization will comprise a Conference of State Parties, an Executive Council and a Technical Secretariat headed by a Director-General. The Conference of State Parties will oversee the work of the Executive Council and the Technical Secretariat in implementing the treaty. Procedural issues will be decided by a majority vote and substantive issues by consensus. If a consensus cannot be reached within 24 hours, a two-thirds majority vote is required. The **Executive**

Council will be the principle implementation and **compliance** body for the treaty and is responsible for overseeing the work of the Technical Secretariat. The Council will consist of 51 members elected by the Conference on the basis of balanced geographical representation. The **Technical Secretariat** will be responsible for the operation of the verification regime. Currently, a Preparatory Commission (PrepCom) and a Provisional Technical Secretariat (PTS) are working to establish the regime.

The aim of the CTBT **verification regime** is to be able, with a high degree of confidence, to detect, and identify the approximate location of, any nuclear explosion. The regime includes: an **International Monitoring System (IMS)**, an **International Data Center (IDC)** and **on-site inspections**. Voluntary **confidence-building measures**, including the notification of large conventional explosives, are also considered to be part of the verification system. The CTBT is unique among multilateral verification regimes in having a permanent monitoring system covering the whole globe and operating around the clock.

The ***International Monitoring System*** comprises a network of 321 monitoring stations and 16 radionuclide laboratories that monitor the whole planet, both above and below ground and under the oceans, to provide timely detection of any nuclear explosion. Four types of detection stations are involved in the monitoring system: **seismological**, **infrasound**, **hydroacoustic**, and **radionuclide**. The data from the IMS is communicated via a dedicated international communications system to the **International Data Centre** in Vienna, both continuously and on request. The IDC collects and analyses this data and provides both data and analysis to all State parties.

Clarification Process

The treaty establishes a **consultation and clarification process** to deal with **compliance** questions. It first requires that parties try to resolve difficulties among themselves. If this is unsuccessful, one party may officially request clarification from another. The State that receives the inquiry must respond within 48 hours. Parties may also ask the Executive Council to obtain clarification from another State. If the requesting State party considers that the answer received is unsatisfactory, it has the right to request a meeting of the Executive Council to consider the question. If this process fails to resolve the matter, the party has the right to request an **on-site inspection**.

On-site Inspections

A request for inspection is presented simultaneously to the Executive Council and the Director-General of the Technical Secretariat. On receiving the request the Council is required to consider it immediately. The Director-General is required to acknowledge receipt of the request within two hours, inform the inspected party within six, and begin preparations for the inspection without delay.

The sole purpose of an on-site inspection is to clarify whether a nuclear weapon test explosion or any other nuclear explosion has been carried out and to gather any facts which might assist in identifying a violator. The decision to carry out an on-site inspection rests with the Executive Council, which must decide by a vote of at least 30 of the 51 members.

The treaty requires inspectors to carry out the inspection with the minimum of **intrusiveness**. The inspected party is permitted to take measures to protect its national security and **commercial proprietary information**, but may not refuse the inspection. The inspected party must not impede the inspection team in performing its activities as mandated. No country may be the subject of several simultaneous inspections. The inspection team is required to provide a progress report within 25 days of the approval of the inspection. The treaty limits the duration of the inspection to 60 days, but this can be extended up to a maximum of an additional 70 days if the Executive Council approves such a request from the inspection team.

In contrast to other nuclear arms control treaties, where on-site inspection is a major and continuous feature of the verification system, it is assumed that OSIs under the CTBT will be rare. The CTBTO, therefore, will have no permanent inspectorate. Inspectors will be selected as needed from lists maintained by the CTBTO. Currently the detailed procedures for OSIs in the form an On-Site Inspection Manual are being discussed by the Prepcom.

Nuclear-Weapon-Free Zones

Extensive areas of the globe have been declared, by treaty, to be nuclear-weapon-free zones (NWFZ). Negotiated and signed by regional organizations of States, such treaties have protocols attached which are open for signature by the nuclear-weapon States. Such protocols commit

them to respect the zones. This signifies that they will not use nuclear weapons against the States parties, deploy nuclear weapons in the zone or on the territories of the zone member States or in some cases that they will not transport nuclear weapons through the zone. While the provisions of the treaties and their verification arrangements vary, there are some basic elements that they have in common. Most rely on the **IAEA safeguards system** to verify the non-nuclear status of the member States and most establish a regional agency for dealing with compliance questions.

Although the 1959 ***Antarctic Treaty***, the 1967 ***Outer Space Treaty***, the 1971 ***Seabed Treaty***, and the 1979 ***Moon Treaty*** do not exactly fit within the definition of nuclear-weapon-free zones, they all prohibit military or nuclear activity in environments or areas where such activities have not yet commenced. All have provision for some form of **on-site-inspection**, after **consultation and clarification**, in order to deal with **compliance** concerns. With the exception of the Antarctic Treaty, such provisions have not been used.

The Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (The Treaty of Tlatelolco)

The 1967 Treaty of Tlatelolco establishes a nuclear-weapon-free zone in Latin America and the Caribbean. It prohibits parties from testing, using, manufacturing, producing or acquiring nuclear weapons. Parties are also prohibited from storing or deploying nuclear weapons. All nuclear material and facilities are to be used exclusively for peaceful purposes. Protocol I of the Treaty requires that States outside the region which have sovereign rights over territories in the region apply the terms of the treaty to such territories. Protocol II calls on all declared nuclear-weapon States to respect the denuclearisation of the region and not to use or threaten to use nuclear weapons against the parties.

The Treaty established the **Agency for the Prohibition of Nuclear Weapons in Latin America** (known as **OPANAL** from its name in Spanish), to oversee implementation of the Treaty. OPANAL comprises a General Conference, a Council and a small Secretariat headed by a General Secretary. All of the parties are represented at the General Conference. Each member has one vote, and decisions are made on the basis of a two-thirds majority. The Council, comprised of five parties elected by the General Conference for four-year terms, is responsible for overseeing the "proper operation of the control system" in cooperation with the **IAEA**.

The Treaty requires that the parties negotiate **safeguards agreements** with the ***IAEA***. It also provides for **special inspections** which may be carried out by the IAEA in accordance with the safeguards agreements. Although the Treaty originally permitted OPANAL itself to carry out such inspections, it was amended in 1992 to limit the OPANAL Council's role to that of requesting the IAEA to make an inspection. Information obtained during the inspection will be forwarded to the Secretary-General of OPANAL only after it has been sent by the Director-General of the IAEA to the IAEA Board of Governors.

The South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga)

The 1985 Treaty of Rarotonga prohibits parties from acquiring, manufacturing, possessing, or controlling a nuclear explosive device anywhere inside or outside the zone. It also prohibits parties from agreeing to the stationing on their territory of nuclear weapons that belong to other States, although it does allow them to permit visits and transit by aircraft and ships that may be carrying nuclear weapons. Each party undertakes not to supply nuclear material or equipment to any other State unless under ***IAEA* nuclear safeguards**, and to prevent the testing of any nuclear explosive device on its territory as well as the dumping of radioactive wastes and other matter at sea or on any territory within the zone.

Protocol I of the treaty requires that States from outside the zone but with sovereignty over territory in the zone abide by the terms of the Treaty. Protocol II requires the five declared nuclear-weapon States to respect the status of the zone and to refrain from the use or threat of use of nuclear weapons against the parties to the Treaty. Protocol III requires the nuclear-weapon States to refrain from testing nuclear devices in the zone.

The Treaty's verification and compliance system comprises:

- reports and exchanges of information;
- consultations in a Consultative Committee;
- application of IAEA safeguards to peaceful nuclear activities; and
- a complaints procedure via the Consultative Committee and the **Pacific Islands Forum (PIF)**, including the option of **on-site inspections**.

Unlike other NWFZ treaties, the Treaty of Rarotonga does not establish its own implementing agency. It does establish a Consultative Committee, comprising representatives of the parties, to be convened periodically. It

makes decisions on the basis of consensus, or failing consensus, by a two-thirds majority. Amendments to the treaty must be adopted unanimously. Each party is required to report to the PIF Secretariat in Suva, Fiji, any "significant event" on its territory relating to the implementation of the Treaty. States may ask the Secretary-General of the PIF to convene a meeting of the Consultative Committee to discuss any matter relating to Treaty implementation.

The Treaty establishes a procedure for dealing with suspected violations. First, the complainant is obliged to consult directly with the party suspected of a violation, allowing reasonable time for an explanation and resolution of the matter. If the issue is not resolved, the complainant may refer the matter to the Secretary-General with a request for a Consultative Committee meeting. The Treaty allows the Consultative Committee, after hearing both sides of the case, to order **on-site inspections** on the territory of the alleged violator or elsewhere. The Committee would appoint a team of qualified inspectors, in consultation with the parties involved, to undertake the inspection. While a representative of the suspected party may accompany the inspection, the team is subject only to the direction of the Committee. The suspected State is required to give inspectors "full and free access to all information and places within its territory" for them to complete their task. The inspectors are required to report their conclusions as quickly as possible to the Committee, which will then report to all members of the PIF, including giving their decision as to whether or not a violation has occurred. If it has been determined that violation has occurred, the Forum is obliged to meet promptly.

The African Nuclear-Weapon-Free Zone Treaty (Pelindaba Treaty)

The 1996 ***Treaty of Pelindaba***, which at the time of writing has not yet achieved ***entry into force***, prohibits the manufacture, stockpiling, acquisition, possession, control or stationing of nuclear weapons on the territories of the parties. The Treaty also bans nuclear weapons research and development, as well as peaceful nuclear explosions. States with nuclear facilities are required to maintain the highest standards of physical protection of nuclear material, facilities and equipment. Each party is permitted to determine for itself whether or not to allow the transit of nuclear weapons through its territory, although this right is conditioned by a requirement that such actions will not prejudice the treaty's purposes and objectives. Each party also undertakes not to take, assist, or encourage any

action aimed at an armed attack by conventional or other means against nuclear installations in the zone.

The treaty has three protocols. Protocol I calls on the declared nuclear-weapon States not to use or threaten to use nuclear weapons against any Treaty member or on the territory of a party to Protocol III that is situated within the zone. Protocol II calls on the declared nuclear-weapon States not to test or encourage the testing of nuclear explosive devices anywhere in the zone. Protocol III requires States with dependent territories in the zone to apply the denuclearisation provisions of the Treaty to such territories and to apply **IAEA safeguards** to them. All five nuclear-weapon States have signed the relevant protocols, and France and China have ratified them.

Parties are required to conclude **full-scope safeguards** agreements with the **IAEA**. In order to ensure compliance, the Treaty establishes the African Commission on Nuclear Energy to deal with reporting, consultations and exchanges of information. The Commission will meet annually and may also meet in extraordinary session. It will have twelve members elected by a Conference of the Parties who will serve three-year terms. Parties must provide the Commission with annual reports of any nuclear activities or other activity relating to the terms of the Treaty.

Under the Treaty, States must declare whether or not they have the capability to manufacture nuclear explosive devices and to destroy any such devices or facilities for manufacturing them prior to the Treaty entering into force. The destruction process is to be overseen by the IAEA and the Commission.

