

The role of Verification in International Relations: 1945-1993

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Dissertation zur Erlangung des Grads einer Doktorin
der Sozialwissenschaft (Dr. rer. pol.) der Universität Erfurt,
Staatswissenschaftliche Fakultät

2006

urn:nbn:de:gbv:547-20061700

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Datum der Disputation: 20. Februar 2006

Abstract

The role of verification in international relations is linked with the urge to verify which is evident throughout human history. This study focused on the evolution of this role in light of political circumstances and technological progress. Several different approaches to verification can be identified – bilateral, regional cooperation, global arrangements, and individual national efforts. Moreover, several themes characterize the existing verification regimes. These issues – namely the sharing of intelligence, managing compliance questions, and the integration of different regimes – present themselves as the negotiating ground for future years. One of the important results of the paper is that it demonstrates how the concept of verification, once a contentious political instrument, is encompassing anew actors, new frameworks, new technologies, and new fields.

Keywords:

Arms Control, Disarmament, Verification, Verification technology, Inspection, Compliances, Sanction, Bilateral Verification, Multilateral Verification, Regional Verification, UN Verification, Export Control, SALT I, SALT II, SALT III, INF, START, PIBT, The Antarctic Treaty, The Outer Space Agreement, The Seabed Treaty, ENMOD, The International Atomic Energy Agency, Chemical Weapons Convention, Biological Weapons Convention, Euratom, CSBM, CFE, Nuclear Weapon Free Zone, The Treaty of Tlatelolco, The Treaty of Rarotonga, The Treaty of Pelindaba, UNSCOM

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Acronyms

ATTU	Atlantic to the Urals
ABACC	Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials
ABM	Anti-Ballistic Missile
ACA	Agency for the Control of Armaments
ATCM	Antarctic Treaty Consultative Meetings
BW	Biological Weapons
BWC	Biological Weapons Convention
CBM or CSBM	Confidence (and Security) Building Measures
CD	Conference on Disarmament (see UN)
CFE	Conventional Forces in Europe
COCOM	Coordinating Committee for Multilateral Export
CSCE	Council on Security and Cooperation in Europe
CTBT	Comprehensive Test Ban Treaty
CW	Chemical Weapons
CWC	Chemical Weapons Convention
EC	European Community
ENMOD	Environmental Modification Treaty
EPC	European Political Cooperation
FRG	Federal Republic of Germany (refers to pre-1990)
GDR	German Democratic Republic (refers to pre-1990)
IAEA	International Atomic Energy Agency
ICBM	Intercontinental Ballistic Missile
ICC	Inter-allied Control Commissions
INF	Intermediate-range Nuclear Forces
IRBM	Intermediate Range Ballistic Missiles
JCIC	Joint Compliance and Inspection Commission (see START talks)
JCG	Joint Consulting Group (see CFE Treaty)
KMP	Key Measurement Points
KT	Kiloton
LTBT	Limited Test Ban Treaty
MBFR	Mutually Balanced Force Reduction
MIRV	Multiple Independent Re-entry Vehicle
MOU	Memorandum of Understanding

MTCR	Missile Technology Control Regime
MUF	Materials Unaccounted For
NACC	North Atlantic Cooperation council
NATO	North Atlantic Treaty Organization
NGO	Non-Governmental Organization
NPT	Non-Proliferation Treaty
NRRC	Nuclear Risk Reduction Centre
NSG	Nuclear Suppliers Group
NTM	National Technical Means
NWFZ	Nuclear Weapon Free Zone
NNWS	Non-Nuclear Weapon States
NWS	Nuclear Weapon States
OPANAL	Agency for the Prohibition of Nuclear Weapons
OPCW	Organization for the Prohibition of Chemical Weapons
OSI	On-Site Inspection
OSIA	On-Site Inspection Agency (US)
PPNN	Programme for Promoting Nuclear Non Proliferation Newsbrief
PNET	Peaceful Nuclear Explosion Treaty
SALT	Strategic Arms Limitation Talks
SAM	Sanction Assistance Missions (of the CSCE)
SCC	Standing Consultative Committee (see SALT agreements)
SCCC	Common System of Accounting and Control of Nuclear Material (see Argentine-Brazil agreement)
SIGINT	Signals Intelligence
SIPRI	Stockholm International Peace Research Institute
SLBM	Submarine-Launched Ballistic Missile
SNDV	Strategic Nuclear Delivery Vehicle
START	Strategic Arms Reduction Talks
SVC	Special Verification Commission (see discussion of INF Treaty)
TLE	Treaty-Limited Equipment
TLI	Treaty-Limited Item
TTBT	Threshold Test Ban Treaty
UN	United Nations
UNSCOM	United Nations Special Commission (see Iraq experience)

US	United States
USSR	Union of Soviet Socialist Republics (refers to pre-1990)
VCC or VICC	Verification (Implementation) Coordination Committee (see CFE Treaty)
VEREX	Ad Hoc Group of Governmental Exports (see BWC)
WEU	Western European Union
WTO	Warsaw Treaty Organization

Chapter 1 The Theory and the Technology of Verification

The urge to verify is evident throughout human history. In the Bible, one finds the example of St. Thomas whose disbelief in the Resurrection was only assuaged by examining Christ's wounds. The checks and audits of today's commercial world can be traced back to the Tolomei and Medici banks of the fifteenth century. And in military history, Xenophon records show an example of verification that occurred nearly 2400 years ago as the Greek army left Persia:

“The more carefully the two armies observed one another the more mutual distrust mounted and the more palpable tensions grew. The Greek commander fearing a new outbreak of hostilities and bloodshed called upon his Persian counterpart 'to put a stop to these suspicions.’”

“I observe that you are watching our moves as though we were enemies, and we, noticing this, are watching yours too. On looking into things, I am unable to find evidence that you are trying to do us any harm, and I am perfectly sure that, as far as we're concerned, we do not even contemplate such a thing; and so I decided to discuss matters with you, to see if we could put an end to this mistrust. I know, too, of cases that have occurred in the past when people, sometimes as a result of slanderous information and sometimes merely on the strength of suspicion, have become frightened of each other and then, in their anxiety to strike first before anything is done to them, have done irreparable harm to those who neither intended nor even wanted to do them any harm at all.”¹

Xenophon goes on to describe the Greek General approaching his Persian counterpart in the hope of clarifying mutual intentions, thereby impeding the other side from striking first out of fear or ignorance. Unhappily during the banquet, which had been arranged to discuss the matter, the Persian's slaughtered the Greek commanders.

Thomas Schelling, commenting on Xenophon's account, writes: “It is the other side's confidence that each side is primarily concerned to build. Facing a potentially hostile enemy what one wants is not to be confident, but to be as confident as the true state of affairs justifies.”² The fatal flaw in the Greek general's strategy was not that he had been lacking information about his Persian escorts but that his confidence had lain in the wrong assumptions as to their intentions.

1 An Athenian-born writer, student of Socrates, and mercenary soldier, Xenophon left a rich legacy of military and political history based largely on his own experiences. After his exile from Athens in 401 B.C., he joined an expedition of some ten thousand Greek mercenaries involved in a Persian civil war. After the betrayal and execution of his officers, Xenophon was one of those elected to lead the Greeks out of Asia Minor, a trek detailed in his *Anabasis*. Although this memoir lacks the grand themes of most Greek historical narrative, it provides an unusual and detailed account of the rigors of the march as experienced by the common foot soldier. Following his return to Greece, Xenophon settled on an estate near the Spartan frontier. He spent the rest of his life in the service of the Spartans, whom he admired, and in writing several works on the history (including the wars) of his own time. Xenophon wrote his *Anabasis*, his account of the Greek expedition into Persia, in the fourth century B.C. *Anabasis* (Greece, third century b.c.) by Xenophon.

2 T.C. Schelling, *The Strategy of Conflict*, Cambridge 1960.

In the twenty-first century, one sees that the principles of military verification³, which were in place earlier, are much the same today. The history of the first half of the twentieth century offers only two practical experiences of verification, both were as a result of wars in Europe. After Versailles, the Allies established an Inter-Allied Control Commission to verify that rearmament do not take place on the territory of vanquished Germany (1920-26) and after the French defeat of 1940, both the Germans and Italians established commissions (1940-42) to oversee French disarmament according to the Armistice.⁴ It is interesting to note a few points that these two experiences have in common:

1. In both cases, the processes were enforced by the victorious party;
2. In both cases they failed: Germany rearmed nearly openly after 1923 and so did the French – both in Northern Africa and in France (although not quite so openly)
3. In both cases, clandestine activities had the approval of regional or national authorities – materiel was concealed and personnel were trained in a systematic way with the connivance of local authorities.⁵

The lesson is evident – verification is powerless against an organized will to cheat.

World War II reawakened the concern about verification of compliance concerning agreements to limit armaments. After the rejection of the Baruch plan to place all nuclear material under international control, discussion was renewed mainly towards plan for general and complete disarmament (GCD) under United Nations (UN) auspices, and separate negotiation for a complete ban on nuclear testing took place in the early 60's. However, the East-West confrontation proved a formidable barrier to the conclusion of any meaningful arms control agreements with acceptable verification measures.

The progress recently made in clarifying verification's role within the arms control and disarmament process needs consolidation, dissemination, and institutionalisation. With the rejuvenation of East-West arms control in the second half of the last decade has come a series of publications on the process, and on treaty compliance. At the same time each country and international organizations concerned have stated their own views.

States have taken a fragmented course, dealing with verification in a variety of ad-hoc manner and building verification regimes, sometimes in the final months of rushed, politically motivated timetables. Academic and government writings have elaborated upon the spectrum of means available to states and organizations; they

3 The Oxford English Dictionary defines verification as “the action of demonstrating or proving to be true or legitimate by means of evidence or testimony”. This definition, although focused on the function of verification as a provider of evidence, already hints at the complexity inherent in verification. While it is most frequently associated with proving the compliance or non-compliance of a state, verification also provides an opportunity for a state to demonstrate its compliance when suspicions are raised, thus also serving a reassurance function.

4 A.J. Mayer, *Politics and Diplomacy of Peacemaking: Containment and Counterrevolution at Versailles, 1918-1919*, New York 1967. (a detailed and authoritative account of the Versailles Treaty negotiations).

5 J. Goldblat, *Arms Control: The New Guide to Negotiations and Agreements*, 2. ed., Thousand Oaks/London/New Delhi 2002, p. 20.

have created elaborate mathematical models quantifying concepts such as “certainty” and “intrusiveness” and a library of theories and terminology.

Studies of state negotiating practices and treaty verification provisions would seem to indicate that administrations have rather muddled through according to a very politicized process. However, recently there has been a remarkable convergence on the concept of “adequacy” of verification, as is demonstrable in on-going arms-control and disarmament negotiations. “Adequacy” is defined here as a level of verification intrusiveness sufficient to convince treaty signatories that other signatories cannot cheat in a militarily significant manner without such non-compliance being detected in sufficient time to negate any advantage gained by the violator.

The discussion of verification during the period of 1945-1993 was too often an abstraction: how to go about detecting and determine cases of non-compliance. But the reality is not so clear-cut and is more political.⁶ The centrality of politics to verification has been represented most obviously in its frequent usage in the past as an obstacle to the whole arms control process. As stated above, decisions as to the degree of verification and intrusiveness necessary are never apolitical. Nevertheless, states have frequently made impossible verification demands as a means of stalling or killing arms control negotiations that they feel detrimental to their security or other interests.

The reason is evident: it is more acceptable to public and international opinion to debate minutiae of a verification regime endlessly than to pronounce oneself against the entire negotiations. In cases such as the Mutual and Balanced Force Reduction (MBFR) talks, the USSR had to sit at the table to secure the Helsinki Accords, but perceived no interest in negotiating away its massive conventional preponderance in Central Europe. Rather than state this and endanger relations with Western Europe it simply insisted on the then seemingly impossible demand that manpower and equipment ceilings be verified through national technical means (NTMs) alone, thus ensuring non-productive talks for thirteen years. “The degree of verification required by the United States was based upon its perception of the threat posed to national security by the arms in question and the likelihood of undetected violations. For example, the United States accepted the limited (and in U.S. opinion largely symbolic) verification provisions contained in the Biological Weapons Convention and the Environmental Weapons Convention, because it did not think it was likely that weapons of this nature would be developed for modern arsenals. Verification in these conventions consisted of procedures for cooperation and consultation between parties and recourse to the Security Council in case of unresolved complaints. The United States rejected similar proposals for verification of a chemical weapons accord, noting that the threat posed by these weapons, already in the arsenals of some states, demanded stricter, more assuring verification measures, including on-site inspection.”⁷

6 “Verification is not just a question of technical capacity but of the political will to reach agreement on the application of technologies and techniques.”

7 E. Morris, *The Superpowers and Verification in the United Nations Committee on Disarmament*, paper written for Government of Canada, DSS File No. 21T.080-4-003, Serial OST84-00123, October 1984, pp. 43 ff.

The MBFR talks are a classic example of how demands for obviously inadequate levels of verification intrusiveness can obstruct arms control. At the other end of the spectrum, demands for excessive levels of verifiability can be used equally well as instruments to prevent agreement. By requiring absolute certainty of treaty compliance or “iron-clad” verification, US President Ronald Reagan ensured that no superpower arms control was finalized for six years. By proclaiming any violation, no matter how minor, to be militarily significant and demanding the absolute right to inspect “anytime, anywhere”, a state can make the costs of intrusion outweigh the benefit of any conceivable treaty. The Reagan Administration dropped its rigid verification requirements during the INF negotiations, but the same political posturing has plagued many other negotiations, such as those for a Comprehensive Test Ban Treaty (CTBT).

The success of a verification regime in deterring treaty violations not only imports upon that treaty and related security issues, but on the whole arms control process. This is observable in the role that questions about verification and Soviet non-compliance played in preventing US ratification of SALT II. During the Presidential campaign of 1979-80, the Republicans were able to cast doubt upon the Carter Administration's ability and willingness to detect and respond to non-compliance and succeeded in convincing many that anything less than absolute verifiability implied “trusting the Russians”. To the extent that “trusting the Russians” thesis was believed in and not simply a conscious strategy to obstruct a policy line, the verification issue succeeded in altering US positions on arms control at the policy-making levels.

In reality, *verification in no way involves trust*. Rather, it involves accepting a certain degree of uncertainty with regards to compliance in exchange for increased openness and predictability in the other sides' activities, limitations or cuts in their activities and forces, and the knowledge that the costs of concealing these systems or activities under the verification regime will be sufficiently high to dissuade non-compliance. The accompanying verification regime together with clear policies for dealing with violations can thus enhance security regardless of the international climate or perception of the others' trustworthiness.

The problem with SALT I and the Anti-Ballistic Missile (ABM) Treaty was not so much with verification. NTMs succeeded very well in detecting each significant violation and circumvention. The problem lay rather in the loose wording of the treaties, the lack of an agreed database, the lack of clarity in counting rules, definitions and a variety of other clauses.

A hurry to conclude arms control agreements as a sign of detente, together with deliberate vagueness to circumvent severe disagreements backlashed against arms control in the late 1970's. In this backlash inadequate verification, poorly defined and all-inclusive was unfairly diagnosed as a cause of the perceived decline in US security. All of which leads us to the first lesson of early arms control experience: even an adequate, functioning verification regime cannot protect the principles of arms control and international law against weakly defined treaties and the damage caused by governments unwilling or unable to react effectively and responsibly to non-compliance.

It is the aim of this work to give an overview and summarize the role of verification in international relations. Attention will be focused on the evolution of this role in light of political circumstances and technological progress. Several different approaches to verification can be identified – bilateral, regional cooperation, global

arrangements, and individual national efforts. Moreover, several themes characterize the existing verification regimes. These issues – namely the sharing of intelligence, managing compliance questions, and the integration of different regimes – present themselves as the negotiating ground for future years. Yet, one conclusion cannot be denied: the concept of verification, once a contentious political instrument, is growing to encompass new actors, new frameworks, new technologies, and new fields.

1. Historical and Theoretical approach of Verification

The purpose of this chapter is to provide a solid intellectual framework for understanding the theoretical questions of verification: what are the standards and strategies involved in establishing and implementing verification regime? How do the ongoing technology developments affect verification regime?

First, it provides a basic historical development of the concepts: arms control, disarmament and verification. It will define a broad conceptual framework for understanding the verification process. An understanding of the basic terminology that is used throughout the work will provide a context for examining the policies of verification during the period of 1945-1993.

Secondly, it briefly describes and analyses international relations theory and their respective applications in verification regime. The purpose here is not to provide a detailed, authoritative account of international relations theory but rather to explain the strategic drives of building a verification regime during the period of 1945-1993.

Third, this chapter outlines the complex relations between verification and technology. Because of their close connection, understanding this relation is fundamental to understanding the role of verification in international relations.

2. Historical development of arms control and disarmament terminologies and definitions

The term disarmament is often used interchangeably with that of arms control, but the two terms should be considered as separate concepts. Disarmament is both a process and an end state. As a process it involves the reduction, removal or elimination of identified weapon systems. As an end state it involves the establishment of a disarmed world and the prevention of rearmament thereafter. Arms control, on the other hand, restrains the acquisitions, deployment and use of military capabilities.

Arms control analysts of the early 1960s were in agreement that the objectives of arms control were threefold: reducing the likelihood of war, reducing the political and economic costs of preparing for war, and minimizing the scope and violence of war if it occurred.⁸ Even though disarmament and arms control are not the same they nevertheless intersect.⁹

8 T. Schelling, comments at the authors' conference for this book, McLean, VA, 12 July 2001; also remarks made by Schelling in a "Roundtable in Honor of Thomas Schelling" at the 97th annual meeting of the American Political Science Association, San Francisco, 31 August 2001.

9 H. Bull, *The Control of the Arms Race: Disarmament and Arms Control in the Missile Age*, New York 1961, pp. 4-5.

Disarmament has a longer legacy¹⁰ than arms control and was a common theme in international relations literature during the 1950s. The advent of atomic weapons during World War II gave further impetus to advocates of disarmament. Many prominent writers, intellectuals, and policy activists supported efforts to “ban the bomb”, even if this entailed unilateral disarmament. Nuclear disarmament became for many a moral imperative, for the stakes at risk seemed nothing less than the extinction of the human species. Consequently, the leaders of the superpowers gave considerable attention to arms control during the Cold War.

During the Cold War the core goal of security policy was enhancement of stability. The alternatives were presented as either nuclear Armageddon or appeasement. This reinforces the case for focusing on deterrence theory. The logic of deterrence suggested that if either side pushed the other too far, they would set for a trail of nuclear escalation leading to universal ruin¹¹. In the early 1960s international security specialists began using the term arms control in place of the term disarmament.

However, by the late 1970s, this tapestry was becoming a little frayed at the edges. Public opinion was uneasy about endorsing a never-ending arms race to an exponential expansion of the Peace Movement in Europe. It was within this setting that a seminal document in the evolution of the concept of security was published in 1982 “*Report of The Independent Commission on Disarmament and Security Issues, titled Common Security: A Blueprint for Survival*” (normally referred to as the Palme Commission Report, after its chairman, Olof Palme).¹²

The report was driven by the idea that arms racing were wasteful, harmful to the prospects for development in the Third World, and – above all else – dangerous. According to the Palme Commission, there was a ‘drift towards war’; the world seemed to be ‘marching towards the brink of a new abyss’.¹³ The Report noted that:

“nations must strive for objectives more ambitious than stability, the goal of the present system in which security is based on armaments. For stability based on armaments cannot be sustained indefinitely. There is always the danger that the fragile stability of an international system based on armaments will suddenly crumble, and that nuclear confrontation will take its place. A more effective way to ensure security is to create positive processes that can lead to peace and disarmament. It is essential to create an irreversible process, with a momentum such that all nations cooperate for their common survival.”¹⁴

10 One of the best examples of disarmament before the twentieth century occurred in Japan. For almost two hundred years, beginning in the middle of the 1600s, the Japanese eschewed the use of firearms as weapons for combat. Throughout this period of self-imposed disarmament, the sword remained the dominant weapon. This changed in the middle of the nineteenth century, when outside great powers threatened intervention in Japanese affairs. With the end of Japan's isolation within the international political system, disarmament also came to an end.

11 A. Butfoy, *Strategic Studies and Common Security: A Critical Analysis*, London 1997, chapter five; and A. Butfoy, *Is Arms Control approaching a Dead-End?*, in: *Australian Journal of International Affairs* 52/3 (November 1998).

12 The Independent Commission on Disarmament and Security Issues, *Common Security: A Blueprint for Survival*, New York 1982; hereafter referred to as the Palme Commission.

13 Palme Commission, p. 1.

14 Palme Commission, p. 7.

A relaxation of tensions in superpower relations, or *détente*, was widely viewed to coincide with arms control agreements, such as the conclusion of the first round of SALT (Strategic Arms Limitation Talks) in 1972, the INF (intermediate nuclear forces) agreement in 1987, and START (Strategic Arms Reduction Talks) in 1991.