If a party believes that another party is in breach of its obligations, it must bring the matter to the attention of the party involved and allow it 30 days to respond. If the matter is not resolved adequately, the complainant party can take the issue to the Commission. If the Commission determines that the situation warrants it, it may ask the **IAEA** to undertake an **on-site inspection** and may send representatives as part of the inspection team. Based on the IAEA's report, the Commission will determine whether a violation of the Treaty has occurred. If the Commission reaches such a conclusion, the Treaty parties will meet in extraordinary session. If necessary, the session may decide to pass the matter to the Organization of African Unity (now the African Union) for further action. The AU may, in turn, decide to pass the matter to the United Nations Security Council.

Treaty on the South-East Asia Nuclear-Weapon-Free Zone (Treaty of Bangkok)

The 1995 **Treaty of Bangkok**, which entered into force in 1997, prohibits States from developing, manufacturing, testing, acquiring, possessing or controlling nuclear weapons, and from allowing the use of their territories by other States for any such purposes. A protocol to the Treaty obliges nuclear-weapon States to abide by the Treaty's terms. None of the nuclear-weapon States have yet signed it.

As with the other NWFZ treaties, except the Treaty of Rarotonga, the Treaty of Bangkok establishes a commission to oversee its implementation. The Commission comprises representatives from all parties and meets as necessary. Commission decisions are on the basis of consensus, or, failing consensus, a two-thirds majority vote. The Commission has an Executive Committee, composed of representatives of all the parties, which is charged with overseeing the verification process, considering requests for **consultation and clarification** and **fact-finding** and dealing with other tasks the Commission may assign it.

The **verification system** established by the Treaty includes: ***IAEA* safeguards**; the reporting and exchange of information; the possibility of requests for clarification; and fact-finding missions. Parties have the right to seek clarification from another party about a possible situation of non-compliance, or request that the Executive Committee seek clarification. States also have the right to ask the Executive Committee to send a fact-finding mission to another party's territory if there is an ambiguous or possible non-compliance situation.

If the Executive Committee determines that a violation has occurred, the non-compliant State will be required to bring itself into compliance. If the State does not comply, a meeting of the Commission will be called to determine what action should be taken. The Commission may decide to submit the issue to the ***IAEA*** or to the United Nations Security Council or United Nations General Assembly for further action. Any dispute over the interpretation of the Treaty that cannot be resolved by the parties within 30 days will be submitted to the **ICJ** or to **arbitration**.

A new nuclear-weapon-free zone is currently under discussion for Central Asia.

CHEMICAL AND BIOLOGICAL WEAPONS

Geneva Protocol

The 1925 ***Geneva Protocol*** bans the use of chemical and biological weapons. Although it lacks a verification mechanism of its own, the General Assembly, through various resolutions has in effect created such a mechanism, albeit one that is not legally binding. In 1980 and 1981 the Assembly passed resolutions empowering the United Nations Secretary-General to investigate the use of chemical weapons in Afghanistan and Southeast Asia. The investigations were hampered by the lack of cooperation of key parties involved and by the length of time that had elapsed since the alleged use had occurred. In 1982 the Assembly passed a resolution requesting the **United Nations Secretary-General** to compile and maintain lists of experts and analytical laboratories and to develop detailed investigation procedures for fact-finding missions to promptly investigate CBW use anywhere in the world. A second set of United Nations field investigations took place during the Iran-Iraq war from 1980 to 1988. In 1988 the **Security Council** passed a resolution encouraging the Secretary-General to investigate allegations of chemical and biological weapons use. This mechanism remains available for use today. There is currently talk of updating the arrangements in the light of the collapse of negotiations on a verification protocol for the 1972 ***Biological Weapons Convention***.

Biological Weapons Convention

The 1972 ***Biological Weapons Convention*** (Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (BWC)) bans the development, production, acquisition, stockpiling or transfer of microbial and other biological agents or toxins for non-peaceful purposes, as well as weapons, equipment or means of delivery of such agents or toxins. Parties are required to destroy or divert to peaceful purposes all prohibited agents, toxins, weapons, equipment and means of delivery within nine months of the convention's entry into force.

The Convention's provisions for verification and **compliance** are limited. Parties essentially rely on **national technical means**. The Convention requires States to consult with one another to deal with any

problems that might arise, including through the United Nations. The Convention specifically provides that if a party finds that another party is violating the Convention, it may make a formal complaint to the United Nations Security Council. Each party is obliged to cooperate with the Council in any investigation it undertakes.

A review conference of the parties has taken place approximately every five years, even though the treaty does not require this. These have attempted to agree measures to strengthen verification and compliance. The first review conference in 1980 established a **consultation process** which gave States the right to request a meeting of experts to discuss compliance concerns. The 1986 Conference agreed several voluntary measures designed to further strengthen the Convention and its consultative arrangements. It also established new politically binding **confidence-building measures**: annual **information exchanges** concerning high-containment research facilities and unusual outbreaks of infectious diseases and reporting on biological research programmes.

The 1991 Review Conference agreed several additional politically binding CBMs. These include detailed **declarations** on current biological defence programmes, past offensive and defensive research programmes vaccine research facilities and national implementation legislation. These reports are to be provided annually to the **United Nations Department for Disarmament Affairs**.

The 1991 Review Conference also established an ***Ad Hoc Group of Governmental Experts to Identify and Examine Potential Verification Measures from a Scientific and Technical Standpoint (VEREX)*** to discuss the technical feasibility of verification measures. VEREX submitted its report in 1993. The following year a special conference to deal with **compliance** issues occurred. The special conference agreed to establish an ***Ad Hoc Group (AHG)*** to work towards developing measures, including verification measures, to strengthen the Convention. At the time of writing, the AHG, despite developing a detailed draft protocol to the Treaty, had failed to reach agreement.

In anticipation of possible verification measures and in order to address concerns about the impact of verification measures on industry, Brazil, Canada, the Netherlands, the United Kingdom, and the United States, along with other countries, have undertaken practice **on-site inspections**

of facilities in order to determine whether or not such inspections could be carried out without jeopardizing the confidentiality of **commercial proprietary information**.

Some parties to the Convention have undertaken independent measures that contribute to verification. In a 1992 ***Joint Statement on Biological Weapons*** (known as the Trilateral Agreement), Russia, the United Kingdom and the United States agreed to on-site visits to each other's non-military facilities in order to deal with **compliance** concerns. The initiative resulted from revelations about a clandestine biological weapons programme in the Soviet Union. In order to avoid the issue being taken before the United Nations Security Council, Russia agreed to on-site inspections, but only on the basis of reciprocity. Some of these took place but the results were not entirely satisfactory and the process petered out.

Chemical Weapons Convention

The 1993 Chemical Weapons Convention (Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and Their Destruction (CWC)), which entered into force in 1997, prohibits States from using, developing, producing, acquiring, stockpiling or retaining chemical weapons, and from transferring them directly or indirectly. The Treaty requires parties to destroy, within ten to fifteen years of the Convention entering into force, all their chemical weapons and chemical weapon production facilities, as well as any chemical weapons abandoned on another party's territory.

Organisation for the Prohibition of Chemical Weapons

To oversee its implementation, the Convention established the Organisation for the Prohibition of Chemical Weapons (OPCW). The OPCW consists of the Conference of the States Parties, the Executive Council and the Technical Secretariat. The Conference, which oversees the implementation of the Treaty, meets annually and may also convene in special session on request. The Executive Council, the executive body, is responsible to the Conference. It has 41 members elected by the parties according to geographic region and meets in regular session three to four times a year. Decisions in both the Conference and the Executive Council are by consensus or, if consensus cannot be reached, by a two-thirds majority on matters of substance. The Council may take decisions on procedural matters by simple majority. The Technical Secretariat is

responsible for implementing the verification regime, including processing **declarations** and carrying out **on-site inspections**. The Director-General of the OPCW oversees the Secretariat's daily operations.

The CWC established a comprehensive, intrusive multilateral **verification system**, comprising declarations, various types of **on-site inspection**, and some off-site **sampling**. The system is designed to ensure that chemical weapons are not produced by military or civilian industrial facilities. Different levels of verification are applied to different chemicals depending on the estimated likelihood that they will be used as or for chemical weapons. Destruction of existing chemical weapons occurs at **designated facilities** subject to the continuous presence of inspectors and continuous **on-site monitoring** using technical means.

The Convention provides for **routine inspections** and **challenge inspections**, as well as investigations of alleged use of chemical weapons. Initial inspections are conducted to confirm the validity of the data provided by parties in their initial declarations of their chemical weapon holdings and/or capabilities, whether past or present. Systematic, routine inspections are conducted at declared chemical weapons storage, production and destruction facilities, as well as civilian facilities that use chemicals listed in the three schedules and certain non-scheduled chemicals.

Challenge inspections may be carried out at short notice at the request of any party if it suspects that a violation has occurred. A request for a challenge inspection is submitted to the Director-General and the Executive Council. The challenging State must support the request by providing sufficient information. The Executive Council must decide, within 12 hours of the request, whether the request is valid (rather than frivolous or abusive). The inspected party will be notified at least 12 hours prior to the arrival of the inspection team at the designated point of entry. These inspections could potentially be highly intrusive. The inspected State, however, has the right to propose alternative ways of demonstrating its compliance and may take measures to protect sensitive installations, and prevent disclosure of confidential information not related to the Convention. Before a challenge inspection, parties may undertake an informal **consultation and clarification process** either bilaterally or with the participation of the OPCW. The information obtained during a challenge inspection is given to the Director-General who must distribute it

to all State parties and to the Executive Council for further action. There have been no challenge inspections to date.

The Executive Council has the authority to determine whether a situation of non-compliance exists and what action should be taken. The matter may be referred to the Conference of States Parties. In situations of serious non-compliance the Conference may suspend the party in question, recommend collective measures against it, or refer the issue to the United Nations General Assembly or the United Nations Security Council.

CHAPTER 5

SECURITY COUNCIL-MANDATED VERIFICATION

To date the Security Council has created two verification bodies, both charged with verifying arms control and disarmament undertakings by a single State, Iraq. While both are unusual bodies that are unlikely to be replicated elsewhere, the **techniques** and **technologies** they used and in some cases developed to a high art, may be replicated in **verification regimes** applied to less adversarial circumstances.

UNITED NATIONS SPECIAL COMMISSION

At the end of the 1991 Gulf War, in which the international community expelled Iraqi forces from Kuwait, the United Nations Security Council passed several resolutions which, as part of the ceasefire arrangements, demanded that Iraq give up its weapons of mass destruction (nuclear, chemical and biological) and its missiles with ranges in excess of 150 kilometres, as well as associated research, development, production and support facilities. Iraq was to provide complete declarations of all its relevant weapons and capabilities. Once Iraq had complied with these and the rest of its ceasefire obligations, the economic and other **sanctions** imposed on Iraq would be lifted.

The United Nations Special Commission (UNSCOM) was established by the Council especially for the purpose of:

- verifying the **declarations** by Iraq of its weapons of mass destruction and capabilities for acquiring such weapons;
- planning and carrying out or supervising the destruction of Iraq's prohibited weapons and capabilities; and
- ongoing **monitoring** to ensure that such capabilities were not revived.

The ***IAEA*** was tasked with collaborating with UNSCOM in regard to the nuclear aspects of the Commission's mandate.