As states do not wish to rely blindly on each other's compliance with an international agreement¹⁵ and as modifying one's behaviour according to treaty affects security, compliance needed to be ensured by standards and technologies. Verification regime is required to ensure that the treaty is not being abused in order to diminish security, to avoid varying interpretations as to a regime's effectiveness and to covert cheating and undetected significant military activities.

Verification is thus central to any agreement affecting a state's security. Verification and monitoring may be applied to the whole range of elements that constitute a peace implementation process, ranging from the military aspects, through electoral monitoring and human rights monitoring, to the monitoring of local police using international civilian police. The monitoring and verification of the military aspects of peace agreements has the longest lineage historically: ceasefire agreements have often called for monitoring by impartial international observers. In comparing the main fields of international cooperation¹⁶ one can observe that the verification problem appears to be most pronounced in arms control and disarmament international treaties.¹⁷

3. The Concept of Verification

"Verification" is, according to the Webster's dictionary, "the act or process of verifying or the state of being verified; the authentication of truth or accuracy by such means as facts, statement, citations, measurements, or attendant circumstances, confirmation by evidence in law."¹⁸ Although this definition does not seem very applicable to arms control and disarmament treaties, we can apply to it the idea of positive and negative verification.

SIPRI defines verification as a process, specifically established or approved by a disarmament agreement, carried out by individual state parties to the agreement, either reciprocally or not, or by an international body established or empowered to carry out the process, by personnel or by technical means, in order to determine the degree to which the parties to the agreement have implemented its provisions and thereby observed or discharged their obligations under the treaty.¹⁹

A Group of Qualified Governmental Experts that have been appointed by the United Nations Secretary-General²⁰ added in 1995 emphasising that verification can be generically defined as a process in which data are collected, collated and analysed in order to make an informed judgement as to whether a party is complying with its

15 T. Bernauer, *The Chemistry of Regime Formation*, Dartmouth 1993, p. 219.

16 See D. Ruloff, *Weltstaat oder Staatenwelt? Über die Chancen globaler Zusammenarbeit*, München 1988.

17 T. Bernauer, op. cit., 1993, p. 219.

18 P.B. Gove, Merriam-Webster (ed.), *Webster's Third New International Dictionary*, Springfield, Mass. 1966, p. 2543.

19 A. Karkoszka, *Strategic Disarmament, Verification and National Security*, London/New York 1977, p. 13.

20 UN Resolution A/51/182 (See Annex I).

obligations: Verification as “the action of demonstrating or proving to be true or legitimate by means of evidence or testimony”.

This definition, although focused on the function of verification as a provider of evidence, already hints at the complexity inherent in verification. While it is most frequently associated with proving the compliance or non-compliance of a state, verification also provides an opportunity for a state to demonstrate its compliance when suspicions are raised, thus also serving a reassurance function. MacEachin identifies the “defining objective” of on-site verification as denying “a potential treaty violator the means for concealing proscribed programmes under the cover of legitimate activities” thus highlighting a third function of verification, namely deterrence.²¹ This definition introduces the concept of verification as a process, ideally a cooperative one.²²

For the purpose of this work, it is necessary to add the definition of verification by Graham Evans and Jeffrey Newnham that “Verification is the inverse of trust. In a system based upon mutual trust and understanding, verification of compliance would be both necessary and contrary to the spirit of the relationship. Indeed, in such circumstances requiring verification would be a contradiction in terms”.²³

Four conclusions can be drawn from this discussion.

Verification is a process.

Verification consists of two elements, which are closely interrelated: monitoring and verification.

Verification targets two actions: positive verification (verifications on actions that the subject perform) or negative verification (verifications on actions the subject is forbidden to perform).²⁴

A fourth element, sanction, even though it does not form an integral part of verification but is closely related²⁵ and an important aspect of effective implementation of verification.

Verification is not an aim in itself, but an essential element in the process of achieving arms limitation and disarmament and should promote the implementation of arms limitation and disarmament measures build confidence among States and ensure that all parties are observing agreements.

Considering these facts verification implies two functions:

to deter cheating on an arms control agreement and

to build confidence between the parties to an agreement.

21 D. MacEachin, *Routine and challenge: two pillars of verification*, The CBW Conventions Bulletin, no. 39 (March 1998), pp. 1-3, available at www.fas.harvard.edu/~hsp/bulletin/cbwcb55.pdf

22 Idem.

23 G. Evans, J. Newnham, *The Dictionary of World Politics. A Reference Guide to Concepts, Ideas and Institutions*, London 1992.

24 For instance, in the field of nuclear weapons, negative verification would imply providing assurance that subject is not producing fissile material for use in nuclear explosive.

25 T. Bernauer, op. cit., 1993, p. 220.

Verification measures include:

1. National Technical Means (NTMS), such as satellite surveillance, radar surveillance from locations outside the boundaries of the countries monitored (SIGINT), radioactive air sampling, tele-seismic geo-physical observations, and communications interception (SIGINT) [including telemetry monitoring]
2. Cooperative means, such as the deliberate opening of certain features of military systems to surveillance [including military expenditure levels], specific channelling of military products through agreed checkpoints, and non-interference with means of verification [such as non-encryption of telemetry];
3. On-site Inspection (OSI) [various levels of intrusiveness]
4. “soft” methods of verification, such as using agents (HUMINT), interviews, and analysing information leaks.²⁶

Verification “system” comprises institutions, arrangements, techniques and technologies. In the case of agreements between two states, it may be enough for each to verify the other’s compliance, using what are known as “national technical means”, such as satellites. When agreements involve multiple parties or aim at global membership, a more elaborate international organisation may be required to establish and manage a verification system. It will usually include a technical secretariat to handle the monitoring technologies and inspection arrangements, an executive council of selected member states to oversee the system and a conference of all states parties to set policy and review the operation of the treaty. Verification systems use a variety of techniques and technologies. Some of the most common elements are as follows.

Declarations and data exchanges are often the first step in implementing a treaty. Typically, parties declare the numbers, location and characteristics of the weapons they possess that are to be banned or limited. Verification will seek to confirm such “baseline” data. Most treaties like NPT provide for periodic updating or even continuous provision of data.

Remote monitoring by satellites, aircraft and other off-site technologies and techniques are used to detect treaty violations.

Inspections are one of the most valuable verification tools, as they permit direct human observation. They may be used to witness a specific event, such as a military exercise, or to monitor a site continuously, such as a chemical weapon destruction plant. On-site inspectors have a balance of rights and responsibilities. While inspected states are required to co-operate with them as fully as possible, inspectors have, until now, never been permitted literally to roam anytime. Since the verification agency may have to adjudicate competing claims, impartiality and good intelligences are an advantage and requires the capability to monitor what the parties are actually doing, as opposed to what they are saying. Since the verification agency

26 G. Duffy, *Compliance and the Future of Arms Control*, Report of a Project Sponsored by the Center of International Security and Arms Control, Stanford University, and Global Outlook, Cambridge, Mass. 1988, p. 4.

may have to respond to non-compliance, a repertoire of sanctions is also an advantage.²⁷

4. Theoretical framework of Verification Regime

This sub-section provides simplified analyses of basic international relations theories and their contribution to the explanation of the role of verification regime in international relations. The purpose here is not to design a theory of verification regime but rather to identify the factors that are relevant in the different theories of international regimes and to explain the process and the purpose of verification regime in international relations. This work consists mainly of empirical arguments, and is thus not a theoretical exposition of the role of verification in international relations.

Until the Second World War, the most influence book on strategic studies is the Carl von Clausewitz's legacy's unfinished book:²⁸ that war is a continuation of political activity by other means, remains the basis for the study of war as a potentially rational pursuit. This assertion was the starting point for investigation into the strategic implications of nuclear weapons. Bernard Brodie was the first to popularise the notion that these weapons were so fearful that they might actually serve to prevent another total war through the workings of deterrence. The experience of the Korean War suggested that wars could be kept limited in their means (non-nuclear), so long as their ends were also limited, a theme picked up by Robert Osgood and Henry Kissinger in the mid-1950s.²⁹

During the Cold War, the central question was how to avoid both war and appeasement. The mainstream agenda for international security studies were formulated in a sense of order – “deterrence”, “containment,” “flexible response,” and “detente”. Soon the Cold War became both less dangerous, in the aftermath of the crises in Berlin and Cuba of the early 1960s, and more aggravating, as the United States followed the imperatives of anti-communism into the quagmire of Vietnam. The former development left strategic studies less vital; the latter tended to discredit it. Consequently, research during this era was characterized by a heightened degree of skepticism, with analysts warning of the limits of deterrence and coercion (Alexander George), the distorting effects of bureaucratic politics (Graham Allison), and the perils of misperception (Robert Jervis).³⁰

27 See J.B. Wiesner, *Arms Control Verification. The Technologies That Make It Possible on the comparisemes of national systems and international systems of inspection and verification*, 1997, available at ic.media.mit.edu/projects/JBW/articles/arms/arms.htm.

28 The most accessible version of Clausewitz's *On War* remains that of Michael Howard, Peter Paret, and Bernard Brodie, Princeton, NJ 1976. Martin van Creveld discusses the inadequacy of the Clausewitzian legacy in *The Transformation of War*, New York, NY 1991.

29 L. Freedman, *International security: changing targets* (includes related article on US international security concerns)(The Frontiers of Knowledge), in: Foreign Policy (Spring 1998). The first classic of the nuclear age was Brodie's, *The Absolute Weapon*, New York, NY 1946. H. Kissinger, *Nuclear Weapons and Foreign Policy*, New York, NY 1957 was the first “bestseller”. Among works of the golden age, H. Kahn, *On Thermonuclear War*, Princeton, NJ 1960 is still worth looking at as a period piece, but T.C. Schelling, *The Strategy of Conflict*, New York, NY 1960 has remained the most durable. The nuclear debates are discussed in L. Freedman, *Evolution of Nuclear Strategy*, 2. ed., London 1989.

30 Alexander George was responsible for two of the more important critical works on American strategy. He and a number of co-authors produced *The Limits of Coercive Diplomacy: Laos, Cuba, Vietnam*, Boston, MA 1971 of which a new version was published in 1994, and co-wrote

Early theorists studied arms control and disarmament treaties in the broadest sense to refer to all forms of military cooperation between potential enemies in the interest of ensuring international stability. As Hedley Bull put it, arms control is “cooperation between antagonistic pairs of states in the military field, whether this cooperation is founded upon interests that are exclusively those of the cooperating states themselves or on interests that are more widely shared.”³¹

The new theoretical approach for arms control and disarmament discussion is cooperative security, a concept that has grown in popularity and use since the end of the Cold War. One commonly accepted definition of cooperative security is “a commitment to regulate the size, technical composition, investment patterns, and operational practices of all military forces by mutual consent for mutual benefit.”³²

Thus, the term *collective security* is slightly different in meaning than the terms *cooperative security* or *collective defence*. Collective security is “a political and legal obligation of member states to defend the integrity of individual states within a group of treaty signatories.” Collective defence is more narrowly defined: “the commitment of all states to defend each other from outside aggression.” By contrast, cooperative security can include the introduction of measures that reduce the risk of war, measures that are not necessarily directed against any specific state or coalition.³³

The greatest policy interest lay in efforts devised to get out of the Cold War, or at least to mitigate its most dangerous aspects, through arms control. Studies in this field tended to have a technical bias, although these widened as academics and policymakers gained an increased appreciation of the political role that arms control negotiations were playing in East-West relations. The debate over SALT II negotiations in the late 1970s was not so much about the arcane of the military balance, though it was often conducted in those terms, than the prospects for detente with the Soviet.

with Richard Smoke, *Deterrence in American Foreign Policy*, New York, NY 1974. Graham Allison's *Essence of Decision: Explaining the Cuban Missile Crisis*, Boston, MA 1971 established the importance of bureaucratic factors in policymaking and Robert Jervis' *Perception and Misperception in International Politics*, Princeton, NJ 1976 drew attention to the dangers of assuming that states understand each other. Richard Ned Lebow and Janice Stein provide a sustained, though somewhat overstated, critique of deterrence in *We All Lost the Cold War*, Princeton, NJ 1994.

- 31 H. Bull, *The Control of the Arms Race: Disarmament and Arms Control in the Missile Age*, New York 1961, p. xxxv.
- 32 A.B. Carter, W.J. Perry, and J.D. Steinbruner, *A New Concept of Cooperative Security*, Washington, DC 1992, p. 6. Other good works on this subject include J. Nolan (ed.), *Global Engagement: Cooperation and Security in the 21st Century*, Washington, DC 1994; A.B. Carter and W.J. Perry, *Preventive Defence: A New Security Strategy for America*, Washington, DC 1999; J.D. Steinbruner, *Principles of Global Security*, Washington, DC 2000; and D. Caldwell, *Cooperative Security and Terrorism*, paper presented to the annual meeting of the International Security Studies Section of the International Studies Association, Whittier, CA, 27 October 2001.
- 33 One can envision four rings of security that make up collective security writ large: individual security, collective security, collective defense, and promoting stability. For more on this argument, see R. Cohen and M. Mihalka, *Cooperative Security: New Horizons for International Order*, Marshall Center Papers No. 3, Garmisch, George C. Marshall European Center for Security Studies, April 2001.

4.1. International relations theories and Verification regime

For the purpose of this work, it seems appropriate to keep in mind the recent publication on: “Theories of International Regimes”³⁴. In this book, Hasenclever, Mayer and Rittberger divide the theories of international regimes into three schools, power-based, interest-based and knowledge-based theories. Power-based theories of international regimes can be described as “neo-realist theories of cooperation”. Not only conflict but also cooperation is explained by power and the distribution of capabilities among states. The interest-based theories are the mainstream of regime theories. It “emphasizes the role of international regimes in helping states to realize common interests”.³⁵ The focus is on situations where the constellation of actors’ interests is such that they can only achieve beneficial outcomes through institutionalized cooperation. The knowledge-based theories stress ideas and knowledge as explanatory variables. The focus is partly on how “causal and normative beliefs form perceptions of international problems and thus demand for regimes”.³⁶

Stephen Krasner’s definition of international regimes in a special issue of the journal “International Organization” in 1982 indicate that: “International regimes are defined as principles, norms, rules, and decision-making procedures around which actor expectations converge in a given issue-area”.³⁷ “Principles are beliefs of fact, causation, rectitude. Norms are standards of behavior defined in terms of rights and obligations. Rules are specific prescriptions or postscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice”.³⁸

There is also a difference in the literature on whether the research is focused on explaining the existence of regimes, or on the effects of regimes. The emphasis of the regime literature has moved from the first to the latter question.³⁹ The empirical discussion in this paper will primarily be related to the effects of regimes. It then seems important to distinguish how the regime improves conditions for cooperation and the “degree to which a regime ameliorates the problem that prompted its creation”.⁴⁰ In the case of verification this would be the difference between how the discussion on the standards of verification on arms control and disarmament facilitated the creation of effective arms control and disarmament regimes and the extent to which this rule-based cooperation leads to international cooperation.

34 A. Hasenclever, P. Mayer and V. Rittberger, *Theories of International Regimes*, Cambridge 1997.

35 Idem, p. 4

36 Idem, p. 137.

37 S.D. Krasner, *Structural causes and regime consequences: regimes as intervening variable*, in: *International organization*, 36/3 (1982), pp. 185-205.

38 Idem, p. 186.

39 D.H. Claes, *What Do Theories of International Regimes Contribute to the Explanation of Cooperation (and Failure of Cooperation) among Oil-Producing Countries?*, ARENA Working Papers WP 1999/12.

40 M.A. Levy, O.R. Young and M. Zürn, *The study of international regimes*, in: *European Journal of International Relations* 1/3 (1995), pp. 267-331.

Two aspects of the concept have to be clarified. First, verification is a part of sub-group of international institutions dealing mainly with arms control and disarmament.

The second aspect of the concept of the verification regimes that is mentioned is its underlying normative core. Levy, Young and Zürn⁴¹ (1995:271) expresses this when they write: “given the basic thrust of regime analysis as a tool for understanding international cooperation and the role of norms in the pursuit of cooperation, there is a need to go beyond merely reutilized or patterned behavior. The principal claim of regime analysis is that states may generate institutions in identifiable issue areas that affect their behavior and foster cooperation, even if short-term interests would dictate deviation”. If the observed cooperation is explained by patterns of complementary interests and underlying distribution of power, regimes have no effect and thus, in such cases, theories of international regimes does not contribute to the explanation of cooperation.⁴²

Even then, turning to traditional regime theories offers no immediate or plausible account for the understanding of the drive and dynamism of verification regime. All three classes of theories – power-, interest-, and knowledge-based – have some potential to contribute in constructing a comprehensive realistic explanation on the discussion of the role of verification in international relations.

4.2. Conclusion of the actual theoretical framework of verification regime

This paper claim that the explanatory factors discussed so far have had an impact regarding the behaviours and drives of states in the negotiation process of the verification regimes but have limited impact to factors related to the structure of the regime, and factors related to the effective implementation of the regime: standards and technologies and constellation of interests among states. Verification standard and technologies are important for the success or failure of arms control and disarmament treaties, or more precise the probability of success or failure of arms control and disarmament treaties.

5. The Theory and Practice of Standards in Verification Regime

One of the major verification issues during the negotiation of bilateral and multilateral treaties of arms control and disarmament is the question of standards of verification. Standards of verification: “absolute”, “adequate,” or “effective,” play a major role throughout the verification process. Standards of verification are not pure, well-defined theoretical concepts but represent a range of purely subjective, conflicting assessments of how much uncertainty in verifying is acceptable.⁴³ For the purpose of this work, table 2 describes the different standards that have been developed by Canadians F.R. Cleminson and E. Gilman⁴⁴ and discusses the most accepted standard of verification “adequate verification”.

41 O.R. Young, *International Governance: Protecting the Environment in a Stateless Society*, Ithaca 1994.

42 D.H. Claes, op. cit., 1999, p. 3.

43 W.F. Rowell, *Arms Control Verification*, Cambridge, Mass. 1986, pp. 73-100.

44 F.R. Cleminson and E. Gilman, *A Conceptual Working paper on Arms Control Verification*, Department of National Defence, Operational Research and Analysis Establishment Report No. R 79, Ottawa, Canada Aug. 1981, pp. 9-11.

5.1. Standards of verification

Table 1: Standards of verification

Standards of verification	Description
Absolute verification	A regime under which no doubt is left in determining treaty compliance. In practical terms, however, the achievement of 100 % verification is unlikely.
Adequate verification	A level of verification intrusiveness sufficient to convince treaty signatories that other signatories cannot cheat in a militarily significant manner without such non-compliance being detected in sufficient time to negate any advantage gained by the violator. In this regime, adequacy would include the ability to respond to possible violation.
Limited verification	In this regime, the limitation in verification capability is defined in real terms and is created by the inadequacy of technology available to contracting parties.
Symbolic verification	A regime in which the verification capability is known in advance to be inadequate through a combination of lack of technology and/or of low probability of compliance.
No verification	A regime in which the treaty or agreement is signed with no provision for verification.

While the concept of adequacy as the logical and attainable verification standard may have obtained multinational support within the United Nations at an earlier date in 1978,⁴⁵ it only won a large consensus with the successful implementation of the INF Treaty. Until President Mikhail Gorbachev led a redefinition of the Soviet conception of their national interest and security,⁴⁶ the USSR refused adequate verification where it included on-site inspection (OSI)⁴⁷ of Warsaw Pact countries on the ground that this constituted “legalized espionage”.

Once the Soviet Union's leadership came to realize the need for reduced defense spending, its attitude toward arms control and verification changed. With arms control set to play a larger role in Soviet security, the desirability of increasing certainty about compliance became increasingly obvious. Consequently, in both the Stockholm Agreement of 1986, which reinforced the importance of confidence and security building measures (CSBMs) and the INF Treaty of 1987, verification regimes including on-site inspections (OSI) were established and operated to the satisfaction of everyone concerned.

The choice of verification standard depends more or less directly on the degree of strategic importance of the agreement proportional to the technical capabilities of the verifying countries – the military cost of inadequate verification and the political costs of cheating.⁴⁸ Assessments of these three elements vary according to perceptions of each party about the other, assumptions about the state of relations between the parties and perceptions of the domestic political elements within each party. On these criteria then, verification can be said to be a process of determining

45 See First UN Special Session on disarmament (UNSSODI) paras 31-91-92 of final document, May-July 1978.

46 For a historical view of USSR policy on Verification see R. Timerbayev, *Control of Arms Limitation and Disarmament*, Moscow 1983.

47 MacEachin identifies the “defining objective” of on-site verification as denying “a potential treaty violator the means for concealing proscribed programmes under the cover of legitimate activities” thus highlighting a third function of verification, namely deterrence. D. MacEachin, *Routine and challenge: two pillars of verification*, in: The CBW Conventions Bulletin 39 (March 1998), pp. 1-3, available at www.fas.harvard.edu/~hsp/bulletin/cbwcb55.pdf.