As part of one of the most **intrusive** arms control verification regimes ever established, UNSCOM's inspectors were authorized to move freely in Iraq, carrying out extremely **short-notice on-site inspections** at any site or facility and installing surveillance equipment as necessary. UNSCOM inspectors had the right of unrestricted freedom of entry and exit, of movement, access, initiative and communication. To assist the work of the Commission, Iraq was required to provide complete information on a regular basis on all activities, sites, facilities, material or other items, whether military or civilian, that might relate to Iraq's mandate. Several United Nations member States provided crucial assistance, including intelligence data. The United States even provided a U-2 surveillance **aircraft** for overflights. Low-altitude aerial surveillance with **helicopters** was also used. Within months of its establishment UNSCOM evolved into a major **verification organization** with significant infrastructure and staff. Apart from its headquarters in New York, UNSCOM also created the Baghdad Monitoring and Verification Centre (BMVC) to facilitate its work in Iraq and established an office in Bahrain as a staging post.

Although Iraq initially cooperated with UNSCOM, it soon backtracked. Its provision of information was incomplete and misleading, it attempted to conceal or destroy data and physical evidence of its programmes, it harassed and obstructed UNSCOM's work and it mounted a campaign to deceive and mislead UNSCOM. The verification of the Iraqi biological weapons programme was particularly difficult as initially Iraq denied completely that it ever had such a programme and then attempted to persuade UNSCOM that it had been minor and had been terminated at an early stage. Iraq also refused to allow on-site inspections to occur at certain facilities. In August 1998 Iraq suspended all cooperation with UNSCOM and the IAEA, claiming that it had done enough to comply and demanding that sanctions be lifted.

UNSCOM was a highly unusual example of international verification. Its wide-ranging mandate, backed by Security Council **enforcement** powers, related only to a single country, one defeated in war by an international coalition. The atmosphere in which it operated was therefore considerably different from that experienced by organizations that verify agreements entered into voluntarily by States. UNSCOM does, however,

hold some lessons for non-adversarial verification. First, it illustrates how a verification system can be established quickly from scratch and successfully adapt to rapidly changing circumstances. Second, UNSCOM learned numerous lessons and inaugurated several techniques and technologies, notably **environmental sampling** and **documentary archaeology** that are applicable to a wide variety of other verification situations. Third, it demonstrated that the Security Council was willing to become directly involved in verification matters if the issue proved to be serious enough.

UNITED NATIONS MONITORING, VERIFICATION AND INSPECTION COMMISSION

On 17 December 1999, the Security Council created a new body, the United Nations Monitoring Verification and Inspection Commission (UNMOVIC) to replace **UNSCOM**. To date, Iraq has not agreed to allow UNMOVIC to begin work on its territory. In the meantime, UNMOVIC has been preparing for fully carrying out its mandate, including by determining what are the most important verification questions that remain to be resolved by Iraq, as well as attempting to learn lessons from UNSCOM's experience. It also uses open source information and satellite imagery to monitor Iraqi behaviour to the extent that it can in the absence of on-site access.

CHAPTER 6

BILATERAL VERIFICATION

The most extensive and sophisticated bilateral **verification systems** are those established by the United States and the Soviet Union during the Cold War for their bilateral nuclear arms reduction treaties. Most of these are still in operation and are likely to be the basis for verification of future treaties. These verification systems evolved significantly, moving from reliance on **national technical means** towards increasingly cooperative and **intrusive** measures, including **on-site inspections**.

ANTI-BALLISTIC MISSILE AND STRATEGIC ARMS LIMITATION TREATIES

Verification of the 1972 ***Anti-Ballistic Missile (ABM) Treaty*** and the first ***Strategic Arms Limitation Treaty (SALT I)*** relies solely on **NTM**. The identical wording of the treaties requires that NTM be used "in a manner consistent with generally recognized principles of international law". It also prohibits each party from interfering with NTM or using "deliberate **concealment measures**" to impede such verification.

The ABM Treaty created a ***Standing Consultative Commission (SCC)*** which was also to be used for SALT I purposes. The mandate of the SCC was to promote the objectives and implementation of the treaties and act as a forum where parties could deal with **compliance** questions, conduct the **information exchange** relating to their treaty obligations, develop and agree on dismantlement procedures as needed, consider changes in the strategic situation that might affect the treaties, and consider proposals for amendments and measures resulting in further limitations on strategic nuclear arms. The SCC was not supposed to monitor compliance, make judgements on compliance or enforce compliance. It was to meet as required or at least twice a year. The proceedings of the meetings were

confidential unless both parties agreed otherwise, in order to permit sensitive issues to be dealt with away from public attention.

Although the verification provisions for the ABM Treaty and SALT I were minimal compared to later treaties, they were considered a major accomplishment at the time.

The 1979 ***SALT II Treaty*** essentially replicated the wording of its predecessors with regard to the use of NTM and terms of reference for the SCC. However it gave the SCC two new functions: maintaining an "agreed data base" on the numbers of strategic offensive arms and developing dismantlement procedures.

INTERMEDIATE-RANGE NUCLEAR FORCES (INF) TREATY

At the time of its signing, the verification provisions of the 1987 ***Intermediate-Range Nuclear Forces (INF) Treaty***, which banned intermediate-range ballistic missiles, were the most detailed ever agreed in a nuclear arms control treaty. It was to be multi-layered, relying on both **NTM** and **cooperative measures**. The Treaty was the first United States/ Soviet agreement to provide for **continuous on-site monitoring** of compliance. This would not last in perpetuity, but would conclude after 13 years, in May 2001. The **verification regime**, in both its design and implementation, has been an important model for other treaties. It demonstrated that not only were **intrusive** verification measures possible, but that once sufficient confidence had been established, a verification system need not be continued indefinitely.

The verification issue was a significant one in the negotiations on the Treaty. The fact that the missiles to be eliminated were small and mobile and could be armed with either conventional or nuclear warheads, could have presented insurmountable verification problems. The agreement by the parties to give up the option of retaining conventionally-armed missiles of this range simplified the verification requirements. Similarly, the verification requirements of the Treaty would have been significantly more complicated and intrusive had the two sides decided to maintain a certain number of missiles rather than eliminate them altogether. Thus, decisions about the scope of the treaty facilitated verification. This illustrates the close relationship between the scope of a treaty and its verification requirements.

National Technical Means and Cooperative Measures

NTM remained important for INF verification. The same protection was given to each side's use of NTM as in the ***ABM*** and ***SALT*** agreements. In addition, the power of NTM was to be enhanced by so-called **cooperative measures**. In an arrangement that was to last three years, the Soviet Union was required, on six hours' notice, to open the sliding roofs of its strategic SS-25 missile silos for twelve hours, up to 6 times a year, to permit United States **satellites** to determine whether they contained any banned SS-20 missiles. In accordance with the principle of reciprocity, the United States agreed to accept the same provisions if it developed a strategic missile that was outwardly similar to one of the banned INF systems.

Data Exchanges

The Treaty provided for extensive **data exchanges**, including technical data relating to the characteristics of the missiles and launchers. A **Memorandum of Understanding (MOU)** Regarding the Establishment of the Data Base was signed on the same day as the Treaty, providing numbers and characteristics of each side's intermediate-range and shorter-range nuclear systems as they were a month before the signing of the Treaty. Diagrams of each side's declared INF missile sites were attached. These would be the basis for **on-site inspections**. Thirty days after the Treaty entered into force the MOU was updated with new data from each side. Further six-monthly updates were required.

Data was exchanged between the two sides via ***Nuclear Risk Reduction Centres (NRRCs)*** established by separate agreement in September 1987. Located in Washington DC and Moscow, these centres, which operate 24 hours a day, have high-speed communication links to permit rapid **information exchanges** and **notifications**. They are used not just for the INF Treaty but for other agreements as well. A ***Special Verification Commission (SVC)*** was established to handle implementation and compliance questions.

Location Restrictions

To facilitate verification, the Treaty limited the location of treaty-relevant items. Intermediate-range missiles, launchers and missile stages

were required to be located either at a deployment area or missile support facility, or be in transit between such areas. Within 30 days of entry into force of the Treaty they were to be at the locations specified by the Treaty. Similar restrictions applied to shorter-range missiles, launchers and components, which were to be located at elimination facilities within 90 days of entry into force. Any treaty-limited item or activity found outside the designated sites would thus be a violation.

Continuous Portal Monitoring of a Production Facility

In order to ensure that continued production of other types of missiles was not used to covertly produce INF missiles, the Treaty gave each party the right to conduct 24-hour **portal monitoring** at a single designated final assembly or production facility. Although this was devised to deal with a problem associated only with a Soviet missile, the SS-25, which was outwardly similar to an SS-20, the Treaty gave the same rights to both parties. Thirty days after the Treaty entered into force, each party was entitled to establish a permanent presence of up to thirty inspectors at the facility. The United States monitored a former SS-20 plant in Votkinsk, which continued to produce SS-25s. The Soviet Union monitored a former INF missile plant in Magna, Utah, which also produced parts for the American MX ICBM. The monitoring continued, as permitted by the Treaty, for 13 years.

Any vehicle leaving the site was subject to inspection if it was large or heavy enough to contain a prohibited item. Vehicles declared to contain a missile or missile stage could be subjected to further verification measures. The parties were allowed to use approved **sensors**, measuring equipment and imaging devices designed to measure, weigh and x-ray rail cars. In addition, a maximum of 8 times a year inspectors were entitled to conduct “interior viewing”, including measuring the missile or missile stage to ensure that it was not a treaty-limited missile. Inspectors were required to preserve the integrity of the inspected item at all times.

On-site Inspections

The INF Treaty mandated **baseline, elimination and close-out inspections** for the first three years of the Treaty and **short-notice inspections** for a thirteen-year period. Such inspections at nuclear missile bases and facilities were unprecedented.

Baseline Inspections

The information provided in the first **data exchange** was verified by **baseline inspections** before the elimination of any weapons began. These inspections commenced 30 days after ***entry into force*** of the Treaty and lasted 60 days. Their purpose was "to verify the numbers of missiles, launchers, support structures and equipment, and other data as of the date of entry into force". As this was the first time that either party was involved in such a process, each conducted full-scale **trial inspections** in advance. On the basis of this successful experience, baseline inspections along the lines of the INF model were included in ***START I*** and the ***Conventional Forces in Europe Treaty***.

Elimination Inspections

These were conducted at **designated sites** to report on the destruction of any treaty-relevant missile, launcher or support equipment.

Close-out Inspections

Close-out inspections were permitted within 60 days of the designated "close-out" day to verify that the facility had been closed. After the bases were closed out they could be converted to other use, subject to thirty days' prior notice. Such converted sites were subject to **short-notice inspections** for the duration of the Treaty.

Short-notice Inspections

In order to give the parties additional reassurance, the Treaty permitted **short-notice inspections** at any **declared facility**. The location of the inspection was not announced until the inspecting party entered the territory of the other party at the designated **point of entry**. The short notice helped ensure that the inspected party did not have time to conceal a prohibited system or stop a prohibited activity. Once the location of the inspection was declared, the inspected party was required to transport the inspecting team to the location within nine hours. The inspection could last up to 24 hours. There was a quota system for determining how may inspections each side was obliged to accept.

The Inspection Process

One day after the Treaty entered into force, the two parties were to provide each other with three lists of proposed personnel for all of the on-site inspections and the **continuous on-site monitoring**. Individuals could be rejected but only within a set period. For **baseline**, **close-out** and **short-**

notice inspections the inspection teams could comprise up to ten people. **Elimination inspection** teams could have up to 20 members. At least two inspectors on each team were required to speak the language of the inspected party. Only one inspection team was permitted at a site at a time. Each inspection team was met and accompanied by an in-country escort. Inspectors were required to obey the laws of the inspected State. Inspectors and aircrew were granted diplomatic privileges and immunities. The host country was required to provide for all the basic needs of the inspectors and aircrew.