48 I. Bellany, *How Much Verification?* Unpublished manuscript (1990) and author's interview at the University of Lancaster May 1990.

compliance with the terms of an arms control agreement to the extent deemed adequate to safeguard 'national security'.⁴⁹

The term, as defined by Richard Nixon relates to the ability to “identify attempted evasion if it occurs on a large enough scale to pose a significant risk, and whether we can do so in time to mount a sufficient response.”⁵⁰ The term also appears in the Basic Principles of Negotiations in 1973.⁵¹

Today there is a general appreciation of the fact that *less than adequate verification discredits the arms control process*. The Geneva Convention of 1925 prohibiting the use of chemical agents in war contains no measures to aid verifiability and no procedures for dealing with allegations of such usages. There is little doubt in anyone's mind that chemical agents and toxins have been used in Vietnam, Cambodia, Laos, in the Iran-Iraq war and elsewhere. Any number of rationale for avoiding the Convention have been found, with the result that it has lost what little influence it had as a statement of international norms. With only usage in war prohibited – but not testing, manufacturing, or stockpiling – the Convention has basically no validity. It merely acts to encourage creative treaty interpretations and foster disrespect for arms control. The example this may have served should be distinct from mere political statements. In the Strategic Arms Reduction Talks (START I) there is a clear division between the treaty, with every measure verifiable and the attached political commitment to adhere to ceilings on air- and sea- launched cruise missiles (ALCMs and SLCMs) with no verification provisions. The benefit of this approach is that no future suspicion as to violations of these ceilings can be aired without necessarily calling into question the whole START package. When one considers the importance of START's cuts to superpower relations and curbing the arms race, it is of course highly desirable that non-verifiable provisions not be allowed to destroy the remainder.

In arms control or partial disarmament discussions involving the retention of treaty-limited items (TLI), adequacy is now the guiding principle in verification regime-building. From the Contadora Peace Process, through START, the Conventional Forces in Europe Treaty, the Chemical Weapons Convention of 1993, and discussion of a Comprehensive Test Ban Treaty, acceptance of the adequacy concept is allowing arms control to progress.

This acceptance makes the determination of verification provisions more of a practical exercise, rather than simply an item to control the scope and content of negotiations. Adequacy as a principle in no way ensures smooth or simple negotiations of verification provisions; only that the range of debate is considerably narrowed from that of the early 1980's: the “legalized espionage” vs. “iron clad” verification impasse has been replaced by the *determination of what adequacy means in real terms*.

49 Idem.

50 Richard Nixon's instructions to the SALT I negotiating team quoted in M. Krepon, *Arms Control: Verification and Compliance*, New York, NY 1984, p. 38.

51 Agreement on Basic Principles of Negotiations on Strategic Arms Limitation, 21 June 1973 signed by Nixon and Brezhnev Article 4.

In 1988 the United Nation Assembly in its Resolution A/RES/43/81 (B) endorsed sixteen Verification Principles:⁵²

1. Adequate and effective verification is an essential element of all arms limitation and disarmament agreements.
2. Verification is not an aim in itself, but an essential element in the process of achieving arms limitation and disarmament agreements.
3. 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.
4. Adequate and effective verification requires employment of different techniques, such as national technical means, international technical means and international procedures, including on-site inspections.
5. Verification in the arms limitation and disarmament process will benefit from greater openness.
6. 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.
7. 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.
8. 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.
9. Verification arrangements should be addressed at the outset and at every stage of negotiations on specific arms limitation and disarmament agreements.
10. All States have equal rights to participate in the process of international verification of agreements to which they are parties.
11. 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.
12. 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.
13. 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.

52 These Principles were prepared by a Working Group at the 1987 and 1988 sessions of the United Nations Disarmament Commission and endorsed by United Nations General Assembly in Resolution A/RES/43/81 (B), 7 December 1988.

14. 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.
15. Verification arrangements should be implemented without discrimination, and, in accomplishing their purpose, avoid unduly interfering with the internal affairs of States parties or other States, or jeopardizing their economic, technological and social development.
16. To be adequate and effective, a verification régime for an agreement must cover all relevant weapons, facilities, locations, installations and activities.⁵³

5.2. Conclusion on the concept of verification

Arms control and success in verification are too often assumed to be dependent upon goodwill. Decision-makers and publics alike need to know that good arms control agreements with functional verification regimes are possible and maintainable regardless of how much atmospherics vary. The ability of the US and USSR to conclude acceptable and effective verification regimes under the hostile conditions of the Cold War is an example to all. No goodwill existed between Egypt and Israel when the Sinai agreements were signed and implemented. The verification regime was able to cope with each minor violation that occurred so that the demilitarized zone contributed visibly to each country's security. This in turn provided the time and inclination to pursue further improvements in the bilateral relationship, ultimately resulting in a peace treaty.

Verification is thus *clearly not only dependent upon goodwill*, although successful regime operation can have the effect of building goodwill and trust. Should relations deteriorate as a result of other matters the arms control process itself might slow or stop. The proven verification regimes in place, however, serve to deter states from allowing the deterioration to spill over into a regularized part of the relationship. Unless the deterioration is so severe as to result in treaty abrogation, areas covered by the treaty could remain verifiably unaffected.

Verified treaties can thus serve to limit military competition even in time of poisoned relations, limiting the damage to mutual security and making it easier to steer the relationship back into a positive direction. The 'tolerated costs' of arms control and intrusive measures should thus not be weighed simply against the expected gains at the time of the ratification, but also against the benefits of having the relevant area of the relationship under verified constraint in any future period of ill will.

6. The Technology of Verification

Technological development, itself responsible for the greater availability and affordability of weapons themselves, is also a critical element in verifying their control. Before examining existing verification regimes, a brief overview of the technological possibilities and their respective qualities and drawbacks is warranted. This section will look at the role of national technical means (NTM) and other cooperative measures of verification. It will examine their strengths and the weakness with respect to the purpose and role of verification regime.

⁵³ UN publications *Verification in All Its Aspects, Including the Role of the United Nations in the Field of Verification* (A/50/377, 22 September 1995).

6.1. National Technical Means

National technical means (NTM) represent the method of verification most commonly used in international agreements thus far. One state verifies that another state is complying without entering the other states territory.⁵⁴ NTM incorporates non-intrusive types of technological ability to observe the activities of another state, including image- and signal- collecting satellites, submarine and air platform observation and signal-collecting abilities. Technical means include seismic detectors, nuclear radiation detectors, radio waves, radar, and visible infrared light.⁵⁵

However, as their name implies, NTM are those of individual states and while this trait may have offered more credibility to their inclusion in bilateral regimes, their unilateral ownership is a contentious – or potentially so – issue within multilateral regimes.

NTM can be roughly divided into two forms of intelligence gathering: IMINT (image intelligence) and SIGINT (signals intelligence).

IMINT primarily refers to observation satellites⁵⁶ that transmit collected data to ground-based receiving stations and to the abilities of national intelligence agencies to process and interpret this data. The spacecraft may carry a variety of sensors and in some cases carry equipment to record data, but in general this information is passed on in digital form to the receiving station where it is converted, interpreted, and even enhanced through the use of other information sources and previously recorded images.

Satellites can collect useful images of the Earth's surface through many means, active and passive, and in much of the electromagnetic spectrum, from shorter-than-ultraviolet wavelengths through thermal infrared and reflected radar waves. Many features may be considered in characterizing the usefulness of a satellite imaging system (inclination, revisit time, spectral sensitivity, and imaging capacity, for instance), but resolution is one of the most commonly invoked. Discussions of resolution can quickly become highly complex; for present purposes, however, it can be understood as the minimum separation between two similar objects needed for an imaging system to distinguish the objects as two rather than one.⁵⁷

54 S. Lubensky, *Verification of Transparency Treaties*, University of Pennsylvania Model United Nations Conference, Philadelphia 2000 and A.S. Krass, *Arms Control Treaty Verification*, in: R.D. Burns (ed.), *Encyclopedia of Arms Control and Disarmament*, Vol. 1, New York, NY 1993.

55 Radar is based on radio waves, infrared light is not visible, I would suggest the following technical means: seismic detectors, nuclear radiation detectors, optical surveillance, radar, radio surveillance.

56 Only six countries – France, the People's Republic of China, India, Japan, Russia and the United States – currently operate remote – sensing satellite systems.

57 Presidential Directive 23 (PDD 23), issued in 1994, states that dissemination of imagery with resolution of one meter or less might be harmful to U.S. national security. J.T. Black, *Commercial Satellites: Future Threats or Allies?*, in: *Naval War College Review* 52/1 (Winter 1999). For a more detailed discussion on satellite imagery and the technical aspects of resolution measurement, see A.M. Florini, *The Opening Skies: Third-Party Imaging Satellites and U.S. Security*, in: *International Security* (Fall 1998), pp. 103-23, and Gupta, pp. 94-125. PDD 23 has never been published in its entirety, but a press release discussing policy based on it is available at www.pub.whitehouse.gov/urries/12R?urn:pd:oma.eop.gov.us/1994/3/11/3.text.1. For a

Generally, optical and radar sensors are carried on separate observation satellites. For example, the French SPOT, the Indian IRS-1C and the US Landsat have optical sensors only while the European ERS and the Japanese JERS series of satellites and the Canadian Radarsat carry only a radar sensor. While the SPOT satellites carry both panchromatic and multispectral sensors, the range and the spectral resolutions are not as good as those of the US Landsat satellites. However, the latter does not have a panchromatic sensor on board. On the other hand the Indian IRS-1C carries both panchromatic and multispectral sensors, the latter being as good as the Landsat TM sensor with the exception of the thermal IR sensor. The IRS-1C has no thermal sensor. Consider first optical multispectral images only.⁵⁸ The American U-2 flights will increase the speed of the inspections in two ways. First, data will be available sooner. The UN does not have real-time access to satellite data, but the U-2's have large, steerable satellite dishes on top, meaning images could be beamed back live.⁵⁹ The U-2's camera will provide 15 cm resolution – about the size of a petri dish – and can sweep up swathes of imagery, 120 km wide and many hundreds of kilometers long. The commercial imagery that commentators believe UN weapons inspectors are using at present, has 100 cm resolution – if they can afford it. A single set of commercial images covering Iraq costs about \$10 million.

The value of these images in interpreting data is primarily contingent on the resolution of the image, defined as the distance two objects must be from one another to appear distinctly in the image.⁶⁰ Depending on the type of sensor used, the resolution of an image can be contingent on the level of technology, the height of the platform, and environmental conditions.

The idea of the use of commercial observation satellites is becoming very attractive because the quality of such satellites has improved by a factor of at least 80 and it continues to improve. In 1998 of the over 2,400 satellites in Earth orbit, only about one hundred are operated by nongovernmental organizations or private companies.⁶¹ That situation is changing: in 2008 as many as a thousand more commercial communication satellites will be placed into orbit.⁶² Commercially available images are intent on providing the highest-resolution images that money and technology could allow.⁶³ They are rapidly driving their systems to one-meter resolution and while US military satellite capabilities are not public, it is certain that resolution capabilities are well below one meter.

discussion of PDD 23, see B. Sweetman, *Spy Satellites: The Next Leap Forward*, in: Jane's International Defence Review (January 1997), p. 30.

58 B. Jasani, *Role of Satellites in Arms Control Monitoring by Year 2000 and Beyond*, Paper presented at the ESARDA (European Safeguards R&D Association) Symposium, Montpellier, France, 13-15 May 1997.

59 D. Carrington, *Spy planes "significant" boost to weapons inspections*, in: New Scientist (February 17, 2003).

60 Technically speaking, spatial resolution is the ground area displayed in a single pixel (picture element).

61 U.S. Space Command, "Satellite Boxscore", 14 January 1998, available at www.spacecom.af.mil/usspace/boxscore.htm (18 January 1998).

62 R. Ropelewski, *Satellite Services Soar*, in: Aerospace America (November 1996), p. 26.

63 J.T. Black, *Commercial Satellites: Future Threats or Allies?*, in: Naval War College Review 52/1 (Winter 1999).

According to Miasnikov,⁶⁴ due to modern commercial satellites capability of taking pictures of any place on the globe with a resolution sufficient the NTM capabilities have grown in the meantime.⁶⁵

Remote-sensing satellites⁶⁶ offer the possibility of collecting images in many parts of the electromagnetic spectrum, each of which may have a particular attraction or weakness depending on the verification task. Within the range of *visible and reflected infrared light*, one can “photograph” a greater range of spectral light than that observed by the human eye. One particularly useful capability is that of distinguishing between healthy vegetation (which greatly reflects infra-red energy) and what might be simply green-coloured camouflage material.⁶⁷

However, because these images are dependent on the use of light already present at the scene, they are of little use for observation at night and are unable to penetrate heavy cloud cover.

Another limitation to images in this range is that the sensitivity of photographic film lessens significantly for longer wavelengths. Very small electro-optical detectors called charge-coupled devices (CCDs) can overcome this problem to some degree. CCDs convert photons into electrical signal forming an image out of “pixels” (picture elements), which can be recorded and restored as a visual image by the data interpreters. These images have the advantage of requiring much less exposure time and because they are directly available in electronic format they are easily transmitted, processed and enhanced by computer.

The thermal infrared range offers the possibility of obtaining images when natural light is not available, at night or under cloud cover. Satellites are equipped with sensors that record amounts of heat energy given off within a given band of wavelengths that is not absorbed by the earth's atmosphere and ozone layer. Thus, images will portray sources of heat that are substantially above ground temperature, including operating vehicles and heated buildings.

Radar measurements can also be made from remote platforms. By artificially illuminating a target with electromagnetic waves, radar can “see” in the dark of night and by employing relatively long wavelengths, it is not seriously impeded by cloud cover. One drawback is that radar would require an antenna several kilometers long in order to collect images of any useful resolution. Synthetic aperture radar (SAR) is able to overcome this obstacle by using the movement of the satellite to mimic the effect of a long antenna.

64 Senior Research Scientist at the Center for Arms Control, Energy and Environmental Studies at Moscow Institute of Physics and Technology, Russia. *Bulletin 21 – Lessons from Control Regimes: U.S.-Russian Nuclear Arms Control. Lessons for a Future Multilateral Verification System*, available at www.inesap.org/bulletin21/bul21art25.htm.

65 International Arms Control, Transparency and Verification in a European-Russian Framework of Cooperative Security Berlin (Germany), January 24-26, 2003.

66 B. Jasani, *Role of Satellites in Arms Control Monitoring by Year 2000 and Beyond*, Paper presented at the ESARDA (European Safeguards R&D Association) Symposium, Montpellier, France, 13-15 May 1997: Information derived from imaging radar, such as a synthetic aperture radar (SAR), is very different from that obtained from optical sensors. This is because a SAR is particularly sensitive to the geometrical characteristics of the surface and the object being monitored as well as to their dielectric properties.

67 T.M. Lillesand and R.W. Kiefer, *Remote Sensing and Image Interpretation*, 2. ed., Wiley 1987, p. 55.

SAR has the added advantage in the sense that, the resolution of collected images are not necessarily hindered by higher altitudes.⁶⁸ However, the power requirements for necessary computer functions and for the emission of sufficiently strong radar signals have often been considered prohibitive to conventionally-powered satellites.⁶⁹

A number of SAR sensors are now in orbit operated by various countries. A multi-channel radar exploits the fact that the interaction of microwave beam with matter is influenced by frequency and polarization of a radar beam. The response of the latter to different shapes or scattering elements of an object will depend on the selection of horizontal or vertical polarization. The US SIR-C/X-SAR experiments during April and October 1994 generated such multi-parameter SAR data from space. The greatest advantage of a SAR sensor is its ability to provide all-weather day and night information.⁷⁰

Signals intelligence satellites (SIGINT) are designed to detect transmissions from broadcast communications systems such as radios, as well as radars and other electronic systems. The interception of such transmissions can provide information on the type and location of even low power transmitters, such as hand-held radios. However, these satellites are not capable of intercepting communications carried over land lines, such as under-sea fibre optic cables (nor can they detect non-electronic communications, such as the spoken word).

SIGINT is a second category of NTM, and consists of several categories. Communications intelligence (COMINT) is directed at the analysis of the source and content of message traffic. While most military communications are protected by encryption techniques, computer processing can be used to decrypt some traffic, and additional intelligence can be derived from analysis of patterns of transmissions over time. Electronic intelligence (ELINT) is devoted analysis of non-communications electronic transmissions. This would include telemetry from missile tests (TELINT), or radar transmitters (RADINT).

Commonly known for its reconnaissance uses during World War I and II, SIGINT can be a valuable tool for the verification of arms control agreements because access to both communications and electronic signals would provide clear signals in the case of any covert weapons development or testing.⁷¹

SIGINT can be evaded by encrypting transmitted signals or by recording them and dropping them to designated receivers without transmitting through the air. However, the SALT agreements set a precedent that included a facilitating agreement not to evade SIGINT in these ways. It has become a general standard that encrypted signals, if proven to pertain to a treaty-limited arms system, are a sure sign of illegal activities.

68 When images are made from a position directly vertically above a target, resolution actually increases with distance above the ground.

69 The US Lacrosse radar satellite, launched in December 1988, has perhaps disproved the accepted conclusions that SAR would require a nuclear power sources. Lacrosse is suspected to collect images below 1 meter in resolution. See R. Kokowski, *National Technical Means*, in: R. Kokowski and S. Koulik (eds.), *Verification of Conventional Arms Control in Europe: Technological Constraints and Opportunities*, Westview Press 1990, p.20-23 and J.T. Richelson, *America's Secret Eyes in Space*, New York 1990, p. 218-228.

70 Jasani, op. cit., 1997.

71 Data from a weapons test is normally transmitted via radio waves.

This description of NTM capabilities in the verification context is not comprehensive, but it does suggest some unique assets to this means of verification.

First, they offer global coverage, as well as the possibility of focusing on particular areas through the use of satellites in geostationary orbits.

Second, “downlinking” satellites makes the collected data available for analysis in *near-real time*.

Third, the use of satellites for verification purposes is an accepted principle that is not considered a violation of national sovereignty.

Thus data collection can take place wherever and as often as desired without the sensitive process of requesting access. Lastly, the secrecy in which the information are held, the exact capabilities and specific operating procedures for satellites means that “inspected” states are unaware of how they are being observed and thus less likely to be able to avert detection of any particular activity.⁷²

6.2. Aerial overflights

Less intrusive than on-site inspections and less expensive than NTM,⁷³ “aerial overflights can be used where resources or circumstances prohibit the use of ground inspections or ATM, but they work most effectively in conjunction with other methods.”⁷⁴

The signature of the Open Skies Agreement has highlighted the possible uses of airborne verification technology, in particular the cameras and sensors permissible under an agreement and the freedom to fly over land at a given altitude.

Political factors emerging during negotiation of this type of verification regime determine the constraints on the technology. For example in Open Skies treaty negotiations, fears regarding the collection of data unrelated to arms control treaties dictated the amount of time an airplane may spend over a given piece of ground and common level of technological development and budget constraints determined the selection of equipment mentioned in the treaty. However, a broad array of aerial overflight technologies exists and suggests the flexibility of this method.

Several types of cameras exist for this purpose. Optical cameras can be bought “off-the-shelf”, providing a simple and inexpensive means of collecting high resolution images, subject only to the constraints of altitude from which the photos are taken,⁷⁵ atmospheric and light conditions, and film processing quality. Framing cameras take pictures vertically, limited area coverage being compensated by flying back and forth in a grid-like pattern to cover every piece of ground.

72 F. Partlow, Jr., *The Verification Triad*, in: M. Krepon and A.E. Smithson (eds.), *Open Skies, Arms Control, and Cooperative Security*, New York 1992, pp. 55-56.

73 To be clear, the aerial platforms are less expensive to build and operate than artificial satellites, although it is likely that satellite imagery can be offered at a price competitive with that of aerial imagery.

74 J.P. Tracey and A.E. Smithson, *Sensors and Platforms for Aerial Overflights*, in: Krepon and Smithson, (eds.), *opt. cit.*, 1992. See also J. Altmann, *The Potential of Technology for the Control of Small Weapons: Applications in Developing Countries*, in: SAND98-0505/16, July 2000, p. 13.

75 Resolutions from a few inches to one foot are possible from a height of 1000 to 3000 feet, *Ibid.*, p. 74.

Three-dimensional stereoscopic images can be produced by combining the first vertical photo with one taken from a different angle, allowing accurate height measurements of objects on the ground. Oblique cameras are pointed at a non-vertical angle allowing greater area coverage, but producing different scales and levels of resolution for different parts of the image. Panoramic and multi-lens cameras produce images for a 180 degree area below the plane.

Multispectral cameras, infrared sensors, and radar sensors are more expensive than their optical counterparts but offer the same advantages during overflights that they do for NTM images but with the added bonus of a much lower altitude and thus much higher resolution.

Remote air monitoring is possible by sampling and analyzing air from different points above the ground. Air samplers allow particle collection or “precipitation scavenging” – the collection of cloud droplets, rain or snow. New cryogenic samplers, for example, allow the collection of whole air samplers without concentration. Then with various analysis techniques, it is possible to determine the presence or level of toxins in the sample and weather patterns are analyzed to track the location of any toxin's source.

6.3. On-site inspection technology

To describe all of the instruments useful for the conduct of an on-site inspection would be an overly ambitious project. First, on-site inspections vary significantly in *technical difficulty*. In many cases, the task is only to observe the destruction of an item, something that may require only a set of binoculars and a clipboard, such as in some inspections within the Conventional Forces in Europe Treaty (CFE). In contrast, an on-site inspection to verify the absence of a small, mobile item or small amounts of a banned substance in a certain area may suggest the need for a more sophisticated array of instruments.

However, the choice of verification technology made within each regime is contingent not only on technical qualifications but also on the *political and financial perspectives* of the parties. In many cases, the parties' perceptions of adequate verification stops short of the technological possibilities available. The added cost-be it monetary cost or the loss of privacy incurred by further intrusiveness- involved in the use of high tech instruments is deemed higher than the value of the additional confidence in the verification task. For this reason, several designs which exist for verification instruments have never been implemented in an actual regime.

The most common technologies used for inspections are, thus, simple instruments whose uses need no explanation: cameras, tape recorders, rulers, flashlights, binoculars, X-ray devices, etc. In some cases, the manner in which these may be used is limited by prior agreement. Locks and seals are also common items which are valuable because they can be examined for tampering or any other signs of illegal access.

Tags are another type of technology that can prove very useful to verification projects, but have not as yet been included in any agreements. A tag marks an object uniquely. A seal or a lock links two objects. Both indicate whether an object has been tampered with. There are many different forms of tags, seals, and locks.⁷⁶ Tags and

⁷⁶ See, for example U.S. Department of Energy, Office of Arms Control and Nonproliferation, *Verification Technologies*, Washington, DC 1992.

seals are currently being considered for use in securing key elements associated with the Chemical Weapon Convention, weapon dismantlement, and the containers designated to transport and store U.S. and Russian special nuclear material.⁷⁷ In general, suggested tagging systems would include some kind of label for each treaty-limited item (TLI), along the lines of the serial numbers that are now used to identify the different items in CFE dismantlement projects. Once a tagging system is implemented, any untagged or improperly tagged item that is discovered is clearly a treaty violation.

Even small random samples chosen for inspection would statistically offer high chances for detecting a violation.⁷⁸ The advantage of more sophisticated tagging technologies is that, unlike most painted-on numbers, they can be designed to prevent counterfeiting, “spoofing”, or unobserved tampering. “Fingerprint” tags, such as those developed by the Argonne National Laboratory and Sandia National Labs would create a unique signature for each TLI, so that chances of detection would reach 98% for even a minor violation at a single site.⁷⁹ Electronic tags could even be given the capability to emit signals so that they might be read by inspectors from a distance of several meters or even by airborne sensors, decreasing the intrusiveness of inspections. The possibilities are endless⁸⁰ and vary in price according to their level of sophistication. While not yet implemented in an active verification regime, these products are being marketed and will continue to emerge as choices in future verification efforts.

6.4. Perimeter or portal monitoring

Ground sensors placed at strategic points, such as entry and exit points to a facility; offer an efficient and non-intrusive method of verification. Perimeter monitoring scouts prohibits traffic at a given installation and can be verified by simply sealing unguarded entrances and checking soil for vehicle traces or it can be monitored with more costly, yet still simple technology such as infrared detectors, television cameras, pressure-sensitive cables, seismic sensors, short-range radar or light/microwave beam interruption devices – all of which are commonly used in civilian security systems.

Point controls can regulate the traffic through a certain point, for example to insure that treaty-limited items are not being covertly transported.⁸¹ Objects can be monitored to ensure that all traffic passes through given points and then various techniques are available to verify the contents of that traffic. Simple weighing stations can be used to indicate vehicles that contain items of a suspicious size and weight. Geophones, or ground vibration sensors, can be installed to insure that this type of sensor is not circumvented. An induction loop built into a road surface can

77 Sandia's Nonproliferation and Counterproliferation Programs, FactSheet 13.

78 For example, according to one calculation the probability of detecting a single violation in a sample of 20,000 tanks at 50 different sites within one year would be 50%. See S. Fetter and T. Garwin, *Tagging*, in: *Verification of Conventional Arms Control in Europe*, op. cit., p. 143.

79 Ibid.

80 For a more detailed description of existing tag designs, see P.M. Lewis, *Technological aids for on-site inspection and monitoring*, in: J. Grinn and H.v.d. Graaf (eds.), *Unconventional Approaches to Conventional Arms Control Verification*, New York 1990, pp. 223-241.

81 For example, the INF Treaty employs portal monitoring at production plants to ensure that given categories of missiles are being transported from the facility.

detect the type and length of a vehicle, which will cause changes in loop inductivity as the metal axles pass above.

Likewise, pressure-sensitive cables can measure axle weight as a vehicle passes. Light-beam interruption devices can sense the profile of a vehicle and closed-circuit TV cameras can be used to record an image of any passing vehicles.

If any suspicious vehicles are discovered, verification would have to become more intrusive. Either the vehicle could be opened to authorized inspection, which would generally involve further measurements of the items being transported or X-raying devices can be used to gather further information about the contents.⁸²

6.5. Monitoring underground explosions

Various types of underground sensors possess specific relevance to the verification of nuclear test bans or limitations. Based on the same equipment used to evaluate the severity of earthquakes, this technology can be used to verify the size or occurrence of nuclear test explosions by placing sensors within strategic distances of suspected or known test sights. These sensors measure the seismic waves that radiate from underground explosions, using either seismic or hydrodynamic methods to determine the size of a given explosion.

Seismic monitoring involves the measurement of underground waves at seismic stations (observatories) and the comparison of recorded data with known geological conditions at the estimated site of explosion to determine the source and size of an explosion. “Teleseismic surface waves” travel along the Earth’s surface and can be recorded from over 2,000 kilometers away while higher-frequency “body waves” travel within the Earth’s crust and outer layers are observable over shorter distances such as from “in-country” seismic stations.

Hydrodynamic measurements, known by the acronym CORRTEx⁸³ can estimate the source and size by observing the velocity of a seismic shock wave in the rock in the immediate vicinity of an explosion. CORRTEx measurements require the placement of a cable in a “satellite” hole very close⁸⁴ to the actual emplacement of the nuclear explosive. This type of measurement is far more intrusive because it requires the presence of observers and equipment so near to the test site and can reveal sensitive data about the explosive device itself. Meanwhile CORRTEx is unable to detect the occurrence of an undeclared explosion because the site must be known ahead of time. However, CORRTEx may be more precise than seismic monitoring in verifying accurately very low yield explosions.

6.6. Conclusion on the role of technologies in verification regime

Not every one of the technologies described above is applicable to every regime, nor is any single method necessarily a *sufficient* means of verification. However, as will be seen in the description of existing verification regimes, combinations of verification methods, legal provisions and institutional frameworks seek to reinforce the accurate interpretation of collected data. This layering of technological means and supporting treaty provisions is known as *synergism* and is a critical element to the success of any verification regime.

82 Such as the Cargoscan X-ray at the Votkinsk missile production facility within the INF regime.

83 Continuous Reflectometry for Radius versus Time Experiments.

84 Within 25 meters of the site of a 150 kiloton explosion.

Chapter 2 Frameworks of Verification: From Bilateral to Global

So far the examples used to describe the role of politics and the definition of adequate verification have been limited primarily to bilateral agreements between the United States and USSR. That two countries as antagonistic as these during the Cold War can make highly intrusive verification regimes work supports the credibility of verification regimes in many other areas of disarmament and in other parts of the world.

As will be shown the number and character of participants and negotiation fora is as numerous and diverse as the objects of verification:

Treaties concluded in the bilateral, East-West forum of negotiations such as the SALT accords, the INF Treaty, START II, and I and the Test Ban treaties demonstrate the evolution of verification regimes in one complex rivalry.

Multilateral regimes, such as those established for the Nuclear Weapon Free Zones in Antarctica, the Sea Bed, and Outer Space, for the Non-Proliferation Treaty (NPT) and the Chemical Weapons Convention (CWC) offer examples of a global definition and the practice of international verification.

The realm of regional agreements suggests the applicability of verification principles and practice in nearly every area of the world and in many different forms including bilateral regimes, regional organizations, and third-party arrangements.

The broad span of UN activities, marked particularly by the activities of UNSCOM: monitoring and verification of Iraq in order to assure that Iraq did not reconstitute or retain its prohibited chemical and biological weapons and missiles with a range greater than 150 kilometres.⁸⁵

Finally the multiple export control regimes exemplify the need for and advantages of a layered approach to verification.

The following chapters will discuss the development of existing verification regimes within bilateral, multilateral, regional, and UN frameworks and will show the strengths and weaknesses of various methods and institutions within these regimes.

1. Bilateral Verification

The ancient roots of the concept of verification were noted in the introduction and later chapters on multilateral and regional agreements will indicate that modern ideas of monitoring compliance with agreed principles are by no means limited to the context of bilateral superpower agreements. However, the recent history of verification does in many ways parallel the chronological developments of

85 By resolution 715 (1991) of 11 October 1991, the Security Council approved the Plan for establishing such monitoring in the chemical, biological and missile areas. Two reports drawn up by the Special Commission: one on the current state of affairs with respect to the disarmament of Iraq's proscribed weapons; the other on ongoing monitoring and verification in Iraq, 25 January 1999. The mandate of UNSCOM, as described in resolution 687, included: Carrying out on-site inspections of Iraq's chemical, biological and missile capabilities; Taking possession of Iraq's CB weapons and all stocks of agents, all sub-systems and components, and all research, development, support and manufacturing facilities, and to destroy, remove or render harmless of all these items; Supervising the destruction by Iraq of all its ballistic missiles with a range greater than 150 km together with related major parts; To undertake the further monitoring and verification of Iraq's compliance its unconditional obligation not to use, develop, construct or acquire any of the above mentioned weapon categories.

superpower arms control. Rapid technological progress in verification technology, in great part motored by the arms race and consequent attention to sophisticated weapon technology, as well as the backing of the two states with a virtual monopoly on global political power have opened the door for the formal elaboration and implementation of verification regimes.

Many aspects of today's extensive verification regimes were first made acceptable through bilateral agreements.⁸⁶ Partly, this is because the weapons limited by early arms control agreements were the exclusive possessions of the United States and Soviet Union. More importantly the bilateral format allowed the two parties to keep a tight rein on the negotiations over their nuclear weapons, the most critical elements of their national security strategy. No *other* format would have been acceptable.

Whether the evolution of bilateral verification provisions – from mere recognition of national technical means of monitoring compliance to complex and intrusive on-site inspections – was a recognition of mutual interest in confidence that agreements were being upheld or was a diplomatic “accident” that found both parties surprised that the other was accepting such extensive proposals, they established precedents. Just as the collapse of the Warsaw Pact and the end of the Cold War may be seen as stepping stones to a “new world order” based on multilateralism and globalism, the concepts established in the SALT, INF, START and Test Ban talks can be seen as stepping stones in the broadening application of principles of verification.

While the era of bilateral agreements between two nuclear-armed superpowers seems to have expired, the complex arms control environment left in its place still derives valuable lessons from the successes and failures of the original efforts to limit strategic weapons.

1.1. Strategic Arms Limitation Talks (SALT I, ABM Treaty and SALT II)

The SALT Agreements imposed the first ever actual limits on strategic hardware and thus mark the first time the two hostile superpowers broached the subject of “effective” verification of each other's treaty compliance. The regime that was established can be considered the first step in the development of the bilateral approach to verification and the lessons learned have been reflected in the development of subsequent regimes. Of SALT Agreements,⁸⁷ actually a series of documents signed during the course of the 1970's, one speaks most often of three of the accords:

1. The 1972 ABM Treaty – accompanied by its 1974 Protocol – placed numerical and qualitative restraints on ballistic missile defense systems and technology for an indefinite duration.⁸⁸
2. The 1972 Interim Agreement – together with the ABM Treaty, known as SALT I – imposed a five-year quantitative limit on each of the superpowers'

86 See G.T. Allison, O.R. Cote Jr., R.A. Falkenrath, *Avoiding Nuclear Anarchy*, in: *The Washington Quarterly*, 20/3 (1997), pp. 185-198. See also, J. Cirincione, *New Initiatives toward a world with fewer nuclear weapons*, in: *disarmament forum* 20/2,3 (1997), pp. 18-31.

87 G.C. Smith, *Disarming Diplomat: The Memoirs of Gerard C. Smith, Arms Control Negotiator*, Lanham, MD 1996, pp. 174-175. Treaty details from U.S. Arms Control and Disarmament Agency, *Arms Control and Disarmament Agreements*, Washington, DC 1996.

88 The 1972 Treaty limited the USA and USSR to two ABM systems each, this number was then cut to one each in the 1974 Protocol. Moreover, the parties are not permitted to test or operate any other system in a manner that serves the purpose of ballistic missile defences.

intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs) or more precisely on their launchers.

3. The 1979 SALT II Treaty limited the number of total strategic missile launchers and warheads or re-entry vehicles per missile. Although it was never ratified and legally brought into force, both parties respected their obligations until at least 1986.⁸⁹

Table 2: Strategic Nuclear Arms Control Agreements

	SALT I	SALT II
Deployed Warhead Limit	Limited Missiles, Not Warheads	Limited Missiles and Bombers, Not Warheads
Deployed Delivery Vehicle Limit	U.S.: 1,710 ICBMs & SLBMs; USSR: 2,347 ICBMs & SLBMS	2250
Status	Expired	Never Entered Into Force
Date Signed	May 26, 1972	June 18, 1979
Date Entered Into Force	October 3, 1972	Not Applicable
Implementation Deadline	Not Applicable	December 31, 1981
Expiration Date	October 3, 1977	December 31, 1985

Verification provisions of the three are based on the use of national technical means and a common framework of consultation, but there are differences between the various agreements that reflect the technological and political environments in which they evolved, and in the case of SALT II, the experience drawn from its preceding agreements. The Strategic Offensive Reductions Treaty

(SORT) known as the Moscow Treaty concluded by United States and Russia, on 24 May 2002 has no verification provisions.

1.2. SALT Verification regime

1.2.1 Characteristics of the verification regime

The SALT verification regime rests solely on the use of "*national technical means*" (most importantly, satellite observation and SIGINT⁹⁰) to monitor treaty compliance. While the purpose of the SALT talks was to limit the number of strategic nuclear missiles in each party's possession, the agreements actually focused on the number of launchers for these missiles. The launchers being a much larger object and much more difficult to conceal, yet essential to the use of any strategic missiles, national technical means were agreed to be a sufficient way of monitoring the numbers and locations of these missiles. The legitimacy of NTM as the sole method of verification was strengthened by two significant factors.

First, a mutual understanding had long existed between the US and USSR as to the acceptability of satellite monitoring of national territory. Unlike aerial reconnaissance, remote sensing is not considered a violation of national sovereignty and thus has the benefits of being a highly "unintrusive" means of verification.

Second, "*rules and principles*" were established for the implementation of the treaty in order to increase the verification abilities of NTM. Memorandums of Understanding were attached to each treaty specifying agreed definitions of treaty limited items, including the stage of production at which limitations begin to apply.

89 In 1986, President Reagan announced that in response to alleged Soviet violations, the US would no longer consider itself bound by the SALT I or II agreements, with the exception of the ABM Treaty.

90 "Signals intelligence" will monitor military communications in the Soviet Union.

Counting rules specified agreed methods for tabulating the number of missiles held by a party by relating them to an easily observable item. For example, a silo observed by NTM was considered to contain the maximum number of missiles it could hold and counted towards aggregate totals accordingly. *Notifications* were required of certain activities, such as ICBM launches.⁹¹ Functionally-related and externally observable *design features* were required to distinguish between “look-alikes”, those objects limited by the treaty that closely resemble an unlimited item. In this way, prior agreement to principles, allowed assumption (as long as they were not proven wrong) to compensate for dependence on a limited number of monitoring methods.

Importantly, these rules and principles were placed in attached Agreed Statements and Common Understandings separate from the accords. Under SALT I they were thus unsigned and not legally binding; SALT II derived lessons from this ambiguity and incorporated even more detailed wording, this time signed and binding. One particular issue made this accomplishment significant. During the 1970's a huge debate had erupted over the Soviet encryption of telemetry during missile test flights, with the US insisting that this was a violation of the SALT principle against “deliberate concealment measures which impede verification” of compliance by NTM and that failure to resolve the issue would jeopardize Congressional ratification of the treaty.⁹²

The creation of a *Standing Consultative Committee*⁹³ (SCC) is a second innovation of the SALT verification regime which has had a profound effect on bilateral and multilateral approaches to verification. The SCC is a joint body made up of delegates from each of the two parties and a staff as considered necessary, meeting as requested by either party but at minimum twice a year. It has no legal or jurisdictional authority but rather derives its power from the consensus it seeks to establish between the two governments. As negotiator Gerard Smith described it: “Its general purpose is to make the agreements more viable, by clearing up ambiguities which were expected to crop up as the agreements are implemented – and so it has.”⁹⁴ SCC business is conducted in private, encouraging “serious negotiation and the resolution of disputes by allowing sensitive issues and ideas to be realized in the absence of public pressures”⁹⁵ and until autumn 1992, all proceedings and documents remained classified.⁹⁶

91 G.C. Smith, op. cit., 1996, pp 174-175, see also S. Talbott, *Endgame: The Inside Story of SALT II*, New York 1980.

92 See S. Talbott, *Scrambling and Spying in SALT II*, in: *International Security* (Fall 1979).

93 The SCC is described by Article XIII of the ABM Treaty, Article VI of the Interim Agreement, as well as Article XVii of SALT II. The Accidents Agreement of 1971 was also placed within its scope.

94 G. Smith, *Doubletalk*, New York 1988, p. 99.

95 J. Boulde, *Bilateral Nuclear Agreements: The Standing Consultative Commission and the Special Verification Commission*, in: E. Morris (ed.), *International Verification Organizations*, Centre for International and Strategic Studies, York 1991, p. 205.

96 Paragraph 8 of the SCC regulations maintained the confidentiality of SCC proceedings and documents to protect sensitive information. For example, the Soviets were particularly concerned that the dismantlement guidelines could reveal sensitive information relating to the design of Soviet ballistic missiles. This became a great issue of contention under the Reagan Administration when compliance issues were made public. The SCC session in autumn 1992 reinterpreted Paragraph 8 intention as protection of discussions related to sensitive issues, but declassified the results of SCC activities, making public several key documents. See S.N.

1.2.2 Evaluation

The achievements of the SCC however are mixed. While thought to have played a valuable role during the 1970's, it encountered difficulties after 1979. Between 1973 and 1978, the SCC was successful in outlining procedures for dismantling systems and mediating several compliance disputes; the minor nature of these disputes is perhaps a credit to the crisis-mediation of the organization. The SALT II agreement actually expanded the role of the SCC, by making it responsible for an agreed database on numbers of strategic offensive arms.

The election of Ronald Reagan as President of the United States on a platform attacking the "fatal flaws" of SALT II marks the degeneration of SCC consultation. Although the role of the ABM Treaty and role of the SCC were upheld at the 2nd review conference in 1982, a US 1984 law began mandating an annual report to Congress on possible cases of Soviet non-compliance. Making Soviet compliance a high-priority, high-publicity issue, Defence Secretary Caspar Weinberger described the SCC as "a diplomatic carpet under which Soviet violations have been continuously swept, an Orwellian memory hole into which our concerns have been dumped like yesterday's trash."⁹⁷

Finally on May 27, 1986, Reagan announced withdrawal from SALT I and II commitments.⁹⁸ "The new atmosphere of public accusation coupled with official unwillingness to use the SCC effectively led the forum into a period where it was viewed negatively from without and was deadlocked from within."⁹⁹ While the SCC remained officially responsible for the ABM Treaty, the US refused to discuss interpretation issues there, plagued as these were by the recent US announcement of the "Star Wars" research on a space-based missile defense system and the now-admitted Soviet violation at Krasnoyarsk. These issues have since been taken up in relation to the Strategic Arms Reduction Talks.

The evident conclusion from the SALT experience is that while verification technology, carefully constructed treaty provisions, and mechanisms of mediation all contribute to a competent regime, the bilateral verification regime is only as strong as each party's political will.

The SCC and verification rules went a long way to maintain a stable regime, but the unresolved issues and ambiguous activities that remained were easily exploited by all those uninterested in controlling arms. The SCC has been criticized for not taking full advantage of its mandate to monitor events and future trends. Nevertheless, the technological capabilities and joint body only function with the backing of the two parties and can be distorted to fit the political will of one or the other. As one

Graybeal and P.A. McFate, *More Light on the ABM Treaty*, in: *Arms Control Today* (March 1993), p. 15.

97 Cited in M.Krepon, *Even Before Iceland, the compliance Machinery was Under Siege*, in: *Washington Post National Weekly Edition*, 27. October 1986.

98 S. Schwartz et al, *Atomic Audit: the Cost and Consequences of U.S. Nuclear Weapons Since 1940*, Washington, D.C. 1998, Table A-2; R.E. Powaski, *Return to Armageddon: The United States and the Nuclear Arms Race 1981-1999*, New York 2000.