The Treaty specified the type of equipment to be used in inspections. All equipment and supplies were subject to inspection by the inspected party when the team arrived at the **point of entry**. All measurements requested by the inspecting party were to be made by the party being inspected. Inspectors had the right to ask for clarification of ambiguities. If the in-country escort could not resolve the ambiguity, photographs could be taken for future resolution of the problem by the inspected party at the request of the inspecting party.

Special Verification Commission

In order to resolve **compliance** issues and to contribute towards the effectiveness of the Treaty's implementation, a **Special Verification Commission (SVC)** was established. Rather than placing the INF Treaty under the purview of the existing **SCC**, it was agreed that a separate organization was warranted to signal a new start in nuclear arms control and because the INF verification provisions were so dramatically different to those of ***SALT***. The Treaty required the SVC to meet at the request of either party, rather than twice yearly as required for the SCC to avoid the tendency of scheduled meetings to encourage the two sides to raise issues for discussion just for the sake of it.

The SVC dealt successfully with a variety of technical and procedural issues facing the Treaty, including those arising from the dissolution of the Soviet Union. It was during negotiations in the SVC that the newly independent States of Belarus, Kazakhstan and Ukraine agreed to accede to the Treaty.

STRATEGIC ARMS REDUCTION TREATIES (START)

In the 1991 ***START I Treaty*** the United States and Soviet Union agreed for the first time to significantly cut their deployed strategic nuclear warheads—to 6,000 each—rather than simply establishing upper limits on them. The treaty provided for the verified destruction of certain delivery vehicles. Less than a year after being signed, the Treaty became multilateral when Belarus, Kazakhstan, Russia and Ukraine, successor States to the Soviet Union, became parties. The 1993 ***START II Treaty*** provided for even deeper reductions, requiring the United States and Russia to reduce to between 3,000 and 3,500 deployed warheads each.

The START treaties were the most complex and detailed nuclear arms control treaties to date, posing difficult verification challenges. The need to verify the numbers and location of mobile missile launchers and the numbers of warheads on missiles, especially those capable of carrying more warheads than permitted by the Treaty, while minimizing the degree of **intrusiveness**, required novel provisions. START I verification provisions are applicable to both Treaties, although START II had some additional requirements.

As in the ***INF*** case, the START Treaties have a verification structure comprising layers of mutually reinforcing mechanisms. As always, **NTM** is the foundation of the system. The Treaties also require extensive **data exchanges** and provide for a variety of **on-site inspections** and **exhibitions**, as well as **continuous monitoring**. In order to deal with **compliance** and treaty interpretation questions, START I established a **Joint Compliance and Inspection Commission (JCIC)**, which meets at the request of one of the parties. The JCIC began meeting well before START I **entered into force**, producing joint statements and agreed understandings relating to the Treaty.

Tagging

In addition to the usual requirement that the parties not interfere with **NTM** and not conceal activities or systems from NTM, the Treaty requires that each party give its mobile ICBMs **unique identifiers** or **tags** to facilitate the **monitoring** process. Inspectors can read the data from the identifiers during **on-site inspections** of mobile ICBMs. In another innovation, the Treaty also requires the parties to broadcast **telemetry** from flight tests of

ballistic missiles and refrain from encryption or jamming of the telemetry. After the flight tests, tapes of the telemetry must be provided to the other parties.

Data Exchanges

The Treaties established an extensive **data exchange** and **notification** system. An initial START I data exchange occurred in 1990, with a second in 1994 within 30 days of ***entry into force***. Further exchanges are required every six months for the life of the Treaty. Notifications occur through the ***Nuclear Risk Reduction Centres***.

Cooperative Measures

Cooperative measures require each party, on request, to display road-mobile and rail-mobile launchers and heavy bombers to permit the other side to undertake **satellite** surveillance. Details of how these displays are to occur, including prohibition of **concealment measures**, are outlined in the Treaty. A maximum of 7 requests a year are permitted, although only one type of display may be requested at a time. The display must occur within 12 hours of a request being made and last 18 hours. In addition, these cooperative measures may be invoked within 30 days of a dispersal exercise involving a mobile system.

Inspections and Exhibitions

The Treaty provides for 11 types of inspection, either **scheduled (routine)** or **short-notice**. Scheduled inspections include:

- **conversion** or **elimination inspections**;
- **close-out inspections**.

Short-notice inspections include:

- **baseline** data inspections;
- **data update inspections** to confirm numbers and facilities in notifications and **data exchanges**;
- **new facility inspections** for facilities subject to Treaty limitations that come into being after the Treaty enters into force;

- **suspect-site inspections** for mobile ICBM assembly at **designated sites**;
- **re-entry vehicle inspections** to ensure deployed warheads numbers on given ballistic missiles do not exceed Treaty limits;
- **post-exercise dispersal inspections** of deployed mobile launchers and their associated missiles to ensure that they have returned to their bases;
- **conversion** or **elimination inspections** to ensure that missiles have been converted or eliminated as required;
- **close-out inspections** to ensure that missile bases have been closed as required;
- **formerly declared facility inspections** to ensure that eliminated facilities are not re-established.

Several types of exhibitions are also mandated to facilitate verification.

- **technical characteristics** exhibitions to confirm data provided in **data exchanges**;
- **distinguishability exhibitions** to help each party confirm the characteristics of long-range bombers and air-launched cruise missiles for future verification;
- **baseline exhibitions** for heavy bombers.

Finally the Treaties also provide for **continuous monitoring** activities at final assembly facilities for mobile ICBMs.

For non-scheduled **short-notice inspections**, the inspecting party must provide the party to be inspected with at least 16 hours' notification of the estimated time of arrival of the inspecting team at the **point of entry**. The notification must include the date and time that the receiving party will be notified of the type of inspection and the inspection site. The Inspection Protocol provides for different notification requirements for different inspection types in recognition of the fact that some types of inspection need to be fast in order to be effective. **Quotas** are applied to some types of inspection. For example, data update and suspect site inspections, in combination, can occur no more than 15 times a year with no more than two inspections a year at any one facility. Three inspections a year of formerly declared facilities are permitted, and re-entry vehicle inspections are limited to ten a year with no more than two a year at any one base, with no more than one inspection occurring at any one time.

In order to monitor the number of missiles being produced for mobile ICBM launchers, each side is permitted to conduct **continuous monitoring** of mobile missile production facilities. Since the United States no longer produces mobile ICBMs, the Russians do not conduct such **monitoring**. The United States does, however, monitor a Russian production facility. The Treaty sets out in great detail how the continuous monitoring system should operate.

Considerable detail is also provided regarding the procedures for the inspection of re-entry vehicles, including the pre-inspection period and the rights of both the inspected and inspecting party. The terms reflect the highly sensitive nature of these inspections. For example, the time that inspectors can view the interior of a launcher during any one phase of the process is limited and the inspected party may cover the re-entry vehicles with a form-fitting cover to protect design information. No more than 10 such inspections may occur each year and no more than two inspections a year are allowed at any one facility.

Because of the **intrusiveness** and resulting sensitivity of some types of START inspections, the United States and Russia undertook reciprocal **trial inspections** before START I was signed. The trials allowed both sides to become familiar with procedures and to iron out any potential problems in advance of implementation.

Although START II relies almost entirely on the verification provisions of START I, a few additional inspection provisions specific to its requirements were added. For example, START II has a protocol outlining procedures for **exhibitions** and inspections of heavy bombers. The parties must carry out exhibitions and allow for inspections of heavy bombers equipped with nuclear armaments, those that have been converted from a nuclear to a conventional role and those reconverted from a conventional to a nuclear role. A second protocol, which outlines procedures for the elimination of heavy ICBMs and the conversion of heavy ICBM silos, also provides for mutual inspection of each of these processes.

STRATEGIC OFFENSIVE REDUCTIONS TREATY (SORT)

On 24 May 2002, the United States and Russia signed the Strategic Offensive Reductions Treaty (SORT), committing them to reducing their

deployed strategic nuclear warheads to between 1,700 and 2,200 each by 31 December 2012. The Treaty does not require the destruction of warheads or delivery vehicles but allows each party to decide how it will reach the agreed deployed numbers. The Treaty, which is only three pages long, contains no verification provisions. It establishes a Bilateral Implementation Commission (BIC) which will meet at least twice yearly to implement the Treaty. There have been suggestions that this body will agree on appropriate verification measures. The Treaty affirms that START I remains in force, which presumably includes its existing verification measures. However, since these apply to verifying numbers and types of delivery vehicles rather than warheads, new verification measures will need to be devised if SORT is to be effectively verifiable. At the time of writing the Treaty had not been ratified by either party and had not yet achieved ***entry into force***. The Treaty will automatically expire unless extended by agreement of the parties, but may be superseded before its expiry by a new agreement.

Table 2: Verification Provisions of United States/Russian Nuclear Arms Control Agreements

Treaty	Basic obligations	Duration	Verification	On-site inspections	Compliance body
ABM Treaty (1972)	Prohibits developments & deployment of anti-ballistic missile systems for defence of national territory or region	Unlimited, but United States gave 6-month's notice of unilateral withdrawal on 13 Dec. 2001	National technical means (NTM)	None	Standing Consultative Commission (SCC)
SALT I (1972)	Upper limits on ICBM and SLBM launchers	5 years	NTM	None	SCC

SALT II (1979)	Equal aggregate limits on strategic nuclear delivery vehicles; limits on production, testing & deployment of certain types of new weapons	Never ratified; would have been in force until 31 Dec. 1985; terms observed until May 1986	NTM; data exchanges; twice yearly notification of changes due to dismantlement or removal of weapons; agreed treaty database	None	SCC
INF Treaty (1987)	Banned all ground-launched ballistic and cruise missiles of intermediate and shorter range	Unlimited duration; entered into force 1 June 1988; 13-year inspection regime ended 31 May 2001	NTM aided by cooperative measures; MOU providing numbers & locations; data exchanges; treaty database; location restrictions	- baseline - elimination - short-notice - portal monitoring	Special Verification Commission
SORT (2002)	Seeks to reduce each side's deployed nuclear warheads to 1,700-2,200	To 31 Dec. 2012; extendable or may be superseded by prior agreement; each party may withdraw on 3 months' notice	NTM; other measures to be agreed		Bilateral Implementation Commission (BIC)

START I (1991)	Reduces strategic forces in 3 phases to 1,600 launchers & 6,000 accountable warheads; 1992 Lisbon Protocol added Belarus, Kazakhstan & Ukraine as parties	15-year duration unless superseded by subsequent agreement; may be extended by successive 5-year periods	NTM, aided by cooperative measures; exchange of telemetry on test flights; extensive data exchanges and notifications	- baseline - data update - new facility - suspect site - re-entry vehicle - post-exercise - conversion or elimination - technical characteristic - distinguishability - heavy bomber baseline - continuous monitoring of perimeter and portals at mobile ICBM assembly plants	Joint Compliance and Inspection Commission (JCIC)
START II (1996)	Aimed to reduce nuclear delivery vehicles in two phases to between 3,000-3,500; bans MIRVed ICBMs	Never entered into force; superseded by 2002 SORT Treaty and renounced by Russia in June 2002	NTM backed by cooperative measures; data exchanges	START I provisions apply; new provisions included: - observation of SS-18 missile silo conversion, and exhibitions - inspections of heavy bombers to confirm weapon loads - inspections of nuclear bombers returned to conventional role or vice versa	JCIC

ANNEX 1

UNITED NATIONS DISARMAMENT COMMISSION PRINCIPLES OF VERIFICATION (1988)

Adequate and effective verification is an essential element of all arms limitation and disarmament agreements.

Verification is not an aim in itself, but an essential element in the process of achieving arms limitation and disarmament agreements.

Verification should promote the implementation of arms limitation and disarmament measures, build confidence among States and ensure that agreements are being observed by all parties.

Adequate and effective verification requires employment of different techniques, such as national technical means, international technical means and international procedures, including on-site inspections.

Verification in the arms limitation and disarmament process will benefit from greater openness.

Arms limitation and disarmament agreements should include explicit provisions whereby each party undertakes not to interfere with the agreed methods, procedures and techniques of verification, when these are operating in a manner consistent with the provisions of the agreement and generally recognized principles of international law.

Arms limitation and disarmament agreements should include explicit provisions whereby each party undertakes not to use deliberate concealment measures which impede verification of compliance with the agreement.

To assess the continuing adequacy and effectiveness of the verification system, an arms limitation and disarmament agreement should provide for procedures and mechanisms for review and evaluation. Where possible, time-frames for such reviews should be agreed in order to facilitate this assessment.

Verification arrangements should be addressed at the outset and at every stage of negotiations on specific arms limitation and disarmament agreements.

All States have equal rights to participate in the process of international verification of agreements to which they are parties.

Adequate and effective verification arrangements must be capable of providing, in a timely fashion, clear and convincing evidence of compliance or non-compliance. Continued confirmation of compliance is an essential ingredient to building and maintaining confidence among the parties.

Determinations about the adequacy, effectiveness and acceptability of specific methods and arrangements intended to verify compliance with the provisions of an arms limitation and disarmament agreement can only be made within the context of that agreement.

Verification of compliance with the obligations imposed by an arms limitation and disarmament agreement is an activity conducted by the parties to an arms limitation and disarmament agreement or by an organization at the request and with the explicit consent of the parties, and is an expression of the sovereign right of States to enter into such arrangements.

Requests for inspections or information in accordance with the provisions of an arms limitation and disarmament agreement should be considered as a normal component of the verification process. Such requests should be used only for the purposes of the determination of compliance, care being taken to avoid abuses.

Verification arrangements should be implemented without discrimination, and, in accomplishing their purpose, avoid unduly interfering with the internal affairs of State parties or other States, or jeopardizing their economic, technological and social development.

To be adequate and effective, a verification regime for an agreement must cover all relevant weapons, facilities, locations, installations and activities.

Source: UN, *Verification in All its Aspects: Study on the Role of the United Nations in the Field of Verification*, UN document A/45/372, 28 August 1990, Section II.

ANNEX 2

VERIFICATION MECHANISMS AND TECHNIQUES IN PEACE OPERATIONS

Peace operation	Mandate source and military tasks	Mechanisms and techniques
UN Truce Supervision Organization (UNTSO), 1948-present	Various Security Council resolutions Truce supervision, then supervision of Armistice Agreements	Military observers (Milobs) Mediator deals with complaints Observers assigned to armed groups on both sides
UN Military Observer Group in India and Pakistan (UNMOGIP), 1949-present	Security Council resolutions Monitor ceasefire	Milobs
International Commission for Supervision and Control (ICSC), 1954	Geneva Accords Cambodia, Laos and Vietnam Oversee and report on implementation	Multinational commission
UN Emergency Force I (UNEF I), 1956-67	UN General Assembly resolutions Monitor ceasefire and withdrawal of forces	Milobs Aerial reconnaissance Observation posts Patrols
UN Observer Group in Lebanon (UNOGIL), 1958	Security Council resolution Ensure no infiltration of personnel and supplies across borders	Observers, observation posts, regular patrols, aerial reconnaissance, evaluation team to analyze and coordinate information

UN Operation in the Congo (ONUC), 1960-64	Security Council resolutions Restore law and order; oversee & verify withdrawal of foreign troops Prevent civil war	Milobs; observation posts, patrols
UN Yemen Observation Mission (UNYOM), 1963-64	Security Council resolution Monitor disengagement of forces	Milobs, check points; ground and air patrols; liaison with forces
UN Peacekeeping Force in Cyprus (UNFICYP), 1964-present	Security Council resolutions Prevent recurrence of fighting Help establish law and order Supervise ceasefire and maintain buffer zone Since 1974, inspection of ceasefire lines	Milobs, patrols; observation posts
Mission of the Representative of the Secretary-General in the Dominican Republic (DOMREP), 1965-66	Security Council resolution Observe and report on ceasefire	Milobs
UN Emergency Force II (UNEF II), 1973-79	Security Council resolutions and withdrawal agreements Supervise ceasefire and return of forces to previous positions Ensure maintenance of agreed limits on forces and arms	Milobs; observation posts; check points; buffer zones for redeployments; ground patrols; air patrols; bi-weekly inspections
International Commission of Control and Supervision in Vietnam, 1973	Paris Agreement of 1973 Oversee ceasefire and withdrawal of foreign troops	Multinational commission to monitor and investigate violations
UN Disengagement Observer Force (UNDOF), 1974-present	Security Council resolution Maintain and supervise ceasefire Supervise redeployment of forces Establish buffer zone as per Israel—Syria agreement	Milobs; observation posts; checkpoints; buffer zones; liaison with parties; fortnightly inspections

Sinai Field Mission (SFM), 1974-82	Sinai Agreement II US monitored buffer zones and Egyptian and Israeli surveillance stations; aerial reconnaissance in conjunction with existing UNEF monitoring Mandate expanded in 1979 to include inspection of Egyptian military installations in interim buffer zone	Observers; watch stations; liaison officers check Israeli and Egyptian surveillance stations; aerial reconnaissance
UN Interim Force in Lebanon (UNIFIL), 1978-present	Security Council resolutions Confirm withdrawal of Israeli forces Restore peace and security Prevent infiltration in zone of operation	Milobs; checkpoints; observation posts; patrols
Commonwealth Monitoring Force, 1979	Comprehensive peace settlement Ceasefire monitoring Separation of forces Demilitarisation	Containment procedures; ceasefire commission
Multilateral Force and Observers (MFO), 1982-present	Protocol to Egypt-Israel Peace Treaty Took over from SFM (above)	In general, same as for SFM
UN Good Offices Mission in Afghanistan and Pakistan (UNGOMAP), 1988-90	Security Council resolutions Monitor peace accord concluded under UN auspices	Milobs; observation posts; inspections of garrisons; investigation of complaints; meetings with parties to discuss compliance
UN Iran-Iraq Military Observer Group (UNIIMOG), 1988-91	Security Council resolutions Verify and supervise ceasefire and troop withdrawal	Milobs; patrols by vehicle, helicopter, boat, mule and foot
UN Angola Verification Mission I (UNAVEM I), 1989-91	Security Council resolution Verify redeployment and withdrawal of Cuban troops	Milobs; mobile teams for ad hoc inspections; Joint Commission for liaison and coordination

UN Angola Verification Mission II (UNAVEM II), 1991-93	Security Council resolutions Verify compliance with peace accords Verify that the parties are adequately monitoring ceasefire	Milobs; observation posts, patrols (including by helicopter); Joint Political Military Commission and subsidiary committees
UN Transitional Assistance Group (UNTAG), 1989-90	Security Council resolutions Oversee reduction and withdrawal of South African troops	Milobs; Joint Commission; Assembly points for surrendering arms; monitoring of bases where troops are confined; permanent border checkpoints
UN Observer Group in Central America (ONUCA), 1989-92	Security Council resolutions Verify security aspects of Esquipulas II Agreement (1990); monitoring ceasefire and demobilisation of troops in Nicaragua	Mobile milob teams (road, helicopter, boat); spot checks and ad hoc inspections; based in verification centres close to sensitive areas
UN Observer Mission in El Salvador (ONUSAL), 1991-95	Security Council resolutions Monitor verification with agreement to end the civil war in El Salvador Includes verification of ceasefire, separation of forces and changes in armed forces	Milobs; monitor troops in designated locations; verify weapons inventories
UN Iraq–Kuwait Observer Mission (UNIKOM), 1991-present	Security Council resolutions Monitor demilitarized zone and waterway	Milobs; observation posts; mobile patrols on cleared tracks; air patrols; visual observation only, no imaging or radar technology
UN Mission for the Referendum in Western Sahara (MINURSO), 1991-present	Security Council resolutions Monitor ceasefire Verify reduction of troops and confinement of certain troops to specified locations	Milobs; observation posts, patrols; helicopter patrols for supplementary and short-notice inspections

European Community Monitoring Mission (ECMM), 1991-95	July 1991 ceasefire agreement between Croatia, Slovenia and former Yugoslavia brokered by European Union Ceasefire monitoring; later joint monitoring of no-fly zone with UNPROFOR	Observers; inspections of departing and arriving aircraft at designated airports
UN Transitional Authority in Cambodia (UNTAC), 1992-93	Security Council resolutions Oversee implementation of Agreements on Comprehensive Political Settlement Supervision of ceasefire; verify withdrawal of forces oversee cantonment, disarmament and demobilisation of forces; weapons control, including verifying end of outside assistance	Milobs, mobile monitoring teams, air and marine patrols' border checkpoints; cantonment sites
UN Protection Force (UNPROFOR), 1992-95	Security Council resolutions Monitor ceasefire; ensure delivery of humanitarian aid Croatia—establish and monitor UN protected areas (UNPAs) Bosnia—security at airport; humanitarian protection; no-fly zone; border observation; and safe areas	UNPAs: checkpoints, intensive patrols by land and air, check complaints of violations (cordon and search operations) Krajina: establish buffer zone, weapons under dual-lock storage Bosnia: milobs, collect weapons and oversee demilitarisation, set up and monitor heavy weapon exclusion zones Maritime monitoring of arms embargo under NATO auspices
UN Observer Mission in Mozambique (ONUMOZ), 1992-94	Security Council resolutions Oversee implementation of peace agreement; ceasefire, separation of forces, demobilisation, collection, storage and destruction of weapons, withdrawal of foreign forces and disbanding of private military groups	Milobs; Supervisory and Monitoring Commission; 2 sub-commissions; assembly areas for pre- and post-demobilisation monitoring; inspections of declared and undeclared sites

UN Observer Mission Uganda-Rwanda (UNOMUR), 1993-94	Security Council resolutions Border monitoring to ensure that no military goods or other military assistance crossing frontier	Milobs
UN Assistance Mission for Rwanda (UNAMIR), 1993-96	Security Council resolutions Initially to implement Arusha Peace Agreement Establish secure environment Monitor ceasefire Later expanded to include protection of civilians, intermediary role between warring factions	Milobs
UN Operation in Somalia I (UNOSOM I), 1992-93	Security Council resolutions Monitor ceasefire Security for humanitarian aid	Milobs
UN Operation in Somalia II (UNOSOM II), 1993-95	Security Council resolutions Ceasefire monitoring; establish secure environment; control of heavy weapons and seizure of small arms; secure ports and airports	Military personnel; cantonment and storage of heavy weapons
UN Observer Mission in Georgia (UNOMIG), 1993-present	Security Council resolutions Verify compliance with ceasefire of 1994; monitor implementation of peace agreement observe Commonwealth of Independent States (CIS) peacekeepers; monitor security zone, weapon storage areas, troop withdrawals; investigate violations	Milobs; patrols, including use of helicopters