99 Boulden, op. cit., p. 210.

Pentagon advisor has noted, “American monitoring capabilities are so good, we're finding violations the Russians haven't even committed.”¹⁰⁰

1.3. Intermediate-range Nuclear Forces (INF) Treaty

The verification regime set up in the context of the INF Treaty (also called the Washington Treaty) eliminating intermediate and shorter range missiles, is a landmark in the development of *intrusive* verification measures. Paradoxically, the Reagan administration hard line against compliance issues that had driven SALT into the ground was the primary impetus to the furthest-reaching, most comprehensive verification system to date.

The INF Treaty entered into force on June 1, 1988. By May 1991, implementation of the Treaty had resulted in the elimination of 846 intermediate and shorter-range U.S. missile systems, including the modernized Pershing II, and 1,846 Soviet missile systems, including the SS-20. The last declared INF missile (a Soviet SS-20) and its transfer vehicle were destroyed on May 28, 1991. However, the ban on the possession, production, or flight-testing of INF missiles remains in force, as the treaty is of unlimited duration. On May 31, 2001, all inspections and monitoring under the Intermediate-Range Nuclear Forces (INF) Treaty ceased.

In a political manoeuvre to block the USSR from establishing an overwhelming superiority of offensive forces in the European theatre by maintaining deployment of SS-20 Intermediate Range Ballistic Missiles (IRBM), Reagan proposed the “zero option”, or complete elimination of INF missiles in the region. When Gorbachev, as part of his “new political thinking” and ambition to stabilize relations with the West, surprised the Administration by accepting not only the “zero-option”, but the inclusion of shorter-range INF (SRINF) forces, the verification issue became the keystone of American negotiating policy and the primary means to control the speed and depth of an arms control agreements whose strategic implications had only begun to be realized.¹⁰¹

The Administration's early support for “iron clad” verification capable of detecting any violation was a certain way of halting any arms control, as Soviets had long shied from the discussion of intrusive verification measures and as “iron clad” would involve an unacceptable level of intrusion and cost while still being subject to imperfect data and interpretation. But with Soviet acceptance of the set of verification principles set forward by Reagan at the Reykjavik summit and eventual endorsement of an “anytime, anywhere” inspection regime¹⁰², this obstacle was removed, and almost by accident one might say, the two superpowers established the basis for “the most stringent verification regime in history”.¹⁰³

100 Cited in: D. Aaron, *Verification: Will it work?*, in: New York Times Magazine (11 October 1987), p. 123.

101 C. Cerniello, *SCC Parties Sign Agreements On Multilateralization, TMD Systems*, in: Arms Control Today, 27/6 (September 1997).

102 See interview with Soviet Deputy Foreign Minister Yuli Vorontsov, in: Karpov Izvestia, FBIS – Soviet Union (23 March 1987).

103 The words of President Reagan at the treaty signature. See *Soviet Union – United States Summit in Washington, D.C., December 8, 1987*, in: Weekly Compilation of Presidential Documents 23 (December 14, 1987), p. 1458.

1.3.1 Characteristics of the INF Verification Regime

A basic, yet critical, aspect of the INF Regime is that like the Treaty, it is *bilateral*. While the choice of the bilateral negotiating framework may not be surprising given the precedent of the SALT Talks, it is remarkable when one considers that the weapons and facilities being eliminated by this Treaty were not all located on national territory. Thus, both signatories, in agreeing to arms cuts and establishing a verification regime, were greatly affecting the military status of their allies and placing obligations on them that included intrusion on sovereign territory and allied military facilities, without involving them in either the negotiation framework or the resulting verification regime. In the Protocol concerning inspections, each Party took responsibilities for the assurances of the “basing” countries to accept inspections on their territory. Separate intra-alliance “basing country agreements”¹⁰⁴ concluded in the week *after* the Washington Treaty, confirmed these countries' consent.

By far, the greatest innovation of the INF verification regime is the *layering* of a *combination of permitted methods*.¹⁰⁵ This layering offers the signatories not only more possibilities of noticing a violation, but also more sources of information to avoid making false accusations.

First, national technical means remain a primary monitoring tool and, like in the SALT Agreements, the Treaty established cooperative measures for enhancing NTM capabilities with respect to certain systems. For instance, to manage the specific problem of similarity between the prohibited SS-20 and permitted SS-25 missiles, the Soviet Union was periodically required to open the sliding roofs of SS-25 shelters in order that they could be examined through satellite observation.

Second, also along the lines of the SALT example, the Treaty requires an initial exchange of baseline information and continuous data exchanges on the technical details of missiles, launchers and supporting equipment and diagrams of designated sites. These exchanges are managed through Nuclear Risk Reduction Centers (described below) and maintained in a common database. The innovative aspect of this information exchange, and likewise the most remarkable novelty of the INF inspection regime is the use of on-site inspections to verify.

On-site inspections (OSI), long rejected by Soviet leaders who held to the protection of military secrecy and hotly debated within the American government, are the third component of INF verification and the most intrusive method ever implemented. Justifying this method in light of the highly publicized American debate over the Soviet treaty compliance record, Defence Secretary Caspar Weinberger stated that it was “absolutely essential that we have something better in the way of verification than we have ever had before ... the ability to go on each others soil and ... look in factories and look at gun sites. You have to have the ability to do what bank examiners do, if we want to be sure.”¹⁰⁶ Meanwhile the Soviets, much to the

104 The Brussels accord was signed between the US, Belgium, the FRG, Italy, the Netherlands and the United Kingdom on 11 December 1987; a parallel Berlin Accord was signed by the USSR, the GDR, and Czechoslovakia.

105 The permitted methods are detailed in Articles IX, XI and XII of the Treaty.

106 Caspar Weinberger on Meet the Press in September of 1986. Cited in: J. Mendelsohn, *INF Verification: A Guide for the Perplexed*, in: Arms Control Today (September 1987), pp. 25-26. See also: J. Dean, *The INF Treaty Negotiations*, in: SIPRI Yearbook 1988, pp. 375-394; R.L. Garthoff, *The Soviet SS-20 Decision*, in: Survival 25/3 (May/June: 1983); J. Haslam, *The Soviet Union and the Politics of Nuclear Weapons in Europe 1969-87*, Ithaca 1990; H.

Americans initial surprise, “aggressively advertised enthusiasm for on-site inspection.”¹⁰⁷ The Soviets invited a group of Congressmen and journalists to inspect the Krasnoyarsk radar site, long suspected as an ABM violation, and participated in a joint seismic monitoring event with the Natural Resources Defence Council – two actions that went far in increasing US confidence that this level of cooperation was possible.

OSI is crucial to the verification of INF compliance because the objects of verification include missiles and canisters less than ten meters long. On-site inspections can provide detailed information from a close-up, literally hands-on analysis. In the end, five different types of inspection were included in the Treaty:¹⁰⁸

Baseline inspection were agreed as a means to verify the accuracy of the numbers given during initial information exchanges.¹⁰⁹ They verified every detail contained in the Memorandum of understanding (MOU) and resulted in further clarifications.¹¹⁰

Elimination inspections were out for any scheduled TLI (Treaty-Limited Item) destruction, all of which were completed in 1990.

Close-out inspections, to be carried out within 60 days of the notified scheduled elimination of INF missile operating bases and support facilities, verified that the dismantling of bases, storage, and support facilities had been conducted in such a way as to end their ability to support INF systems.

Short-notice inspections permit the signatories to examine declared and former missile facilities (except production facilities) for up to thirteen years after the Treaty entered into force to ensure that no sites have been reactivated, no remaining sites are concealing TLIs, and no testing sites or training facilities are being used for evasion.¹¹¹ These inspections, still retaining a degree of “challenge” are not as intrusive as the original “anytime, anywhere” proposals. NTM have been left to ensure against undeclared sites and covert production. Inspection teams may bring linear measurement devices, scales, radiation detectors, and cameras,¹¹² all of which are subject to inspection at the point of entry. At the end of the visit, a report is filed and signed jointly by the inspecting and escorting parties.

Schmidt, *Men and Powers: A Political Retrospective*, New York 1989; S. Talbot, *Deadly Gambits: The Reagan Administration and the Stalemate in Nuclear Arms Control*, New York 1985; U.S. Government Printing Office, *U.S. Fiscal Year 1981 Arms Control Impact Statements*, Washington, DC 1980, pp., 250-251.

107 D. Aaron, *Verification: Will it work?*, in: New York Times Magazine (11 October 1987), p. 39. See also J.P. Harahan, *On-Site Inspections Under the INF Treaty. A History of the On-Site Inspections Agency and INF Implementation, 1988-1991*, Collingdale 1994.

108 The provisions for these inspections are outlined in Article XI of the Treaty.

109 These were carried out between July 1 and Aug 29, 1988. The US inspected 129 facilities in the USSR and Eastern Europe, and the USSR inspected 18 facilities in the US and 13 in Italy, Belgium, Great Britain, the Netherlands and West Germany.

110 Lajoie, *Insights of an On-Site Inspection*, in: Arms Control Today (November 1988), p. 3.

111 Up to twenty such inspections were permitted during the first three years, fifteen per year for the next five years, and ten per year for the last five years of inspection regime.

112 Cameras may only be used with permission, in which case two case photos must be taken and signed by both the inspecting team leader and escort.

Continuous inspections or portal monitoring was permitted by each signatory at one production site for at least three and up to thirteen years, and includes the right to measure all vehicles existing in the facility and inspect the interior of those large enough to contain a banned missile.¹¹³

This impressive and unprecedented array of monitoring and inspection capabilities, is however, only one factor in the success of the verification regime. Two other provisions are equally significant: the agreement to eliminate a whole category of weapons (as opposed to limiting or reducing them) and the added ban on all future flight testing.¹¹⁴

First, by banning the production, storage, and deployment of *all* INF and SRINF, the Treaty made verification simpler¹¹⁵ by reducing the uncertainty involved, for example, in distinguishing the 101st missile when only 100 are permitted. In fact, the initial Reykjavik agreement would have permitted the Soviet Union to maintain 100 INF in its Asian territory, but this provision was modified in order to facilitate more effective verification. After agreeing to a global “zero-zero” option as the new agreement was called, some arms control experts acknowledged that continuous OSI was no longer necessary, but policymakers in both countries continued to insist on it.

Second, by prohibiting testing, the Treaty raised the costs (both financial and to missile reliability) of covertly producing or maintaining the banned missiles, and thus increased the deterrence effect on illegal actions.

The various *institutions* established within the context of INF implementation provide further insight into the strengths and weaknesses of the regime. The Special Verification Commission was set up as a forum for discussion to be convened at the request of either signatory to resolve compliance issues and to agree upon measures necessary “to improve the viability and effectiveness” of the Treaty. Since its creation, the role of the SVC has been questioned. It has an advantage over the SALT SCC because it is not linked to the controversial issue of ABM interpretation and its ad hoc schedule and composition offer greater flexibility. As Paul Nitze indicated, “In light of what we conceive as being the faster reaction time necessary under this treaty, we wanted a commission which could be called on a moment's notice and where you could really discuss such things as immediate, short-notice, on-site inspection ... and where the limitation on their composition and the level, et cetera, would be flexible.”¹¹⁶ The complete elimination of all INF left less need for negotiated interpretations. Yet, the SVC has been criticized as being powerless,

113 The US began portal monitoring inspections at the Votkinsk Machine-Building Plant in Magna, Utah (a former Pershing II facility). See S.I. Griffiths, *The Implementation of the INF Treaty*, in: SIPRI Yearbook 1990: World Armaments and Disarmament, Oxford 1990., p. 447.

114 M.M. Lowenthal, *The Politics of Verification: What's Not*, in: *The Washington Quarterly* (Winter 1991), pp. 23 f.

115 Max M. Kampelman, *INF and Verification: Beyond Politics*, in: *International Review* (August/September 1988), p. 12.

116 Cited in U.S. Congress, Senate Foreign Relations Committee, *The INF Treaty, Report 14, April 1988*, p. 92.

nothing more than a formal name for a bilateral meeting that does not strengthen the cooperative principles.¹¹⁷

In addition to the SVC, each signatory had to establish a national inspection agency. The On-Site Inspection Agency (OSIA), a field-operating agency of the Department of Defence in the USA, was established to manage American verification measures, including a contract awarded to the Hughes Technical Services Company to operate the portal monitoring facility in Votkinsk. As discussed later, the OSIA has since assumed the same function under other verification regimes. In the USSR, a similar agency has been established under the Ministries of Defence and Foreign Affairs. In addition, Nuclear Risk Reduction Centres, established by a bilateral agreement predating the INF Treaty, were delegated responsibility for Treaty-related communications and the maintenance of the common database.

1.3.2 Evaluation of INF Verification Regime

The INF verification regime, above all, demonstrated the value of a *layered* verification regime. NTM continue to play the lead role in providing information¹¹⁸ using the initial exchanges as a basis of comparison, OSI collects information that can increase the detail and confidence in that information, and the JVC consultation forum provides for the low-key mediation of any suspected violations. Even through, States-parties' rights to conduct on-site inspections under the treaty ended on May 31, 2001, the use of surveillance satellites for data collection continues. The INF Treaty established the Special Verification Commission (SVC) to act as an implementing body for the treaty, resolving questions of compliance and agreeing on measures to "improve [the treaty's] viability and effectiveness."¹¹⁹

In addition, the existence of more than one source of information provides political leaders with more leeway to publicize compliance judgements, something that is otherwise limited "because they might not want to reveal the source of the information or the method used to collect it, and because the information collected by NTM usually cannot provide direct evidence without further translation and interpretation."¹²⁰

The success of this progressive arms control regime can also be attributed to the *cooperation* encouraged by the verification regime. On-site inspections are particularly valuable as a confidence-building symbol of improved cooperation, helping to reduce mutual suspicions and tension.¹²¹ Those involved with OSI suggest

117 See S. Sur, *Problems of the Washington Treaty on the Elimination of Intermediate Range Missiles*, Research Paper 2, United Nations Institute for Disarmament Research, October 1988, p. 16-17.

118 A.S. Krass, *On-Site Inspections and INF: What have we accomplished?*, in: *International Review* (August/September 1988), p. 19.

119 *Arms Control, The Intermediate-Range Nuclear Forces Treaty at a Glance*, Fact Sheets, February 2003.

120 US Arms Control and Disarmament Agency, *Annual Report to Congress 1988*, p. 63 – cited in A.F. Woolf, *On-site Inspection in Arms Control: Verifying Compliance with INF and START*, Congressional Research Service, The Library of Congress, November 1, 1989, p. 10. See also J.K. Davis, C.M. Perry and R.L. Pfaltzgraff Jr., *The INF Controversy: Lessons for NATO Modernization and Transatlantic Relations*, Cambridge, MA 1989.

121 See S.N. Graybeal and M. Krepon, *The Limitations of On-site Inspection*, in: *Bulletin of the Atomic Scientists* (December 1987), p. 26.

that the “human factor” – the contact of visiting inspectors with their counterparts – is as important as the verification factor of such visits in building confidence in treaty compliance. The motivation for cooperation is even greater due to the bilateral format of the regime in which the principle of *reciprocity* governs parties' interests. For example, the Treaty does not limit the size of the escorting team that accompanies on-site inspectors. So foreseeably a state concerned about protecting military secrecy or even a violation could reduce the effectiveness of OSI by surrounding the inspectors with numerous vigilant (and thus inhibiting) escorts. But that state would then have to expect a reciprocal lack of cooperation and possibilities of concealment when it inspects the other party.

It is fair to conclude, then, that within INF “verification seems more adequate than effective.”¹²² It meets the interests of the parties in balancing the more secure confirmation of treaty compliance that is provided by a more intrusive regime, with the maintenance of control over sensitive information, which can only be guaranteed under less rigorous procedures. Because “iron clad” (or 100% “effective”) verification can never be achieved and the two parties are satisfied with the degree of confidence obtained in the regime described, one could also conclude however, that the INF regime is a remarkable success for bringing the definition of “adequate” verification so close to “effective”.¹²³ As a result of the INF Treaty, the United States and the Soviet Union destroyed a total of 2,692 short-, medium-, and intermediate-range missiles by the treaty's implementation deadline of June 1, 1991. Neither Washington nor Moscow now deploys such systems.¹²⁴ These events brought to an end a remarkable chapter in arms control verification. During these 13 years a total of 851 inspections were conducted. US inspectors carried out approximately 60 percent of them at 130 sites in Belarus, Kazakhstan, Russia and Ukraine. Around 40 percent were conducted by the other parties at 31 sites in the US and in the five Western European INF basing countries (Belgium, Germany, Italy, the Netherlands and the UK).¹²⁵

Compliance verification was realized through a combination of national technical means, on-site inspections, and continuous portal monitoring. In addition to being the first nuclear agreement to reduce arms delivery vehicles, the INF Treaty was also the first major arms control agreement to establish a verification regime including on-site inspections. In all, the United States conducted 540 inspections and Russia (prior to December 25, 1991-the Soviet Union) conducted 311 inspections as detailed in the table below.

Table 3: Inspection conducted under the INF Treaty.

	United States	S.U. / Russia
Eliminations:	137	109

122 S. Sur, op. cit., 1988, p. 12.

123 J.R. Blackwell, *Contributions and Limitations of On-Site Inspections in INF and START*, in: L.A. Dunn and A.E. Gordon (eds.), *Arms Control Verification and the New Role of On-Site Inspection*, Lexington 1990, pp. 95-120.

124 Arms Control, *The Intermediate-Range Nuclear Forces Treaty at a Glance*, Fact Sheets, February 2003.

125 Office of Public Affairs, Defence Threat Reduction Agency, Washington, DC 2004.

Quotas:	185	141
Closeouts:	101 ¹²⁶	27
Baseline:	117	34
Totals:	540	311

It has been said that the minimal military significance of the INF did not warrant the costly and elaborate verification schemes adopted, but if one looks at the effects that the INF example has had on subsequent bilateral and multilateral arms control agreements, the significance of this regime is far-reaching.

1.4. The Strategic Arms Reduction Talks (START)

The verification regime for the Strategic Arms Reduction Talks (START) can be seen both as the last step to a pattern of increasing rigor and intrusiveness in bilateral agreements, and the turning point for the superpower approach to arms control. The START talks began in the midst of the Cold War and had already achieved many valuable points of consensus by the end of 1989 when events in the Soviet Union and Eastern Europe began to dramatically shake the strategic background for negotiations and the relationship between the two parties. “Thus, when the cold war ended, START had an established negotiating format. Negotiations were taking place within that specific format and only secondarily within an evolving political environment.”¹²⁷ It was estimated that any shift in negotiation objectives risked the loss of what had already been agreed. Thus, the bilateral framework was maintained and in July 1991 Presidents Gorbachev and Bush signed the START I Treaty limiting strategic ballistic missiles, their platforms, and the weapons they carry.¹²⁸ The Treaty reductions are to be implemented over a period of seven years after it enters into force, this time being divided into three phases to create a structured, verifiable process.

126 Includes the closeout inspection conducted at Saryozek, which the Special Verification Commission determined to be invalid; and does not include closeout inspections due to MOU omission (17) and collocated sites (12). Defence Threat Reduction Agency (DTRA). On-Site Inspection Operations, Intermediate-Range Nuclear Forces (INF) Treaty, INF: The Beginning and End of an Era, available at www.dtra.mil/toolbox/directorates/osi/Programs/ops/inf/index.cfm.

127 C.K. Regina, *The START Treaty and the future of strategic nuclear arms control*, in: SIPRI Yearbook 1992: World Armaments and Disarmament, Oxford 1992, p. 16.

128 The START I Treaty consists of the Treaty text, 2 annexes, 6 protocols, one MOU and 12 “associated documents”. Each side is allowed to keep 1600 SNDVs each on ICBMs, SLBMs, and heavy bombers, and no more than 6000 “accountable” warheads with sublimits of 4900 on ballistic missiles, 1100 on mobile ICBMs and 1540 on heavy ICBMs. “Accountable” warheads are determined by the counting rules in Article III.