UN Observer Mission in Liberia (UNOMIL), 1993-97	Security Council resolutions and Cotonou Peace Agreement Monitor implementation of the peace accord to verify impartial application by ECOMOG and ECOWAS, including ceasefire, encampment and disarmament of troops, demobilisation, and arms embargo; 1995 mandate expansion: monitor borders for movement of arms; assemble and disarm combatants	Milobs; Joint Cease-fire Monitoring Committee; checkpoints
UN Mission in Haiti (UNMIH), 1993-96	Security Council resolutions Certain aspects of Governors Island agreement: establish security, and oversee modernization of armed forces	Milobs
UN Aouzou Strip Observer Group (UNASOG), 1994	Security Council resolution Oversee the withdrawal of Libyan forces as specified in International Court of Justice decision	Milobs
UN Mission of Observers in Tajikistan (UNMOT), 1994-present	Security Council resolutions Agreements between the two sides Support agreements and operation of the Joint Commission, including investigation of cease-fire complaints and liaison with CIS peacekeepers	Milobs; Joint Commission
UN Angola Verification Mission III (UNAVEM III), 1995-97	Security Council resolutions, Lusaka Protocol and Accordas de Paz Monitor and verify cease-fire, assembly of troops and demobilisation, disarmament, formation of new armed forces	Milobs; Joint Commission framework

UN Confidence Restoration Operation in Croatia (UNCRO), 1995-96	Security Council resolution Monitor ceasefire; control, monitor and report on flow of military personnel and equipment across borders; monitor demilitarization of Prevlaka peninsula	Milobs; patrols
Military Observer Mission Ecuador-Peru (MOMEP), 1995-99	By agreement between the parties and participating states	Milobs
Implementation Force (IFOR), 1996 Stabilisation Force (SFOR), 1996-present	Dayton Agreement and Security Council resolutions Verify compliance with ceasefire; withdrawal of forces from zone of separation; collection of heavy weapons; demobilisation, various arms control and confidence-building measures	NATO and UN member troops; patrols; cantonment sites; notifications and inspections; Joint Military Commission with IFOR as chair
UN Transitional Administration for Eastern Slavonia, Baranja and Western Sirmium (UNTAES), 1996-98	Security Council resolutions and separate peace agreement Monitor return of refugees; demilitarization; assist in implementation	Milobs and troops
UN Mission of Observers in Prevlaka (UNMOP), 1996-present	Security Council resolution Continuation of UNPROFOR tasks; monitor demilitarization	Milobs
Peace Monitoring Group (Bougainville), 1997-present	By agreement between the parties Monitor ceasefire and peace agreement	Milobs
UN Mission in the Central African Republic (MINURCA), 1998-2000	Security Council resolutions Supervise control and storage of weapons and disarmament	Milobs

UN Organization Mission in the Democratic Republic of Congo (MONUC), 1999-present	Security Council resolution Tasks relating to the Lusaka ceasefire agreement	Military liaison officers; Joint Military Commission
UN Mission of Observation in Sierra Leone (UNOMSIL), 1998-99	Security Council resolution Monitor military and security situation, disarmament and demobilisation	Milobs
UN Mission in Sierra Leone (UNAMSIL), 1999-present (took over from UNOMSIL)	Security Council resolution and Lomé Peace Agreement Oversee implementation of agreement; disarmament, demobilisation and re-integration of troops	Milobs and troops; Joint Monitoring Commission
Irish Peace Process	Good Friday Agreement Provision for decommissioning of all paramilitary arms within two years after positive referendum result	Independent International Commission on Decommissioning
Kosovo Verification Mission (KVM), 1998-99	Agreement with Yugoslav Government & OSCE Permanent Council authorisation Verify compliance with UN Security Council resolution and ceasefire	OSCE civilian observers NATO-led aerial reconnaissance
Kosovo Force (KFOR), 1999-present	Security Council resolutions; Agreement for an "international security presence" in principles agreed with Group of 8; maintain and enforce ceasefire; oversee withdrawal of Yugoslav troops and demilitarization of Kosovo Liberation Army (KLA); border monitoring	NATO-led troops; Joint Implementation Committee

Sources: William J. Durch (ed.), *UN Peacekeeping, American Policy, and the Uncivil Wars of the 1990s*, New York: St. Martin's Press, 1996; William J. Durch (ed.), *The Evolution of UN Peacekeeping,* New York: St. Martin's Press, 1993; Trevor Findlay, *Cambodia, The Legacy and Lessons of UNTAC*,

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ACRONYMS AND ABBREVIATIONS

ABACC	Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials
ABM	Anti-Ballistic Missile (Treaty)
AHG	Ad Hoc Group
ATTU	Atlantic to the Urals
BCC	Bilateral Consultative Commission
BIC	Bilateral Implementation Commission
BMVC	Baghdad Monitoring and Verification Centre
BTWC	Biological and Toxin Weapons Convention
BWC	Biological Weapons Convention
CD	Conference on Disarmament
CFE	Conventional Armed Forces in Europe (Treaty)
CSCE	Conference on Security and Co-operation in Europe
CSP	Conference of States Parties
CTBT	Comprehensive Nuclear-Test-Ban Treaty
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
CWC	Chemical Weapons Convention
EC	Executive Council
ENMOD	Environmental Modification Treaty
EURATOM	European Atomic Energy Community
GDP	Gross Domestic Product
GLBM	Ground-Launched Ballistic Missile
GPS	Global Positioning System
HUMINT	Human Intelligence
IAEA	International Atomic Energy Agency
ICBL	International Campaign to Ban Landmines
ICBM	Intercontinental Ballistic Missile
ICJ	International Court of Justice
IDC	International Data Centre
IMS	International Monitoring System
INF	Intermediate-Range Nuclear Forces (Treaty)
IRA	Irish Republican Army

JCG	Joint Consultative Group
JCIC	Joint Compliance and Inspection Commission
JDEC	Joint Data Exchange Center
Kt	Kilotons
LAL	Look-Alike (items)
MILOB	Military Observer
MIRV	Multiple Independently Targetable Re-entry Vehicle
MOU	Memorandum of Understanding
MTM	Multinational Technical Means (of verification)
MFO	Multinational Force and Observers (mission)
NASA	National Aeronautical and Space Administration
NATO	North Atlantic Treaty Organisation
NGO	Non-Governmental Organization
NPT	Non-Proliferation Treaty
NRDC	Natural Resources Defence Council
NRRC	Nuclear Risk Reduction Centres
NTM	National Technical Means (of verification)
NWFZ	Nuclear-Weapon-Free Zone
OOV	Object of Verification
OPANAL	Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean
OPCW	Organisation for the Prohibition of Chemical Weapons
OSCC	Open Skies Consultative Commission
OSCE	Organization for Security and Co-operation in Europe
OSI	On-Site Inspection
PIF	Pacific Islands Forum
PNET	Peaceful Nuclear Explosions Treaty
PrepCom	Preparatory Commission
PTBT	Partial Test Ban Treaty
PTS	Provisional Technical Secretariat
RPV	Remotely-Piloted Vehicle
SALT	Strategic Arms Limitation Treaty
SAR	Synthetic Aperture Radar
SCC	Standing Consultative Commission
SCCC	Common System of Accounting and Control
SSAC	State System of Accounting and Control (of Nuclear Material)
SFM	Sinai Field Mission
SIGINT	Signals Intelligence
SLBM	Submarine-Launched Ballistic Missile

SORT	Strategic Offensive Reductions Treaty
START	Strategic Arms Reduction Treaty
SVC	Special Verification Commission
TLE	Treaty-Limited Equipment
TTBT	Threshold Test Ban Treaty
UAV	Unmanned Aerial Vehicle
UK	United Kingdom
UN	United Nations
UNDC	United Nations Disarmament Commission
UNDDA	United Nations Department for Disarmament Affairs
UNGA	United Nations General Assembly
UNIDIR	United Nations Institute for Disarmament Research
UNMOVIC	United Nations Monitoring, Verification and Inspection Commission
UNSC	United Nations Security Council
UNSCOM	United Nations Special Commission on Iraq
UNSG	United Nations Secretary-General
US	United States of America
VEREX	Ad Hoc Group of Governmental Experts to Identify and Examine Potential Verification Measures from a Scientific and Technical Standpoint
VERTIC	Verification Research, Training and Information Centre

KEY TERMS

ACTIVE QUOTA

See **inspection quota**.

AD HOC INSPECTION

An inspection that is not part of series of regular, **routine inspections**. Also called **random inspections**. May be **short-notice**.

AERIAL INSPECTION

Inspection from the air of an area, site, facility or activity for verification purposes. See also **aerial monitoring**.

AERIAL MONITORING

Monitoring using airborne platforms, such as **satellites**, **aircraft**, **helicopters** or **UAVs**. May involve a wide variety of **sensors**, cameras and other monitoring equipment.

ARBITRATION

Dispute settlement procedure initiated with the consent and cooperation of disputing parties which results in a binding decision. Unlike judicial proceedings, the parties have some control over the process, as they may appoint the arbitrators and decide which laws and procedures will apply.

AREA OF APPLICATION

The geographic area to which a treaty is applicable, normally the territory of the parties. In other cases, such as **nuclear-weapon-free zones** or treaties covering outer space or the moon, all or part of the area of application may lie outside state control or be under joint or international control.

BASELINE DECLARATION

Declaration providing baseline information. Arms control and disarmament agreements tend to specify that baseline information be provided shortly after signature or ***entry into force*** but some other date and/or time may be nominated. Baseline declarations may include such information as current numbers, locations and technical characteristics of activities or items controlled by a treaty. May be subject to verification by **baseline inspection**.

BASELINE INFORMATION

Information that is correct at a particular point in time which is used as the basis for verifying subsequent changes.

BASELINE INSPECTION

A form of **on-site inspection** used to verify information contained in a **baseline declaration**.

BILATERAL AGREEMENT

An agreement between two states or between a state and a verification organization.

BUFFER ZONE

Designated portion of land separating hostile forces. Typically demilitarized. May also be referred to as a **zone of separation**.

CANTONMENT

The confinement of troops to designated facilities, usually prior to being disarmed and/or demobilized, or included in a new military force as part of a peace agreement.

CERTIFICATION

A declaration by a state that a certain piece of equipment has been converted to some other agreed purpose.

CERTIFICATION INSPECTION

An inspection conducted to verify the correctness of a certification. Used in ***CFE Treaty***.

CHALLENGE INSPECTION

A type of **on-site inspection** conducted to investigate credible evidence of non-compliance. In multilateral regimes such an inspection may be requested by any state party, but must be approved by the treaty's executive body before it proceeds. Usually the requested state will not have a right of refusal. Likely to be rare and controversial.

CLOSE-OUT INSPECTION

Type of **on-site inspection** used to verify that **treaty-limited items** are no longer present at designated sites or to confirm that facilities have been dismantled or "closed out" as required. Used for the ***INF Treaty*** and ***START I*** and ***START II***.

COMMERCIAL PROPRIETARY INFORMATION

Information held by commercial companies which they wish to keep confidential, such as design or manufacturing process information.