Table 4: Strategic Nuclear Arms Control Agreements

	START I	START II	START III	SORT
Deployed Warhead Limit	6,000	3,000-3,500	2,000-2,500	1,700-2,200
Deployed Delivery Vehicle Limit	1,600	Not Applicable	Not Applicable	Not Applicable
Status	In Force	Never Entered Into Force	Never Negotiated	Signed, Awaits Ratification
Date Signed	July 31, 1991	January 3, 1993	Not Applicable	May 24, 2002
Date Entered Into Force	December 5, 1994	Not Applicable	Not Applicable	?
Implementation Deadline	December 5, 2001	December 31, 2007	December 31, 2007	December 31, 2012
Expiration Date	December 5, 2009	December 5, 2009	Not Applicable	December 31, 2012

A multilateral protocol, the Lisbon Protocol of 23 May 1992 has been attached to the START I Treaty to include the successor states to the Soviet Union, with whom the Treaty had been negotiated, in the implementation and verification framework. The four successor states possessing strategic weapons on their soil – Russia, Belarus, Kazakhstan, and the Ukraine – are identified as “the bilateral US treaty partner”.¹²⁹ It is interesting to note that while this document commits the parties to “work out” a system of implementation for START I and its verification provisions, no verification measures whatsoever are mentioned for the mandated transfer of tactical weapons to Russian soil.¹³⁰ In essence, the negotiations were bilateral but the START I Treaty is multilateral. Kazakhstan, Russia, and Belarus have all ratified the Treaty,¹³¹ but Kiev has made parliamentary action conditional on security guarantees, financial compensation for dismantlement, and an acceptable conclusion to the issue of weapon control.¹³²

On 5 December 2001, the US and Russia reported that they had completed reductions mandated by the treaty¹³³. The reductions were accomplished in three phases within the seven years prescribed by the treaty. Each side has reduced to less than 1,600 deployed ballistic missiles and heavy bombers, 6,000 warheads on those missiles and bombers, and no more than 4,900 warheads on the ballistic missiles. Launchers associated with those missiles were also eliminated. Belarus and Kazakhstan now have no strategic nuclear arms, and Ukraine is in the process of

129 Amy Smithson, *START II: Evolution or Revolution?*, in: S. Sur (ed.) *Verification of Disarmament or Limitation of Armaments: Instruments, Negotiations, Proposals*, UNIDR, Geneva 1992, p. 60.

130 See C. Paine and T.B. Cochran, *Kiev Conference: Verified Warhead Controls*, in: *Arms Control Today* (January/February 1992).

131 In July 1992, November 1992, and February 1993 respectively.

132 The Ukrainian hesitation was overcome by the extension of security guarantees from the nuclear-weapon states (assurances from Russia, the UK and the United States were provided in a memorandum at the CSCE Conference on December 5, 1994; France and China also provided security assurances to Ukraine in separate documents). *Arms Control Policy Brief, Nuclear Arms Control*, Geneva Centre for Security policy, 2004.

133 Nikolai Sokov, *Recent development in nuclear weapons verification*, in: *Verification Yearbook 2002*, VERTIC, London 2002, p. 24.

actively eliminating their remaining missiles and launchers. The strategic arsenals of the United States and former Soviet Union have been reduced by 30-40 percent.¹³⁴

1.4.1 Characteristics of the Regime

The verification regime established under START I is in many ways the descendent of the INF regime, but is even more rigorous in light of the ambitious, yet more complex, technical and quantitative limits set by the treaty. It combines the verification provisions of its predecessors (SALT I and II, and INF), but expands them through even more intense and penetrating *cooperation*.

First, NTM remains the cornerstone of verification procedures under the START regime. Although available NTM are capable of “seeing” the delivery systems limited by START,¹³⁵ by themselves they could not reliably track mobile items, particularly if these were concealed, and are by no means capable of counting the numbers of warheads on each missile. Thus, along the lines of SALT and INF provisions, START established a comprehensive list of *cooperative measures* aiming to facilitate the use of NTM and increase the information available to each country. First, the *restricted deployment approach* to verifying mobile missile numbers limits the location, the size, and the number of missiles present at deployment sites and non-deployed storage sites for both road-mobile and rail-mobile missiles so that they can be readily observed by NTM and any confirmed irregularity can be considered a violation.

Second, START I ensures full access to telemetric information from missile flight tests by banning concealment measures and mandating that each side record and exchange information obtained during those tests. Importantly, this access to telemetry under START applies to nearly all ICBM and SLBM flight tests, not just those that might be considered a violation of the Treaty.¹³⁶ Finally, START I also introduced three categories of “exhibitions” (“technical characteristics”, “distinguishability”, and “heavy bomber baseline”). These exhibitions are designed to increase each state's knowledge of the others Treaty limited items (TLI), so that they and their functions may be more easily distinguished.

Counting rules, or *attribution rules*, established under Article III, represent another cooperative measure that permits START to verify technical characteristic limitations and numerical reductions. These agreed rules detail what counts as a Strategic Nuclear Delivery Vehicle (SNDV) or warhead under the Treaty limits and how warheads on new types of missiles are to be counted.¹³⁷ The principle of “downloading” permits each side to reduce the number of nuclear warheads on a MIRVed missile, so that only the remaining mounted warheads count against the sublimity of 4900 permitted under the treaty. Because the Treaty does not mandate

134 Defence Threat Reduction Agency, “Strategic Arms Reduction Treaty (START)”, DTRA Factsheet; available at www.dtra.mil/news/fact/nw_start.html, current as of may 2004.

135 Congress of the United States, Office of Technology Assessment, *Verification Technologies. Measures for Monitoring Compliance with the START Treaty-Summary*, December 1990.

136 Under SALT II, the long debate regarding the encryption of telemetry signals resulted only in compromise provisions that forbid encryption “when it would impede the verification of the Treaty”. Limited exceptions under START I include some older missiles (Minuteman II, SS-11 and SS-13) which do not broadcast telemetry, as well as research rockets.

137 Each ICBM, SLBM, and heavy bomber count as one SNDV; each RV counts as one warhead and certain numbers of warheads are counted for each bomber.

the destruction of warheads, US negotiators were particularly concerned that the warheads could be quickly “uploaded” to “breakthrough” the Treaty limitations. The issue was settled by agreeing on not only a total quota of downloaded warheads, but exactly how each MIRVed missile would count towards this quota and how many may be downloaded from each.¹³⁸ Although counting rules made possible the verification of the complex Treaty requirements, they also came under heavy scrutiny as the weak point of the regime by theoretically leaving room for much higher numbers of nuclear charges than stipulated under the treaty.¹³⁹

Another category of cooperative measures provides for the exchange of information through *baseline data exchanges*, *baseline inspections* and *data update inspections*¹⁴⁰. In a Memorandum of Understanding the two sides agree to exchange detailed information on TLIs and future developments, and to notify one another of any changes. The foundation for this exchange of information is a provision for a common database (Article VIII), which will maintain detailed records on the location and technical characteristics of all Treaty-related equipment.

On-site inspections, founded on the intrusive measures agreed to in the INF Treaty, are even more extensive and intrusive under the START regime, covering every major phase of weapons life cycles. Twelve different types of OSI and exhibition are described for: baseline data, data updates, new facilities, suspect sites, re-entry vehicles, post-exercise dispersal, conversion or elimination, close-outs, formerly declared facilities, technical characteristics, distinguishability, and heavy bomber categorization. In addition, continuous perimeter and portal monitoring activities are permitted at production facilities for mobile ICBM launchers.¹⁴¹ Suspect site inspections (as they are called in START, but also known as challenge inspections) are a new step in intrusive verification, but as Alan Krass has pointed out “their application has been carefully circumscribed to deal only with mobile ICBMs. They are in no sense the ‘anytime, anywhere’ inspections that were often discussed in the 1980s.” With the exception of three designated sites in each country,¹⁴² countries always maintain the right to refuse challenge inspections and attempt to answer the other parties concerns by other means.

The last major characteristic of the regime is the creation of the Joint Compliance and Inspection Commission. Any of the five parties may request a meeting of the JCIC to clarify Treaty requirements or address implementation issues and all agreements reached are binding on all five parties. The START Treaty requires that

138 In addition, if more than 2 warheads are downloaded from one ICBM, the missiles front section must be replaced with one that is incapable of being “uploaded”. See Karp, op. cit., pp. 18 f.; B. Starr, *Downloading: key hurdle on the run-up to START*, in: Jane’s Defence Weekly (29 June 1991), p. 1173; D. Lockwood, *START Treaty signed, brings historic cuts in strategic warheads*, in: Arms Control Today (September 1991), pp. 25, 32-33.

139 S. Kislyak, *START Verification: A Step Towards Transparent Restraint*, in: S. Sur (ed.), *Verification of Disarmament or Limitation of Armaments: Instruments, Negotiations, Proposals*, UNIDR, Geneva 1992, p. 49.

140 Data update inspections are a new measure under START, allowing inspections to confirm any change in baseline information.

141 The US monitors final assembly of SS-24s at Pavlograd and SS-25s at Votkinsk, while the USSR is at the Thiokol Strategic Operations MX plant in Premontory, Utah.

142 These are only facilities that could possibly be used to assembly mobile ICBM missiles or components.

the JCIC begin functions before the Treaty actually enters into force and in this capacity it has already overseen such activities as technical exhibitions created a forum for making minor corrections to certain Treaty documents, and concluded several supplementary provisions.¹⁴³ The Nuclear Risk Reduction Centres continue to serve as the communication link between the parties and maintain the new database.¹⁴⁴

1.4.2 Evaluation

Evidently the various measures foreseen, principles of cooperation and openness are the keys in creating a network of verification sources. Consider that under the first strategic arms limitations (SALT I and II) verification was conducted only from remote sensing and limited exchange of information, yet START's provisions permit inspectors to open up the most threatening weapons in one another's arsenals, count the number of warheads inside, and accurately calculate their payloads. The combination of such intrusive inspections, a highly detailed exchange of technical information, and the increasingly effective possibilities of NTM creates a synergistic multiplicity of sources that can only increase the parties' confidence of assuring compliance.

Nevertheless, the regime's dependence on *cooperative* measures means that the evaluation of its success is always dependent on political will. The large arsenals that remain even after Treaty reductions guarantee that a state would have to deploy thousands of concealed weapons before any significant military advantage would be obtained, yet even small violations can be politically significant, particularly in fostering continued public and congressional support for arms control.¹⁴⁵

The unprecedented comprehensiveness of the regime raises another issue that is particularly relevant as the United States and Russia argue the value of the "peace dividend" created by strategic arms control. This is, of course, the cost of such extensive verification efforts. Already the JCIC has dealt with complaints by Belarus, Kazakhstan and Ukraine regarding the costs that must be born by the inspected party.¹⁴⁶ The negotiators went to great lengths to reduce, both the cost of reduction tasks – by permitting the re-use of warheads and the conversion, as opposed to the elimination, of bombers and missiles – and of verification tasks – by eliminating some high-tech options such as "tagging". Yet, a Congressional Budget Office

143 For example, the JCIC has slightly modified provisions of the Inspection Protocol and data in the Memorandum of Understanding, as well as agreed upon supplementary provisions for equipment to play back telemetry recordings. See Thomas Graham, Jr, acting director, US Arms Control and Disarmament Agency, Statement before the Senate Foreign Relations Committee, 18 May 1993 on the Second Strategic Arms Reduction Treaty.

144 Washington and Moscow are already linked by such Government-to-Government Communication Links (GGCL) and the US has agreed to establish a similar link in Belarus and is negotiating such assistance with Ukraine and Kazakhstan.

145 D. Lockwood, *Verifying START: From Satellites to Suspect Sites*, in: *Arms Control Today* (October 1990), p. 13. See also A. Diakov, T. Kadyshchev, E. Miasnikov and P. Podvig, *What to Do with the Treaty on Strategic Offensive Reductions?*, in: *Nezavisimoye Voennoye Obozreniye* (20 September 2002).

146 These countries are concerned that the Treaty rule that "the inspected party pays" will result in an inequitable financial burden on them, as they will be inspected more often than they can afford to inspect other parties.

study¹⁴⁷ estimated that the cost of START verification would range from \$150 million to \$740 million over the lifetime of the Treaty, several times larger than the On-Site Inspection Agency's 1990 budget of \$38 million. Nevertheless, given that the treaties are likely pre-requisites to substantial reductions, the expenditures on a verification regime are minimal compared to the predicted savings.¹⁴⁸

One of the most valuable aspects of the START I regime, has already been proven. This is its utility for subsequent agreements. While the various bilateral agreements discussed above have built on the principles and rules established in one another, the regimes for the SALT and ABM agreements, the INF Treaty, and the START I treaty have remained almost entirely separate. Provisions of START I, however, are easily expandable to encompass further reductions without compromising the principles already agreed. It is precisely this which has been done in START II.

1.5. START II

Signed by Russia and the United States¹⁴⁹ in January of 1993, START II applies to the same forces as its predecessor, but provides for 60% further reductions beneath the levels agreed in START I.¹⁵⁰ The U.S. Senate approved ratification of the START II Treaty in January 1996 and the Russian Duma ratified the treaty in April 2000, after the U.S. President George W. Bush issued a six-month notice to withdraw from the ABM Treaty, on 13 June 2002. The next day, June 14, 2002 the Russian President Vladimir Putin declared that Russia is no longer bound by its signature of START II, thus ending his country's efforts to bring the treaty into force.

The most remarkable feature of its verification regime, and the reason it will be treated only briefly here, is that it is merely an extension of the regime installed under its predecessor. It does, however, provide for additional types of on-site inspection.

START II is, as Spurgeon M. Keeney has remarked “in a sense ... a numerical amendment to START I. Without a START I treaty there cannot be a START II treaty.”¹⁵¹ The same principles of monitoring, inspection, and consultation will be

147 The Congress of the United States, Congressional Budget Office, *US Costs of Verification and Compliance Under Pending Arms Treaties*, September 1990.

148 \$9 billion is considered a conservative estimate of the combined saving under the START I and CFE Treaties. As of today In the case of the Strategic Arms Reduction Treaty (START), the US has found itself shouldering the burden of its own implementation requirements and those of the former Soviet Union via the Cooperative Threat Reduction (CTR) programme, which has cost so far a total of US\$ 5.1 billion. This has led critics in the US to question the costbenefit advantages of arms control.

149 The bilateral nature of the regime is dictated by the assumption at the time of its signature, that Russia would be the only Soviet successor state to retain strategic weapons (as agreed in the Alma-Ata Declaration). See M. O'Hanlon, *Star Wars Strikes Back*, in: *Foreign Affairs* 78/6 (2000), pp. 68-82.

150 The two countries agreed to reduce their forces to between 3000 and 3500 each by the year 2003, or earlier if the US decides to give financial assistance to reduction efforts in Russia. Multiple-warhead, MIRVed, weapons must be eliminated completely, and a sublimit of 1700-50 is placed on sea-based warheads.

151 S.M. Keeney Jr., *December 30, 1992 special press conference of the Arms Control Association*, published in: *Arms Control Today* (December 1992), p. 4. See also K.B. Payne, *The Case for national Missile Defence*, in: *Orbis. A journal of world affairs* 44/2 (2000), pp. 187-196; S.E. Miller, *The Flawed Case for Missile Defence*, in: *Survival* 43/3 (2000),

applied to the successor Treaty. The Bilateral Inspection Commission set up to oversee START II implementation is a direct application of the JCIC model and in fact because the verification procedures are so similar for the two regimes, JCIC will in great part handle the detailed implementation discussions for both treaties.¹⁵² In some cases, the principles applied to certain systems under START I are merely projected to other issues. For instance, START II applies the “restricted deployment approach”, devised for mobile ICBMs under START I, to the issue of distinguishing conventional bombers from nuclear bombers.¹⁵³ In yet other instances, START II is actually written to make verification under the existing regime more effective, for example by simplifying the counting rules so that each weapon or platform is counted according to exactly the number of warheads for which it is actually equipped.

Nevertheless, in cases where START II limitations have no exact START I counterparts, the verification regime has been extended to include new procedures for observing elimination or confirming weapons functions. One example of these innovations is the limited access to the weapons bay of the B-2 bomber (not subject to inspection under START I), which will now be permitted during a one-time exhibition as well as during routine START I inspections.¹⁵⁴

Perhaps most important are the new procedures for temporarily placing nuclear-capable systems in the conventional category. In light of the fragile Russian economic situation and its continuing concerns to maintain modern security forces, START II, like its predecessor, allows many reductions to be accomplished by converting TLIs for permitted uses. In this vein, strategic nuclear forces can be converted to conventional functions, but START II also permits the redesignation of these to their former functions, as long as the agreed levels are never exceeded.¹⁵⁵ In order to avoid Russian concerns that this process would become a “revolving door”, difficult to verify, START II established a new principle limiting each item to one conversion process, subject to both notification and inspection, in its lifetime.¹⁵⁶

From the prolonged and detailed negotiations on these two treaties and their mutual regime, one can at present only draw some general conclusions. The first is that the far-reaching possibilities of this verification regime, are equally as important as the force reductions in contributing to strategic stability. The second is that the line between cooperative measures or CSBMs is becoming finer and finer as acceptable levels of verification become more dependent on such harmonious interaction.

pp. 95-109; C.L. Glaser and S. Fetter, *National missile Defence and the Future of U.S. Nuclear Weapons Policy*, in: *International Security* 26/1 (2001), pp. 40-92.

152 Because the Bilateral Inspection Commission (BIC) will not be initiated until after START II enters into force, the JCIC is already responsible for such discussions in preparation for the entry into force of both Treaties.

153 While bombers are in the conventional force they must be separately based and display visible indicators that they are dedicated to conventional functions. Nuclear weapons will not be stored at these bases.

154 Ambassador Linton F. Brooks, May 18, 1993, statement before the Senate Foreign Relations Committee on the START II Treaty.

155 The best-known example is the US plan to maintain the B-52 bombers in the nuclear force until they wear out, at which point B-1 bombers initially designated to conventional use would be brought back into the conventional forces.

156 Keeney, op. cit., 1992, p. 6.

Finally, the delays encountered due to Ukraine's hesitation and increasing tension between the Russian and Ukrainian governments show the fragility of this extraordinary progress in arms control in the face of political instability.¹⁵⁷

1.6. START III

At the Helsinki summit in 1997, former US and Russian Presidents Bill Clinton and Boris Yeltsin agreed an ambitious framework for a possible START III Treaty. It included an understanding on the establishment, by 31 December 2007, of lower aggregate levels of deployed strategic nuclear warheads for each side, to between 2,000 and 2,500.¹⁵⁸

It establish, that by December 31, 2007, of lower aggregate levels of 2000-2500 strategic nuclear warheads for each side.

The framework also called for measures relating to the transparency of strategic nuclear warhead inventories and the destruction of strategic nuclear warheads to promote the irreversibility of deep reductions.

Deactivation by December 31, 2003, of all strategic nuclear delivery vehicles to be eliminated under START II.

Extending the START II deadline for elimination of strategic nuclear delivery vehicles to December 31, 2007.

Bilateral talks on START III and the ABM Treaty took place in June 1999 without any significant progress. The United States argued in favour of a tradeoff between cutbacks under START III, which Russia desired for financial reasons, and modifications of the ABM Treaty to permit the deployment of a limited national missile defense system. Russia continued to disagree to such a policy tradeoff. Due to continuing disputes about the conflict between the ABM Treaty and the planned NMD system, the Pentagon began considering START III options that would permit limited deployments of the new Russian Topol-M ICBM with a MIRVed three-warhead configuration.¹⁵⁹

Nearly after a decade of efforts to bring START II into force ended in June 2002, a month after, the United States and Russia concluded negotiations on the Strategic Offensive Reductions Treaty (SORT), which stipulates a 1,700-2,200 deployed

157 H.A. Feiveson (ed.), B.G. Blair, J. Dean, S. Fetter, J. Goodby, et al., *The Nuclear Turning Point: A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons*, Washington 1999, pp. 171-192. Ukraine destroyed its last silo for the SS-24 inter-continental ballistic missiles on Monday. According to the press service of the Ukrainian Defence Ministry, the 46th and last silo of the aforementioned type was destroyed by means of an explosion in the nearby Pervomaisk, the Nikolayev region (to West of the Black Sea coast line.) The 43rd Army of the Soviet Strategic Missile Force was stationed here before the collapse of the Soviet Union. Ukraine started destroying its nuclear potential after proclaiming its non-nuclear status and signing the START Treaty in 1991. Scrapping of the SS-24 missiles, as well as the destruction of missile silos is funded by the United States. Before proclaiming independence, Ukraine ranked third in the world in terms of its nuclear potential. After the collapse of the Soviet Union Ukraine had 130 SS-19 and 46 SS-24 strategic missiles. All of them were subsequently transported to Russia. In exchange, Ukraine got nuclear fuel for its power plants.