COMPLEMENTARY ACCESS

Additional access to nuclear facilities and sites granted to the ***IAEA*** under the **Additional Protocol** to **safeguards agreements**.

COMPLIANCE

Fulfilment by a treaty party of all its treaty obligations. A party in non-compliance is one that is violating all or part of its obligations.

COMPLIANCE MECHANISM

Procedure for dealing with questions about, allegations of, or actual non-compliance.

CONCEALMENT MEASURE

A step taken by a treaty party to illegally hide relevant evidence from verification, for example by covering weapons to avoid detection by **satellite** or during an on-site inspection. Not to be confused with **managed access** techniques which are permitted by some treaties.

CONFERENCE OF STATES PARTIES

A meeting of all the parties to a **multilateral** treaty, either on a regular basis or when agreed. Usually the body that has the final say in a compliance matter.

CONFIDENCE-BUILDING MEASURE (CBM)

Measure undertaken to avoid or overcome uncertainties or misconceptions about a state's military activities that might lead to political or military tensions with other states. CBMs seek to increase **transparency** and predictability and reduce the opportunity for surprise attack. May be undertaken unilaterally or by agreement. The term originated with the ***CSCE***. See also **Confidence- and Security-Building Measure (CSBM).**

CONFIDENCE- AND SECURITY-BUILDING MEASURE (CSBM)

Conceptually similar to **CBMs**, but encompassing a broader range of measures beyond increasing **transparency**. Three broad categories are: (1) information and communication measures; (2) observation and inspection measures; and (3) military constraint measures. The term originated with the ***CSCE***. See also **Confidence-Building Measure (CBM)**.

CONSULTATION AND CLARIFICATION PROCESS

A process that permits the parties to an agreement to meet to discuss problems with implementation, including possible non-compliance.

CONTINUOUS (ON-SITE) MONITORING

Round-the-clock **monitoring** of a designated activity or facility. May use **sensors** and/or personnel. A typical example is **portal monitoring**. Used in the ***INF Treaty*** and ***START I*** and **START II**. The **IAEA** also uses continuous monitoring as part of its nuclear **safeguards** system.

CONVERSION

A process intended to permanently change the way in which an asset will be used, particularly from a military use to a peaceful use.

CONVERSION INSPECTION

Form of **on-site inspection** used to confirm the conversion of **treaty-limited items** or facilities from one use to another. Used in ***START I*** and the ***CFE Treaty***.

COOPERATIVE MEASURE

Action taken by a party to enhance the ability of another party's **national technical means** to verify compliance. An example is the **START I** provision requiring each party to remove the covers on their

missile silos for a given period, on request, to permit satellite confirmation that they contain the agreed type of missile.

COOPERATIVE MONITORING

Monitoring done by treaty parties jointly, using shared facilities and/or technology or involving inspections in which each is represented. May also refer to any monitoring that is not done by **national technical means**.

DATA EXCHANGE

Information exchanged by treaty parties, sometimes simultaneously or in coordinated fashion, to demonstrate their ongoing compliance with a treaty. Typically, data declarations report the location, number, characteristics and status of treaty-limited equipment and the details of restricted activities. Exchanges may occur directly between individual parties or via an international organization. They may be confidential or public. See also **declaration**.

DECLARATION

Statement made by a treaty party containing information intended to demonstrate their current situation or status and/or their compliance with their obligations. Declarations may be made directly to other parties or via an international organization or other body designated to receive them. See also **data exchange**.

DECLARED FACILITY

Facility that has been identified by a treaty party as being subject to the terms of a treaty. Under **IAEA safeguards *non-nuclear-weapon States*** are required to declare all their nuclear facilities. Under the ***CWC*** parties are required to declare all their chemical weapons-related facilities.

DECLARED SITE INSPECTION

An inspection conducted at a site that has been declared as relevant to a treaty. See also **designated site/facility**.

DECOMMISSIONING

Term used for disarmament of paramilitary forces in the Northern Ireland context. More commonly used to refer to the process of making

a facility permanently incapable of producing or storing prohibited items. May involve **conversion** to peaceful uses.

DEMILITARIZED ZONE (DMZ)
Geographical area within which the deployment of military forces and of military installations of any type is prohibited. Used to separate hostile forces following cessation of combat. The most prominent current example is the zone separating North and South Korea since the 1954 Korean War armistice. See also **buffer zone**.

DEPOSITARY
The state, states or organization charged with receiving documents from governments indicating their signature, **ratification** or accession to a treaty.

DESIGNATED SITE/FACILITY
A site that has been declared as relevant to a treaty

DOCUMENTARY ARCHAEOLOGY
The assembling of a documentary "paper trail" to help prove or disprove a case of non-compliance.

DUAL-USE TECHNOLOGY/MATERIALS
Technology that can have both peaceful and non-peaceful uses.

ELIMINATION INSPECTION
See **reduction inspection**.

ELINT
Electronic intelligence. See also **SIGINT**.

ENCRYPTION
Conversion of data into unintelligible code. See **telemetry**.

ENFORCEMENT (OF COMPLIANCE)
The power to coerce a state into complying with its treaty obligations through the use of political pressure, economic or other sanctions and/or the use of military force. Reserved to the UN Security Council acting under Chapter VII of the UN Charter.

ENTRY INTO FORCE

The date that a treaty becomes legally binding on a state or states. Treaties generally stipulate the conditions for entry into force. Some enter into force when signed, others only after all or a number of signatories ratify their signature. See also **ratification**.

ENVIRONMENTAL SAMPLING

The taking and analysis of samples from the immediate environment of a site or facility to help monitor the activity taking place there.

EVALUATION VISIT

A visit by inspectors to assess the accuracy of information provided in **information exchanges**.

EXHIBITION

Open display of military equipment to facilitate monitoring by **on-site inspections**, **aerial observation** or by **satellite**. Applied under ***START I*** to help parties distinguish between various types of heavy bombers, former heavy bombers, and nuclear air-launched cruise missiles.

EXIT MONITORING

Monitoring conducted at the exit of a plant or facility to ensure that whatever enters or leaves is in accordance with a treaty. Used in the ***INF Treaty***.

FACILITY AGREEMENT

Agreement between a treaty party and a verification organization defining the procedures to be followed during **on-site inspection** of a specified facility or facilities.

FACT-FINDING MISSION

A mission to acquire information relating to a compliance difficulty or alleged non-compliance. May comprise diplomats, scientific and technical experts and/or military personnel. May be dispatched by parties to any treaty if they so decide or by the ***UN Secretary-General***, ***UN Security Council*** and ***UN General Assembly***. Some treaties, such as the ***Landmine Convention***, specifically provide for fact-finding missions.

FULL-SCOPE SAFEGUARDS (FSS)

Comprehensive nuclear safeguards implemented by the ***IAEA*** covering all declared nuclear materials and facilities in a ***non-nuclear-weapon state (NNWS)*** as outlined in IAEA document (INFCIRC/153). See also **IAEA safeguards**.

GLOBAL POSITIONING SYSTEM (GPS)

Technology which permits the determination of accurate latitude and longitude using signals from satellites. Currently a US monopoly, although the European Union is considering establishing its own system.

GOOD OFFICES

Non-judicial dispute settlement process where disputing parties invite a trusted, impartial third party to facilitate communication or negotiation between them. The UN Secretary-General is often called upon to exercise his "good offices", both in dispute settlement clauses of treaties and on an ad hoc basis.

GREEN LIGHT PROCEDURE

The requirement that a positive vote be taken to permit a **challenge on-site inspection** to proceed. See also **red light procedure**.

GROUND-BASED SENSOR

Sensor deployed on the ground, whether buried, surface-mounted or mast-mounted. Ground-based sensors can employ a host of technologies, including movement detectors, infra-red detectors and cameras.

HUMINT

Intelligence gathered by or from humans.

HYDROACOUSTIC MONITORING

Use of hydrophones to measure variations in water pressure to detect and determine the location of underwater nuclear explosions. One of four technologies used by the **International Monitoring System (IMS)** for the ***CTBT***.

HYDRODYNAMIC YIELD MEASUREMENT
Records the velocity of the expanding shock wave in rock surrounding an underground nuclear explosion. Used to verify the ***TTBT***.

IN-COUNTRY ESCORT
Representatives of inspected party nominated to accompany and assist on-site inspectors while they are in their country.

INFORMATION EXCHANGE
See **data exchange**.

INFORMATION TECHNOLOGY (IT)
Encompasses all forms of electronic technology, including hardware and software, used to create, store, exchange and use information in its various forms. Includes digital and analog data, sound, still images and motion pictures. A convenient term for the combination of telephony and computer technology, the technologies driving the "**information revolution**".

INFRASOUND MONITORING
The monitoring of low-frequency acoustic signals from nuclear explosions. Used to detect atmospheric nuclear tests but may also detect shallow underground and underwater nuclear explosions. Infrasound stations are part of the **IMS** for the ***CTBT***.

INSPECTION
See **on-site inspection**.

INSPECTION QUOTA
An agreed number of inspections that may be conducted in a particular period, in a specified country or at specified sites or facilities. Used to limit the number of inspections in order to reduce their cost, inconvenience and intrusiveness and to prevent an unfair burden falling on a particular party or parties. May be **active** (the number that a party is allowed to conduct on the territory of other states) or **passive** (the number of inspections it is obliged to receive). Provided for in the ***CFE Treaty*** and the ***Open Skies Treaty***.

INSPECTION SITE
A facility or area at which an on-site inspection is carried out.

LOOK-ALIKE (LAL) ITEMS
Items similar in outward appearance to those banned or limited by a treaty. Term originated in the ***CFE Treaty***.

MANAGED ACCESS
Procedures and techniques that a treaty permits an inspected party to use in order to limit access by on-site inspectors to sensitive areas and equipment. Designed to prevent inspectors obtaining information unrelated to their mission, especially national security information or **commercial proprietary information** (commercial secrets).

MATERIALS ACCOUNTANCY
See **nuclear materials accountancy**.

MILOB
Military observer.

MOCK INSPECTION
See **trial inspection**.

MONITORING
The means by which information is obtained for verification purposes. May be done remotely or on-site. It may seek to obtain a particular type of information or to detect any activity that is potentially non-compliant.

MULTILATERAL AGREEMENT
An agreement with more than two parties.

MULTILATERAL TECHNICAL MEANS (MTM)
Internationally-owned and -operated technologies and techniques used to monitor treaty compliance on behalf of the treaty parties. Typically, MTM will be maintained and operated by an **international verification organization**, such as the **OPCW** and **IAEA**.

NATIONAL AUTHORITY
A body designated by a government to ensure that a state's obligations under a treaty are carried out. It will often also be the intermediary between the government and an international verification

organization. Some treaties, like the ***CWC***, make it compulsory for each party to designate a national authority.

NATIONAL TECHNICAL MEANS (NTM)

Nationally-owned and -operated technologies and techniques used to monitor the activities of other states, including their compliance with treaty obligations. NTM include **satellites**, **aircraft**, **remote monitoring**, **signals intelligence (SIGINT)** and **open source information**. Some treaties, such as the US/Russian nuclear arms control agreements, prohibit interference with NTM and may provide for **cooperative measures** to enhance the value of NTM. Information derived from NTM may be used in international verification regimes by a treaty party to question another party's compliance and/or to mount a case for a **challenge inspection**.

NOTIFICATION

The official advice that a treaty party is required to give to other parties when it is about to or has just undertaken a treaty-related activity. May be transmitted directly between treaty parties or through a designated mechanism, like the US/Russia **Nuclear Risk Reduction Centers** or the CFE's Conflict Prevention Centre. Typical notifiable activities are the date and size of military exercises, movements and manoeuvres, the redeployment of military forces and the introduction of new weapon systems.

NUCLEAR MATERIALS ACCOUNTANCY

A system for keeping track of an inventory of nuclear materials. **IAEA safeguards agreements** oblige the state party to operate such a system and submit the records regularly to the IAEA. **On-site inspections** verify the accuracy of the records.

OBJECT OF VERIFICATION (OOV)

A military formation, unit or site subject to **on-site inspection**. Term first used in the ***CFE Treaty***.

OBSERVATION

Passive monitoring by humans or technical means of an area, site or activity of particular interest. May be distinguished from **monitoring**, which tends to be less static than observation, more targeted and more technologically based. Observation may also be distinguished from **on-**

site inspection, which is more active, usually more intrusive and may even be inquisitorial.

OBSERVER

Someone designated to engage in **observation** of a particular area, site or activity, usually restricted to visual means, including visual enhancers such as binoculars. Typically in **UN peace operations**, **military observers (milobs)** are posted on borders at stationary border posts to observe military activity. Observers may be distinguished from monitors who tend to be more active and equipped with technical means of monitoring.

ON-SITE INSPECTION (OSI)

A visit, of limited duration, by an inspection team to an area, site or facility to verify compliance. There are various types, including **routine**, **short-notice**, **random** and **challenge**.

ON-SITE MONITORING

Monitoring conducted at the site of the treaty-relevant activity, equipment or materials. May be done by technical means or by humans. Implies more continuous activity than **on-site inspections**, where inspectors visit for short periods and then depart.

OPEN SOURCE INFORMATION

Publicly available information, including that from the media, academic and scientific bodies and non-governmental organizations. Some international verification organizations, like the **IAEA**, are explicitly permitted to collect and analyze such information, while others do so informally.

PASSIVE QUOTA

See **inspection quota**.

PERIMETER

External boundary of an inspection site, defined by either geographic coordinates or description. May be subject to negotiation between the inspection team and the inspected party.

POINT OF ENTRY

Designated location where an inspection team must enter the territory of the inspected party.

PORTAL MONITORING

Type of **continuous monitoring** whereby entry to and exit from a **designated site or facility** through a designated entry/exit point (portal) is subject to continuous **monitoring**.

PROPRIETARY INFORMATION

See **commercial proprietary information**.

QUOTA (FOR INSPECTIONS)

See **inspection quota**.

RADIONUCLIDE MONITORING

Monitoring of radioactive fallout from nuclear explosions to detect atmospheric explosions as well as underground or underwater explosions that vent gases or debris into the atmosphere. Radionuclide monitoring stations are part of the **IMS** for verifying the ***CTBT***.

RANDOM INSPECTION

See **ad hoc inspection**.

RATIFICATION

A country's formal consent to be bound by a treaty following signature. See also **entry into force**.

RED LIGHT PROCEDURE

The requirement that a requested **challenge on-site inspection** should proceed unless a vote is taken to stop it. See also **green light procedure**.

REDUCTION INSPECTIONS

On-site inspections undertaken to ensure that arms reductions required by an agreement have been completed according to the terms of the agreement.

REMOTE MONITORING

Monitoring of treaty-related objects and/or activities from a distance. Techniques include **satellites**, **aircraft**, **electronic intelligence** and **seismic**, **hydroacoustic** and **infrasound monitoring**.

ROUTINE INSPECTION

A type of **on-site inspection** conducted systematically or predictably. They imply no suspicion or allegation of non-compliance.

SAFEGUARDS AGREEMENT

Agreement between a state and the **IAEA** which gives the Agency the right to verify that nuclear materials and facilities are being used for peaceful purposes.

SAMPLING

The taking of samples of materials for verification purposes. Provided for in the ***CWC*** and ***CTBT***.

SATELLITE

Space-based craft orbiting the Earth, either stationary above a fixed point on the Earth's surface (geostationary) or in Earth orbit. May be equipped with a variety of **sensor** technologies, including high-resolution cameras, infrared cameras, sensors and radars. A key component of **NTM**.

SCHEDULED INSPECTIONS

See **routine inspections**.

SEAL

Unique identifier used to ensure that equipment has not been moved or tampered with and/or that areas have not been entered.

SEISMIC MONITORING

The use of seismographs to detect seismic waves that travel through the Earth as a result of underground events. Used to detect underground nuclear explosions and distinguish them from earthquakes. Seismic monitoring is the most important technology used by the **IMS** for verifying the **CTBT**.

SENSOR

Device that converts emitted or reflected energy into an electronic signal that may be used for monitoring or detection purposes. Sensors may detect ground vibrations, sound, heat or a wide spectrum of waveform data, including radar, radio, infra-red, visible light, ultraviolet, x-rays and gamma rays. May be accompanied permanently by personnel or installed and left unattended. Sensors can be fitted to a wide variety of air, ground and sea platforms. See also **remote sensing**.

SHORT-NOTICE INSPECTION

Type of **on-site inspection** for which very little notice is given in order to enhance the **deterrent** effect. Does not imply an allegation of non-compliance. See also **challenge inspection**.

SIGNALS INTELLIGENCE (SIGINT)

Information gathered through the interception of electronic communications. Gathered for broader national security purposes than verifying compliance with arms control and disarmament agreements, but considered an important element of **NTM**. See also **ELINT**.

SPECIAL INSPECTION

Term used in the context of **IAEA safeguards** for a **challenge inspection**.

TAG

Unique identifier placed on military equipment to facilitate counting and/or tracking of treaty-limited equipment. Used as part of the ***INF***, ***START*** and ***CFE*** verification systems.

TELEMETRY

Data about the performance of an experimental device, typically a missile or nuclear device, which may be transmitted by radio signal, either encrypted or unencrypted. See **encryption**.

THIRD-PARTY MONITORING

Monitoring undertaken by a party which is not involved in the conflict or dispute at issue and which may be perceived as impartial.

TRANSPARENCY

Openness of information. In the verification field it may refer to openness about a state's military activities and about any peaceful activities that may have military implications (such as **dual-use technology**).

TREATY-ACCOUNTABLE ITEM

Weapons or other items subject to counting rules under a treaty. See also **treaty-limited item**.

TREATY-LIMITED EQUIPMENT (TLE)

Weapons or other items limited in quantity or quality by a treaty. See also **treaty-accountable item**.

TRIAL INSPECTION

An inspection undertaken during the negotiation or prior to the entry into force of a treaty, in conditions approximating those of a real inspection, in order to test preparations, procedures and/or equipment.

UNIQUE IDENTIFIERS

A non-repeating alpha-numeric production number assigned to a weapon, weapon part or other treaty-limited item.

UNMANNED AERIAL VEHICLE (UAV)

Pilotless aircraft used for reconnaissance or other military purpose. An example is the United States' Global Hawk.

VERIFICATION

Process of gathering, interpreting and using information to make a judgement about parties' **compliance** or non-compliance with an agreement. The aim of verification is to establish or increase confidence that all parties are implementing a treaty fairly and effectively.

VERIFICATION COMMISSION

A body established to facilitate the implementation of a treaty's verification provisions.

VERIFICATION MECHANISM

A particular means of verification that forms part of a **verification system**.

VERIFICATION REGIME

The sum total of the arrangements for ensuring verification of compliance with a treaty, consisting of legal commitments, **data exchange** and **notification** arrangements, **monitoring** methods, communication, **consultation** and **clarification mechanisms** and an agreed method for making verification judgements. Sometimes also taken to include the **compliance mechanism(s)**.

VERIFICATION SYSTEM

As used in this volume, the sum total of the elements which provide information for making a verification judgement, but not including the **compliance mechanism** for making that judgement.

ZONE OF SEPARATION

See **buffer zone**.

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The CBW Conventions Bulletin
The Nonproliferation Review
Trust & Verify

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Arms Control Reporter: A Chronicle of Treaties, Negotiations, Proposals, Weapons and Policy, Cambridge, MA: Institute for Defence and Disarmament Studies.
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ELECTRONIC LINKS

INTERNATIONAL VERIFICATION ORGANIZATIONS

Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)
http://www.ctbto.org

International Atomic Energy Agency (IAEA)
http://www.iaea.org

Organisation for the Prohibition of Chemical Weapons (OPCW)
http://www.opcw.org

United Nations Department for Disarmament Affairs (UNDDA)
http://www.un.org/Depts/dda

United Nations Monitoring, Verification and Inspection Commission (UNMOVIC)
http://www.un.org/Depts/unmovic

VERIFICATION RESEARCH

General

Arms Control Association (ACA)
http://www.armscontrol.org

Bochum Verification Project
http://www.ep3.ruhr-uni-bochum.de

British American Security Information Council (BASIC)
http://www.basicint.org

Carnegie Endowment for International Peace (CEIP)
http://www.ceip.org

Centre for Arms Control, Energy and Environmental Studies at the Moscow Institute of Physics and Technology
http://www.armscontrol.ru

Cooperative Monitoring Centre, Sandia National Laboratories, US Department of Energy
http://www.cmc.sandia.gov

Federation of American Scientists (FAS)
http://www.fas.org

Henry L. Stimson Centre
http://www.stimson.org

Peace Research Institute Frankfurt (PRIF)
http://www.hsfk.de

Stockholm International Peace Research Institute (SIPRI)
http://www.sipri.se

Verification Research, Training and Information Centre (VERTIC)
http://www.vertic.org

United Nations Institute for Disarmament Research (UNIDIR)
http://www.unidir.org

Chemical and Biological Weapons

Organisation for the Prohibition of Chemical Weapons (OPCW)
http://www.opcw.org

Chemical and Biological Arms Control Institute (CBACI)
http://www.cbaci.org

Finnish Institute for Verification of the Chemical Weapons Convention (VERIFIN)
http://www.verifin.helsinki.fi

Harvard Sussex Program on CBW Armament and Arms Limitation
http://www.fas.harvard.edu/~hsp

The Sunshine Project
http://www.sunshine-project.org

Project on Strengthening the Biological and Toxins Weapons Convention, Bradford University
http://www.brad.ac.uk/acad/sbtwc

Comprehensive Test Ban Treaty

Incorporated Research Institutions for Seismology (IRIS)
http://www.iris.edu

Independent Commission on the Verifiability of the CTBT
http://www.ctbtcommission.org

Landmines

Landmine Monitor
http://www.icbl.org

Nuclear Non-proliferation

Centre for Nonproliferation Studies, Monterey Institute of International Studies
http://www.cns.miis.edu

European Safeguards Research and Development Association (ESARDA)
http://www.hosting.jrc.cec.eu.int/esarda

Institute of Nuclear Materials Management
http://www.inmm.org

International Network of Engineers and Scientists Against Proliferation (INESAP)
http://www.inesap.org

The Nuclear Control Institute
http://www.nci.org

Russian American Nuclear Security Advisory Council
http://www.ransac.org

Small Arms

Centre de Documentation et de Recherche sur la Paix et les Conflicts (CDRPC)
http://www.obsarm.org

International Action Network on Small Arms
http://www.iansa.org

Small Arms Survey (SAS)
http://www.smallarmssurvey.org