158 E.M. Lfft, *Verifying nuclear arms control and disarmament*, in: Verification Yearbook 2001, VERTIC, p. 30.

159 See also M.T. Clark, *Seven worries about START III*, in: Orbis. A journal of world affairs 45/2 (2001), pp. 175-191.

strategic warhead ceiling for each of the two countries' nuclear arsenals. The SORT limit effectively supersedes START II's cap of 3,000-3,500 warheads for each side. On November 13, 2000, the Russian President Vladimir Putin stated that the earlier offer to reduce to 1500 strategic warheads was not a lower limit.¹⁶⁰

Realistically, there is a strong possibility that START III will be even more unbalanced compared to START II. The "breakout potential" problem is unlikely to be solved. However, it may be softened, if non-deployed nuclear warheads are to be eliminated. Nevertheless, such a decision will take just a temporary effect, unless production of new warheads is covered by transparent measures. An unbalanced START III may have a strong negative impact on further nuclear disarmament. Deeper reductions may become impossible for a long period of time. START III implementation will be a hostage both for of U.S. NMD deployment plans, and the Russian Federal Assembly.¹⁶¹

The simplicity of "START III" results from the absence of the most complex elements: transparency and verification. When (and if) the two sides agree on a transparency and verification package for "START III", the new document will no longer be "simple" and will be as good a "snooze" as START I. In the meantime, the verification mechanism of START I will be used to keep track of "START III" developments.¹⁶² The United States and Russia will continue negotiations on transparency and verification issues.¹⁶³ Mainly for that reason, representatives of both sides have emphasized lately that the new document will be "simple", unlike START I (signed by Presidents George H.W. Bush and Mikhail Gorbachev in 1991), which Assistant Secretary of Defence J.D. Crouch described as "a good snooze".¹⁶⁴ Negotiations will continue, however, and hopefully a more robust agreement will be signed when the two countries are ready for it. Even more important, the signing of "START III" will reduce political pressures on negotiators, increasing the chances for success. The decision to postpone controversial issues was explained away by the Russian side with a reference to the fact that both START I and the ABM Treaty "continued to develop" after they entered into force. The difference is, of course, that

160 His administration would consider even lower limits, given the continued acceptance and observation of the ABM Treaty. Putin proposed intensification of the disarmament process, limitation of strategic nuclear arsenals to 1500 warheads by 2008, negotiations on further reductions, U.S. ratification of START II and the 1997 ABM Treaty amendments, preservation of the ABM Treaty and development of an alternative to NMD. The U.S. position comes from a negotiating proposal presented to Russia between January 20 and 21, 2000 that leaked to the Bulletin of Atomic Scientists Magazine. The document deals mostly with NMD, but there are also significant aspects relevant to the U.S. perspective on START III. See N. Sokov, *Putin's arms control agenda. Russia outlines its position on START III before the appointment of next US administration*, in: Jane's Defence Weekly 34/22 (2000), p. 23.

161 E. Miasnikov, *START III: Opportunities and Consequences for Nuclear Disarmament, Presentation at the panel "Achieving a Nuclear Weapons Convention. Legal, Political, and Technical Strategies for Nuclear Disarmament*, United Nations, New York, NY, 9 May 2000.

162 N. Sokov, *START III: An End Or Beginning of Negotiations*, CNC, 13 May 2002.

163 D. Gornostaev, *Dogovor Po SNV Budet Skoree Obshchim, Chem Konkretnym*, Strana.Ru, 2 May 2002; *Rossiia i SshA Soglasovali Tri Osnovnykh Printsipa Novogo Dogovora Po SNV*, Strana.Ru, 4 May 2002, available at www.strana.ru.

164 S. Weinberger, *U.S. Will not Destroy Nuclear Warheads, Crouch Says*, in: Aerospace Daily (May 2, 2002); *Interview with Deputy Minister of Foreign Affairs Georgi Mamedov on ORT*, 24 April 2002 (Information and Press Department, Ministry of Foreign Affairs of the Russian Federation, Document 848-25-04-2002 available at www.in.mid.ru).

by the time of signing, both treaties were complete documents, while the future “START III” looks more like a framework agreement.¹⁶⁵

1.7. Bilateral Framework with Multilateral Verification Procedure: Nuclear Test Bans

The issue of nuclear test ban offers a vivid example of the differences that have existed between what was considered possible in a bilateral framework and what verification measures were acceptable in a global framework.¹⁶⁶ The intrusiveness of the bilateral agreements serve as a theatrical foil to the, as yet, slim achievements at the global level.

Negotiations on the Threshold Test Ban Treaty (TTBT) and the Peaceful Nuclear Explosion Treaty (PNET), originally concluded in the mid-1970's and respected despite their unratified status, were revived in 1982 in order to resolve concerns about the reliability of their intended verification systems,¹⁶⁷ and, by 1990, forged verification provisions and a political consensus that would finally permit ratification. At the Bush-Gorbachev summit of June 1990, two verification protocols were signed and submitted along with the treaties for ratification. This achievement owes its success to the progress made within the bilateral verification framework and, to some extent, to international pressure, primarily within the nuclear non-proliferation regime, for progress towards a comprehensive test ban.

Public interest in ending nuclear test explosions arose early in the 1950's as more information became available on the effects of radioactivity on people and the environment, and concern heightened after several test accidents were made public. Both the US and USSR recognized the political value of being the first to declare a halt to testing, but US military advisors and the nuclear laboratories cautioned strongly against the suspension of testing, warning that tests were important to reaffirming the reliability and safety of the nuclear deterrent arsenal. A short moratorium on testing implemented by both sides, although accompanied by a rush of last minute testing, which demonstrated the hesitation towards such a commitment, provided the basis for negotiations on the issue of a test ban agreement. Yet, from the very beginning, the sticky point in negotiations was the *issue of verification* of underground testing, by the proposed emplacement of monitoring stations and on-site inspections. The French nuclear test of February 1960 and the U-2 incident of May 1960 led to the breakdown of bilateral talks and the sacrifice of the test ban issue to what was achievable in a multilateral forum.

1.7.1 *The PTBT – a multilateral precedent*

The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water (also known as the Limited or Partial Test Ban Treaty, LTBT or PTBT) entered into force in October of 1963, after several years of failed negotiations among the nuclear powers towards a verifiable complete ban on nuclear weapon

¹⁶⁵ N. Sokov, op. cit.

¹⁶⁶ See G.T. Seaborg, Kennedy, Krushchev and the Test Ban, London 1981. See also J. Schell, *The Folly of Arms Control*, in: Foreign Affairs 79/5 (Sep./Oct. 2000), pp. 22-46, 25; A. Neidle, *Nuclear Test Bans: History and Future Prospects*, in: A.L. George, et al, US-Soviet Security Cooperation: Achievements, Failures, Lessons, Oxford 1988, pp. 175-214, 40 and C.E. Paine, *A Case Against Virtual Nuclear Testing*, in: Scientific American 281/3 (September 1999), pp. 74-79.

¹⁶⁷ See A. Dean, *Test Ban and Disarmament, the path of negotiation*, New York 1986.

testing.¹⁶⁸ Although the preamble asserts the wish to “achieve the discontinuance of all test explosions of nuclear weapons for all time”, the content of the Treaty is far less ambitious, bypassing the verification issue in order to establish at least a minimum consensus on limiting nuclear tests. It requires only that the parties refrain from nuclear testing in the atmosphere, outer space, under water – where verification is much easier.

Although the PTBT represented “the first global agreement to protect the environment”,¹⁶⁹ *it had only limited arms control value*. This criticism was not unusual as legal possibilities afforded by the treaty, in particular in underground testing,¹⁷⁰ were used to test new generations of missiles.¹⁷¹ Despite the commitment to pursue a comprehensive test ban, no such negotiations followed for over a decade.

Although the multilateral Partial Test Ban Treaty makes no mention of verification and relies only on national technical means to monitor its ban, its merit lies in the fact that it created a test ban precedent from which to work and galvanized research on seismological verification techniques. A decade after its signature, the issue was taken up once again in the bilateral framework. The Threshold Test Ban Treaty (TTBT) was concluded at the Moscow summit of June 1974, and an associated agreement on the peaceful nuclear explosions, the PNET, was settled in 1976.¹⁷²

1.7.2 The Bilateral Test Ban Treaties

The Threshold Test Ban Treaty limited underground nuclear weapons tests to a maximum yield of 150 kilotons with verification to be carried out by the national technical means (NTM) of the two parties. Unlike the PTBT where there was only implicit agreement to NTM monitoring, here the reference is explicit and is to be carried out by each state with its own seismic network. The Treaty as it was signed in 1974 provided additional cooperative measures to facilitate NTM, but although there is no evidence that the Treaty has ever been violated, it was not ratified until after the addition of two verification protocols in 1990, and the envisioned cooperative measures were never carried out.¹⁷³

The PNET accompanied the TTBT signature, allowing the USSR to continue conducting peaceful nuclear explosions as long as they were below the ceiling of 150 kilotons and the United States was permitted to verify them and preventing any circumvention of the TTBT under the guise of non-military functions. The detailed procedures negotiated for observance of these tests and measurement of yields produced a Verification Protocol that is considerably longer than the Treaty itself. The PNET, as signed in 1976, contained several advances in cooperative measures,

168 The Soviet Union continued to reject the concept of on-site inspections, first as legal espionage and then due the numbers that would be required.

169 See Väyrynen, *From a Partial to a Comprehensive Test Ban*, in: Disarmament (1988/89), p. 18.

170 Even for generation nuclear weapons several tests were needed to produce a primary (fission device), more tests to optimize weight and size and more tests to produce weapons with different yields.

171 See Von Hippel, P. Feiveson, *A low Threshold Nuclear Test Ban*, in: International Security (Fall 1987).

172 See the U.S. Department of State Fact Sheet and CNS, Inventory of International Nonproliferation Organizations and Regime, Washington 2002.

173 See W. Panofsky, *Verification of the Threshold Test Ban Treaties*, in: Arms Control Today (May 1992).

including the presence of “designated personnel” (inspectors) to observe and monitor explosions at the site using double sets of equipment to record data¹⁷⁴ and an SCC-like consultative commission. Yet these advances were never achieved in practice, and the verification measures of the PNET, like those of the TTBT, were modified and expanded in the 1990 protocols, which finally led to its ratification by the US Senate.¹⁷⁵

1.7.2.1 Characteristics of the regime

The 1990 protocols provide the substance of both Treaties' verification system, significantly elaborating the ways in which seismic monitoring can be performed as well as the cooperative measures that greatly improve the efficiency of these measurements, but national technical means remain the core of the verification regime.

In addition to observation satellites, which can detect excavation and geological evidence of nuclear testing,¹⁷⁶ the threshold of 150 kilotons, which applies to both Treaties, was judged even in the mid-1970's as capable of being “readily detected and identified by seismic stations throughout the world”.¹⁷⁷ However, by themselves and measured at a distance from the testing site, these yield estimates were accurate only within a “factor of two uncertainty”, implying that a measurement of 150 kilotons could be the result of an explosion as small as 75 kilotons or as large as 300 kilotons. Hydrodynamic techniques of yield estimation,¹⁷⁸ foreseen by the 1990 protocols for explosions greater than 50 kilotons, are more accurate, but involve a close-in direct measurement of the explosion.

Cooperative procedures have, thus, been designed to help reduce the margin of error of the results obtained from NTM. The first cooperative measures involve an *exchange of information* regarding test sites and the geological environment in which they are situated. The Joint Verification Experiment organized during 1988 gave the US and USSR a chance to exchange additional data and check the precision attainable in practice. NTM, including hydrodynamic testing methods,¹⁷⁹ were set up during two explosions¹⁸⁰ and the “measurements were carried out successfully, demonstrating a level of cooperation unheard of before glasnost.”¹⁸¹

174 It was agreed that one set of equipment would be left behind to the host state and one would be kept by the inspecting state so that any violation or tampering with the equipment had a one in two chance of being caught.

175 See E.H. Arnett, *Nuclear Weapons after the Comprehensive Test Ban Implications for Modernization and Proliferation*, New York 1996. See also K.C. Bailey, *The Comprehensive Test Ban Treaty: An Update on the Debate*, Fairfax, VA 2001, available at www.nipp.org/Adobe/CTBT%20Update.pdf.

176 W. Leith and D.W. Simpson, *Monitoring Underground Nuclear Tests*, in: M. Krepon, P.D. Zimmerman, L.S. Spector, and M. Umberger (eds.), *Commercial Observation Satellites and International Security*, New York 1990.

177 G.E.v.d. Vink and C.E. Pine, *The Politics of Verification: Limiting the Testing of Nuclear Weapons*, in: *Science and Global Security* 3 (1993), pp. 267 f.

178 The normal US method of hydrodynamic measurement is called CORRTEX (Continuous Reflectometry for Radius Time Experiments). See Technology Chapter.

179 The use of a “satellite hole” – a separate small hole adjacent to that where the explosive is placed – was allowed to test the effect of hydrodynamic measurements.

180 One conducted in Nevada on August 17, 1988 at very near 150 kilotons and one at the Shagan River test site in the USSR on September 14, 1988 at a lower yield.

The IRIS Consortium of seismic monitoring systems takes this cooperation even further. Established in 1988 by a U.S. university research organization, the U.S. Geological Survey and the Soviet Academy of Sciences, this project was expected to install a total of 13 stations to monitor data and send it back to the respective states. “Ultimately, a larger seismic network coupled with restrictions on chemical explosions could probably monitor nuclear tests down to one or two kilotons, even if another country attempted to hide them,” said the project's planning director.¹⁸²

The protocols provide for additional exchanges to take place through *on-site inspections*, during which scientists may collect geological data, rock samples, and the like. The OSI provisions were made possible by the INF precedent. A chief U.S. negotiator at the Nuclear Testing Talks, which speaking of the importance of this possibility, has said that “being able to correlate the reading from your seismometer with an on-site measurement is a real key to improving NTM.”¹⁸³ First, the protocols establish the right of each side to perform on-site observations and hydrodynamic measurements at two tests per year for the first five years (one each year after that), regardless of the yield size of the test. Moreover, the same rights apply to two tests per year at any new test sites opened after the initial data exchange.

In addition, OSI is permitted for all explosions whose planned yield exceeds 35 kilotons. Inspectors will be able to take soil samples and make geological measurements to establish a baseline for yield estimation and ensure that “de-coupling”¹⁸⁴ techniques are not used to conceal an illegal explosion. If the intended yield exceeds 50 kilotons, on-site hydrodynamic measurements of the test will also be permitted, as will close-in direct measurement of the yield from three seismic stations offered by the host state and chosen to provide surface wave registrations that NTM do not record.¹⁸⁵

Further cooperative measures include a *non-interference clause* committing the parties not to impede verification as long as they operate within the principles of international law and Article 2.3, which provides for consultations and enquiries between both parties to promote the objectives and implementation of the treaty. Similar provisions inserted in the SALT and ABM Treaties of 1972 had amounted to Soviet acceptance of NTMs once regarded as a form of espionage. The inclusion of this provision in the TTBT is a sign that both parties were reasonably satisfied with the system that had been set up.

181 Wolfgang K. H. Panofsky, *Verification of the Threshold Test Ban*, in: Arms Control Today (September 1990), p. 6 ff.

182 G.E.v.d. Vink, *Verifying a Comprehensive Test Ban*, in: Arms Control Today (November 1990), p. 19.

183 C.P. Robinson, *Verifying Testing Treaties – Old and New*, July/August 1990, p. 3. C.P. Robinson, *Statement to the United States Senate Committee on Armed Services*, Hearing of the Subcommittee on Strategic Forces, March 12, 1996. Robinson, C.P., Bailey, K.C, *To Zero or Not to Zero: A US Perspective on Nuclear Disarmament*, in: Security Dialogue 28/2 (1997), p. 149-158.

184 “De-coupling” involves the use of geologic conditions to disguise the strength of an explosion as it is seen through seismic signals.

185 For tests held in “nonstandard” geological configurations, the inspecting party may ask to collect additional information and even observe a reference test.

The “*whoops*” clause is a much-debated innovation of the TTBT. This provision of the original TTBT allowed for one or two slight unintentional breaches per year, which when noted by the other party would be termed a “cause for concern” but not serious enough to warrant withdrawing from the treaty. The clause subsequently proved to be “political dynamite” prompting one US Treaty negotiator to label it “the mistake's mistake”.¹⁸⁶ However, it is still included as a bilateral side agreement in the version signed in 1990.

Lastly, the 1990 protocols offer an unprecedented provision that is basically equal to a *veto power* against tests that it considers unverifiable. If a state cannot announce a test in a cavity larger than 20,000 cubic meters (a scenario that would make accurate yield measurement very difficult), without arranging a new verification agreement with the verifying party.

1.7.2.2 Evaluation

Any evaluation of the TTBT and the PNET must take into account the highly politicized nature of the test ban issue and the role that verification has played in this debate. Many arms controllers opposed the treaties, saying a verified 150-kiloton ceiling is too high and would permit destabilizing testing and development. President Carter, for example, avoided ratification of the Treaties because he felt that they were an intermediary step that would limit the ability to conclude a more far-reaching or comprehensive test ban. Opponents of nuclear test ban, on the other hand, argue that although both states claim to have stayed within the Treaties' limits throughout the 1980's, there is ample evidence that both sides violated the agreement.¹⁸⁷ They consequently fear the precedent that these Treaties set towards agreement on a total test ban. Thus, “in reviewing the verification debate of the last decade, it appears that the strategy for delaying progress toward a test ban worked, ultimately entangling both the US and the Soviet Union in a largely spurious debate over threshold verification at high yields.”¹⁸⁸

Yet, technically there is little reason to doubt that the combination of NTM and cooperative measures described in the 1990 verification protocols would not detect any explosions over the agreed yield levels.¹⁸⁹ The verification provisions are extremely detailed, a factor that has spawned criticism for entailing higher costs and providing too much room for argument over implementation.¹⁹⁰ However, this detail is designed to support the precision required to verify nuclear tests, which take place in fractions of a second of time and whose various environments can dramatically affect the necessary methods of measurement and calculation.

Most importantly, the recent ratification of the TTBT, the PNET, and their verification protocols is an optimistic precedent for a multilateral comprehensive test ban. Whereas the Treaties' high ceilings and minimal verification may have stood “as

186 W. Potter, *IGCC and Ploughshares*, Kingston 1988, p. 158.

187 William R.v. Cleave and S.T.Cohen, *Nuclear weapons, Policies, and the Test Ban Issue*, Westport 1987, pp. 81-86.

188 G.v.d. Vink and Paine, op. cit., p. 282.

189 “We went through two and a half year of this (negotiating) process, and I can tell you honestly that none of us know of any possibility for getting by with a violation.”, C.P. Robinson, op. cit., 1990, p. 5.

190 Panofsky, op. cit., 1990, p. 6.

symbols of the shallowness of detente”¹⁹¹ at their signature in the 1970's, the confidence in technological and cooperative means of verification expressed in the 1990 protocols reflects the defeat of a long-standing obstacle to progress on this issue.

1.7.3 From bilateral to multilateral again – the CTBT debate

Changing political attitudes towards the acceptability of available technology for the verification of nuclear test bans has given new spirit to the debate over a comprehensive test ban – an idea that has been discussed since the mid-1950's.¹⁹² Pressure from non-nuclear weapon states within the Non-Proliferation Treaty to control “vertical proliferation”,¹⁹³ has given the nuclear weapons states a certain incentive to reconsider their customary opposition. Since 1985, the Soviet Union has announced its willingness to execute a permanent moratorium on nuclear testing, and the US, Russia, and France have all implemented temporary halts to testing, as signs of their willingness to consider the issue. Yet, a 1991 PTBT Amendment Conference failed to garner support for an amendment that would convert the PTBT into a Comprehensive Test Ban Treaty (CTBT).¹⁹⁴

President George H. W. Bush signed into law the unilateral declaration to forego full-scale nuclear weapons testing on October 2, 1992. The United States signed the CTBT on September 24, 1996, the day it opened for signature, but the Senate dealt a severe blow to the near-term prospects for U.S. participation when it refused to provide its advice and consent on October 13, 1999. The current Bush administration has refused to ask the Senate to reconsider the treaty but has said it will observe the moratorium.¹⁹⁵

The recent seeds for this change of context for the debate have already been sown by the imminent release of several studies. These include General Shalikhvili's January 2001 report to the President with “Findings and Recommendations Concerning the CTBT”;¹⁹⁶ a November 2000 Lawyers Alliance for World Security

191 A.S. Krass, *Verification: How Much is Enough?*, London 1985, p. 257.

192 H. Haak and L. Evers, *Infrasound as a tool for CTBT verification*, in: *Verification Yearbook 2002*, VERTIC, London 2002, pp. 207-221.

193 “Vertical proliferation” is a term coined by the late Homi Bhabha Chairman of Indian AEC describing the development of new generations of nuclear weapons by states that are already recognized as Nuclear Weapon States. Article IV of the NPT commits these states to halt this phenomenon, but failure to act in the spirit of Article IV has been a constant source of tension between the “have” and “have not” Member States.

194 See V. Gupta, *The Politics of the 1991 Partial Test Ban Treaty Amendment Conference*, in: *Verification Report*, op. cit., 1992, pp. 85-90.

195 Russia has ratified the Treaty. In his campaign statements in 2000 and after his January 20, 2001 inauguration, President Bush has made clear that ratifying the CTBT is not a priority for his administration. He noted in a response to a survey by the Arms Control Association of presidential candidate views on arms control issues that the CTBT is unverifiable, unenforceable, and would threaten the maintenance of the U.S. arsenal. He asserted, “We can fight the spread of nuclear weapons, but we cannot wish them away with unwise treaties.” The CTBT will formally enter into force after 44 designated “nuclear-capable states” have deposited their instruments of ratification with the UN secretary-general. To date, 169 states have signed and 106 have ratified the treaty. Yet of the 44 specified countries, India, Pakistan, and North Korea still have not signed, and only 32 have ratified the treaty.

196 Findings and Recommendations Concerning the Comprehensive Nuclear Test Ban Treaty, available at www.state.gov/www/global/arms/ctbtpage/ctbt_report.html, Report by General

(LAWS) “White Paper on the CTBT” with chapters by a number of scientific and arms control experts; and a National Academy contain serious responses to the technical, economic and political criticisms that arose during the US ratification debate, addressed President Bush's specific concerns about proliferation value, verifiability, enforceability, and confidence in the stockpile, and made recommendations to improve the likelihood of treaty ratification.¹⁹⁷

Verification questions continue to enter the debate, however, particularly in the decision as to whether a Comprehensive Test Ban or a Very Limited Threshold Test Ban is more appropriate. Those who argue in favor of a very low threshold (likely to be 1 kiloton yield), maintain that significant weapons testing requires a yield of 5-10 KT minimum level, which can be detected and therefore controlled. Explosion for industrial purposes such as construction and excavation – generally under 1 KT – could thus be carried out without need for verification as they were not for military purposes, and those above the limit could be monitored by a seismic network and be identified.¹⁹⁸ A low threshold would also remove the chance of controversies over whether various activities in nuclear research laboratories constitute a nuclear test explosion.¹⁹⁹ To reduce possible technical disputes, proponents recommend that low-yield tests be restricted to one site and that “muffling” techniques such as decoupling be prohibited. Placement of the treaty threshold too far below that required for security purposes would only lead to endless confrontation over irrelevancies.²⁰⁰

The CTBT provides for the establishment of a unique global verification regime that consists of an International Monitoring System (IMS), a consultation and clarification process, on-site inspections (OSIs) and confidence building measures (CBMs). Data from IMS stations are processed and analysed by the International Data Centre (IDC). The IMS is to consist of a global network of 337 facilities: 170 seismic, 11 hydroacoustic, 60 infrasound and 80 radionuclide stations together with 16 radionuclide laboratories. The facilities, to be established or upgraded in some 90 countries around the world, will be capable of registering vibrations underground, in the sea and in the air, as well as detecting traces of radionuclides released into the atmosphere from a nuclear explosion.²⁰¹

The argument in favour of an outright test ban is that it would eliminate disputes over the exact yields of tests made near the threshold and all uncertainties would work

John Shalikashvili (USA, Ret.), Special Advisor to the President and Secretary of State, submitted January 5, 2001. See also S. Drell, *Stockpile Stewardship Under the CTBT: “It is Adequate to the Task”*, Issue Brief (December 2000), available at www.clw.org/coalition/briefv4n20.htm.

197 Disarmament Diplomacy 53 (December 2000 – January 2001).

198 V. Gupta and F. Pabian, *Commercial Satellite Imagery and the CTBT Verification Process*, in: The Nonproliferation Review 5 (Spring-Summer 1998), available at cns.mii.edu/pubs/npr/vol05/53/gupta53.pdf.

199 “At such low yields, there may even be a philosophical debate as to what is a nuclear test explosion and what is simply a physics experiment”, explains van der Vink, citing the example of nuclear safety experiments. G.v.d. Vink, op. cit., 1990, p. 23.

200 Sykes and Evernden, *Round two of test ban flap (discussion of October 1988 article, Lies that stopped a test ban)*, in: The Bulletin of the Atomic Scientists 44, pp. 5-6.

201 Background Document by the Provisional Technical Secretariat of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization prepared for the Conference on Facilitating the Entry into Force of the CTBT, New York, 2001.

against the potential evader. A total test ban would also reinforce the inherent difference between nuclear and conventional weapons.

The decision, however, is not to be made on the basis of technological capabilities alone – the decision will be a political one: judging the acceptable level of certainty in any verification system and the acceptable level of sacrifice within nuclear testing programs.

For this reason, the debate over the CTBT²⁰² has strayed from the issue of verification and currently centers more on the desirability of such a treaty. For example, arguments are there against those ranging from simplistic “we just can’t trust the others” statements to concerns for the dependability and safety of an untested nuclear stockpile.²⁰³ Proposals now focus less on verifiable limits and more on limits that allow for continued research and maintenance of the arsenal, for instance the idea of a low threshold ban that still allows one or two tests above the threshold each year.²⁰⁴

Even though, in 1996, CTBT had widespread international support and it has been signed by 171 states and ratified by 113, including three of the five nuclear weapon states and all but one member of NATO. However, the failure of the Senate to give its advice and consent for ratification in 1999, the current administration’s opposition to the treaty, and the reluctance of 12 other key states to approve the treaty means that the formal entry into force of the treaty is still years away.²⁰⁵

Whatever the outcome, the CTBT debate is symbolic of the transition between bilateral negotiations and agreement on mutual acceptance of intrusive procedures to the acceptance of these same principles in a multilateral negotiating framework. Earlier test ban treaties were bilateral and the debate, if not limited to only two parties, centers around the very few states with independent means of nuclear testing.²⁰⁶ But the resulting treaty will doubtlessly reflect the influence and the format of a more globalised negotiation process.²⁰⁷

202 D. Kimball, *What Went Wrong: Repairing the Damage to the CTBT*, in: *Arms Control Today* 29/8 (December 1999), pp. 3-9, available at www.armscontrol.org/ACT/dec99/dkde99.htm; G.v.d. Vink et al., *False Accusations, Undetected Tests and Implications for the CTB Treaty*, in: *Arms Control Today* 28/4 (May 1998), pp. 7-13 (with useful illustrations), available at or www.armscontrol.org/ACT/may98/vimy98.htm.

203 “More than one third of all weapons designs introduced into the stockpile since 1958 have encountered reliability problems. Of these 75% were discovered and/or corrected as a result of nuclear testing.” P. Brown, *Lawrence Livermore National Laboratory*, September 1986, p. 13.

204 F.N.v. Hippel, H.A. Feiveson, and C.E. Paine, *A Low-Threshold Nuclear Test Ban*, in: *International Security* (Fall 1987), pp. 135-151.

205 D.G. Kimball, *Prospects for the Comprehensive Test Ban Treaty*, *Arms Control and Nonproliferation*, Arms Control Association, June 1, 2004.

206 In this regard see R. Johnson, *Beyond Article XIV: Strategies To Save The CTBT*, in: *Disarmament Diplomacy* 73 (October – November 2003).

207 See D. Kimball, *Analysis of March 12 Helms Letter to Powell Calling for Repudiation of CTBT*, 2001, available at www.clw.org/coalition/helms031201.htm. See also J.V. Parachini, *U.S. Senate Ratification of the CWC: Lessons for the CTBT*, in: *The Nonproliferation Review* 5 (Fall 1997), available at cns.miis.edu/pubs/npr/vol05/51/parach51.pdf; Research Required to Support Comprehensive Nuclear Test Ban Treaty Monitoring (1997); Panel on Basic Research Requirements in Support of Comprehensive Test Ban Monitoring, National Research Council; Seismic Signals from Mining Operations and the Comprehensive Test Ban Treaty: Comments on a Draft Report by a Department of Energy Working Group (1998); Committee on Seismic

2. Multilateral Verification

2.1. Arrangements concerning uninhabited regions and environment

The first multilateral verification agreements pre-date the bilateral arms control agreements discussed in the previous section. The Antarctica Treaty (1959), the Outer Space Agreement (1967), and the Seabed Agreement (1971), attempted to subdue an unbridled arms race by demilitarizing certain parts of the earth and their environment and providing verification regimes to increase parties confidence that their national interest would not be jeopardized by their commitments.

As sovereign states have always been reluctant to relinquish any control over their territory, it is evident that it is less difficult to implement these projects in areas that are of relatively low military significance and not under any state's control.

One can then understand why it was that the first agreements on Nuclear Weapon Free Zones, the peaceful use of certain areas, and multilateral inspection regimes covered only uninhabited regions such as Antarctica, the Seabed, Outer space and somewhat militarily insignificant issues such as environmental modification techniques.

2.2. The Antarctic Treaty

The Antarctic Treaty, signed in December 1, 1959; entered into effect on June 23, 1961 and set a significant precedent as a multilateral verification regime based on international cooperation and openness. The twelve original signatories²⁰⁸ agreed that Antarctica shall be used for peaceful purposes only, prohibiting all military measures (including bases, manoeuvres, and weapons testing), outlawing nuclear explosions and waste disposal, and encouraging scientific research and international cooperation. The Treaty also suspends all territorial sovereignty claims during its lifetime.

To verify its implementation, a system of control was set up which, for the first time, was based on national verification by inspection. The fact that the area controlled was of relatively low military significance and that no weapons system had to be counted or controlled was a factor, which must have assisted agreement on this format. Nonetheless, the Treaty provided a precedent in international cooperation and verification; the key elements of open access to all stations and equal opportunity of all interested parties to verify, have been developed and expanded in subsequent agreements of a similar nature, such as the Outer Space, Seabed and Environmental Modification (Enmod) accords.

The regime operates according to the principle of *reciprocity*. Only the Consultative Parties to the Treaty – those states, which demonstrate interest in the area by establishing a scientific station or dispatching a scientific expedition to Antarctica –

Signals from Mining Activities, National Research Council; Review of the Department of Energy's Inertial Confinement Fusion Program: The National Ignition Facility (1997); Committee for the Review of the Department of Energy's Inertial Confinement Fusion Program, National Research Council; Physics in a New Era: An Overview (2001); Physics Survey Overview Seismological Research Requirements for a Comprehensive Test-Ban Monitoring System (1995); Panel on Seismological Research Requirements for a Comprehensive Test-Ban Monitoring System, National Research Council.

208 Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, UK, USA, and USSR. See also, Arthur Watts, *International Law and the Antarctic Treaty System*, Cambridge 1992.

are allowed to designate observers. There are now 26 Consultative Parties including the original signatories and 14 other states, which have achieved this status by conducting “substantial scientific research activity” in the region.²⁰⁹

Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection to the Antarctic Treaty provides a verification regime that covers all areas of Antarctica, including all stations, installations, and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargos or personnel in Antarctica are open at all times to inspection by observers designated by the Contracting Parties.

Article VII of the Antarctic Treaty establishes the right of free access for observation and inspection by the Contracting Parties. Observers designed under Article VII (1) “shall have complete freedom of access”, including the conducting of aerial observations, “at any time to any or all areas of Antarctica.” The facilities that may be inspected include “all stations, installations and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica.”

Article 14 of the Protocol establishes that Antarctic Treaty Consultative Parties “shall arrange, individually or collectively, for inspections by observers to be made in accordance with Article VII of the Antarctic Treaty.” During inspections, observers should be given access to “all parts of stations, installations, equipment, ships and aircraft open to inspection under Article VII of the Antarctic Treaty, and to all records” that are maintained at those facilities in accordance to Protocol requirements.

The Verification regime is based on two measures: inspection and information exchange.

First, observers, remaining under the control and protection of their national governments, are entitled to complete freedom of access at all times, to all areas of the Antarctic,²¹⁰ in order to carry out inspections.

The observers are also empowered under Article VII, to carry out aerial observation of the entire area. Inspections may provide information on:

the relationship of logistic support and principal activities observed at the station to the information in the annual exchanges

Treaty-prohibited activities, such as military activities, nuclear explosions or disposal of radioactive waste

the quantity of arms present

environmental protection measures

observance of measures adopted at Antarctic Treaty Consultative Meetings

scientific research and equipment

construction activities

any new or unusual activities²¹¹

209 According to Article IX.2 of the Treaty.

210 This includes all stations, installations, equipment, aircraft or ships and their cargoes.

Over 100 inspections have taken place between 1961 and 2002, the majority since 1980. Argentina, Australia, Chile, France, Germany, New Zealand, Russia, the United Kingdom, and the United States have conducted these inspections. Compliance: so far there is no administrative body to oversee the effective implementation of these measures.²¹²

In addition, in order to promote the freedom of scientific investigation guaranteed under the treaty, and to avoid duplication of efforts, the signatories agreed to a maximum possible exchange of information, personnel, observation, and results of inspections. The Treaty requires advance notice of expeditions to and within Antarctica, the activities of research stations, as well as the intent to introduce any military personnel or equipment (which must be justified for scientific purposes). In this way observers from other signatory states are viewed more as cooperating colleagues and less as potential spies. Reports are made to regular meetings of the Treaty parties, known as the Antarctic Treaty Consultative Meetings (ATCM).

The ATCM meet once every two years to decide measures relating to the Treaty by consensus. As of 1991, the Treaty may be amended with consensus at these meetings. The parties have so far avoided setting up a permanent secretariat, preferring minimal institutional arrangement, notably due to the concern by some parties that this might jeopardize sovereignty claims if the Treaty's system ever fell apart.²¹³ However, demands for a type of general secretariat, particularly from Greenpeace USA assert that “While not functioning as an enforcement body per se, a secretariat could serve to facilitate information exchange, including inspection reports, updated Antarctic Treaty recommendations and general information on environmental protection. Better use and wider availability of such information could help remedy some of the current difficulties frustrating broader implementation and compliance.”²¹⁴

Although the Treaty does not involve any other organizations in the verification process, it does encourage signatories to work closely with Specialized Agencies of the United Nations, which have an interest in Antarctica. Against the resistance of the Consultative Parties, a number of non-signatories to the Treaty, who would like its management to be transferred under UN control, have used this article to back up their argument.²¹⁵

The verification regime, however remarkable it may have been at the time of its signature, has come under attack in recent years. No compliance issues have ever

211 US delegation to the XIVth Consultative, Meeting paper NT/XIV/WP8, in: Handbook of the Antarctic Treaty System, Polar Publications, 1988, p. 1301 f.

212 A Review of Inspections, under Article 7 of the Antarctic Treaty, and Article 14 of its Protocol on Environmental Protection, 1959-2001, Madrid, 9/20 June 2003.

213 United Kingdom delegation to the XVIth Consultative Meeting, “Reports of the Inspection under Article VII of the Antarctic Treaty”, information paper XVI ATCM/INFO 5, October 7, 1991 – cited in N. Donlon, *Prospects for the Verification of the Environmental Protection Protocol to the Antarctic Treaty*, in: Verification Report 1992, op. cit., 1992.

214 Greenpeace USA, Testimony in United States Congress, House of Representatives, Hearing before Subcommittees of the Committee on Merchant Marine and Fisheries, Serial No. 101-103, June 26, 1990, p. 144 f.

215 For A good description of all the problems of Antarctica, See P.Beck, *The international politics of Antarctica*, London 1986.

been raised at an ATCM. Yet non-governmental organizations, such as Greenpeace, have observed and publicized numerous violations to environmental provisions. For this reason, they propose an independent inspection force or mandatory collective inspections that would reduce the chance of states' concealing violations for political or diplomatic reasons.

“The unanimity displayed by the (Antarctic) Treaty powers ... has offered an interesting demonstration of the cooperative possibilities of the Antarctic Treaty in respect to an extremely diverse range of signatories.”²¹⁶ Treaty signatories have found themselves issuing statements in support of each other on Antarctica despite their differences elsewhere on other issues. Although the verification regime is not entirely “internationalized” – participation being limited to those countries developed enough to establish a scientific research station – the seed of international cooperation and coordination with agencies such as the UN is sown in this agreement.

The treaties, which followed the Antarctic agreement show a certain development or evolution and according to some authors a sort of tradition.²¹⁷ Like Antarctica, the areas covered by these multilateral Nuclear Weapon Free Zones (NWFZs) are uninhabited, but some progress can be noted. The military significance of the area covered also is increasing and the degree of internationalization of their verification provisions is more advanced.

As of May 2000, 15 additional nations (Brazil, Bulgaria, China, Ecuador, Finland, Germany, India, Italy, Netherlands, Poland, Peru, Republic of Korea, Sweden, Spain, and Uruguay) have achieved consultative status by acceding to the Treaty and by conducting substantial scientific research in Antarctica. Russia carries forward the signatory privileges and responsibilities established by the former Soviet Union.

Another 18 nations have acceded to the Antarctic Treaty: Austria, Canada, Colombia, Cuba, Czech Republic, Democratic Peoples Republic of Korea, Denmark, Estonia, Greece, Guatemala, Hungary, Papua New Guinea, Romania, Slovak Republic, Switzerland, Turkey, Ukraine, and Venezuela. These nations agree to abide by the treaty and may attend consultative meetings as observers.

2.3. The Outer Space Agreement

By some estimates, there are over 500 active satellites currently in outer space, with the USA building about 75% of them. It is evident that the international community, and especially Western states, is dependent to an ever-increasing extent on the peaceful uses of outer space for crucial civilian and military functions. One need only consider the global communications, weather, navigation and remote sensing functions performed by civilian satellites. Military applications include communication, navigation, search & rescue and surveillance, including for purposes of verification of arms control and disarmament commitments.²¹⁸

216 P.J. Beck, *The Antarctic Treaty System after 25 Years*, in: *The World Today* (November 1986), p. 196.

217 A. Krass, *op. cit.*, 1985, p. 224.

218 Paul Meyer, Director-General, International Security Bureau, Department of Foreign Affairs and International Trade, Ottawa, Canada, Arms Control Options in and from Space Presentation to Fisher Institute-RAND International Conference, Towards Fusion of Air and Space: Surveying Developments and Assessing Choices for Small and Middle Powers, Tel-Aviv, Israel, March 19-21, 2001; See also R.L. Garwin, *Space Weapons: Not Yet*, paper

The Outer Space Agreement of 1967 took place in an environment of great international activity and awareness of global issues. Both superpowers were carrying out extensive space programmes, which had captured the world's attention and imagination²¹⁹. Space exploration was no longer a science fiction dream but a reality which needed to be controlled and regulated. The newly independent states of the 1960s had found their majority in the UN and did not want to stand by and watch the superpowers carve up this new territory between themselves.

The Treaty of course reflects both these influences. Parties agree in Article I, that outer space, the moon and other celestial bodies are not subject to national appropriation by claim of sovereignty. Exploration and the use of outer space, including the moon and other celestial bodies, is declared to be the province of all mankind²²⁰ and is to be carried out for the benefit and interest of all, irrespective of their degree of economic or scientific development. States undertake to encourage and facilitate international cooperation and investigation, and guarantee free access to all areas of celestial bodies. In this vein, the Treaty prohibits the stationing in outer space of any objects carrying nuclear weapons or any weapons of mass destruction²²¹ and bans weapons testing and military installations of any type.²²²

To verify compliance²²³, parties agree in Article 10 to consider on an equal basis any requests from other States Parties to the Treaty to be given an opportunity to observe the launch and flight of space objects. This, in effect, amounts to an on-site inspection of the flight by the “guest” observer. However, such “inspection” is subject to the consent of the launching state.

In addition, Article 12 stipulates that all Parties are entitled to inspect, on a basis of reciprocity, all stations, installations, equipment and space vehicles of other parties on the moon and other celestial bodies. States may refuse a requested inspection, but this is unlikely to be necessary as states can also demand “reasonable advance notice

presented at Pugwash Workshop on Preserving the Non-Weaponization of Space, Castellon de la Plana, Spain, 22–24 May 2003, available at fas.org/rlg/030522-space.pdf.

219 The military use of outer space is currently confined to a variety of missions in support of terrestrial military force application (such as early warning; communications, command and control; intelligence, surveillance and reconnaissance; navigation; and meteorology), confined not so much by the bindings of international law but by technical limitations and decisions on national policy. To the best knowledge of the international community, no nation has so far deployed space-based weapons in orbit above the Earth for extended operations. *The Non-Weaponization of Outer Space*, Food for Thought Paper, 31 March 2002, available at www.dfait-maeci.gc.ca/arms/outer3-en.asp.

220 J. Fawcett, *International law and the use of Outer Space*, Manchester 1968; see also his book *Outer Space new challenges to law & policy*, Clarendon 1984.

221 Parties may not place weapons in orbit, but weapons in transit (i.e. missiles) are not included, nor are satellites used for military surveillance. See M. Benkő and K.-U. Schrogl, *International Space Law in the Making*, Gif-sur-Yvette 1993.

222 This clause would be violated were SDI tests to take place in space.

223 The request for consultation under Article IX can come from any party or group of parties to the Outer Space Treaty. It has been noted that parties to the treaty could convene and issue an interpretation that US testing or orbiting of space weapons was contrary to the peaceful-uses language of the treaty, in effect amending the treaty to preclude weaponization. G. Bunn and J. Rhineland, *Letter to the Editor*, in: *Arms Control Today* 6/2002, available at www.armscontrol.org/act/2002_06/letterjune02.asp.

of a projected visit”, which is subject to negotiation and consultation to ensure that it does not interfere unduly with the normal operations of the facility to be observed.

The reciprocal nature of the inspections, however, restricts it to a very limited number of countries who possess advanced space programs, and even under these circumstances inspections may be refused. For the majority of states,²²⁴ not possessing the technology for this type of verification, the right of inspection may be meaningless.²²⁵ Moreover, given the military significance of satellites orbiting the Earth,²²⁶ the verification provisions of the regime failed to mention bodies in Earth's orbit, rendering unverifiable the main provision of the Treaty – the exclusion of nuclear weapons from our orbit.

Monitoring of space activities is a key element Outer space is permeable for all parts of the electromagnetic spectrum and thus well suited for various kinds of monitoring at long distances, with systems looking from earth into space (tracking) and systems in space (satellites) looking towards earth. Accuracy is close to 10 cm in both directions. Especially, testing is often visible.

The more capable the systems are, the more costly they become which speaks in favour of cost sharing. Since remote sensing sometimes can only provide an indication of suspected treaty violations but not absolute certainty, some form of on-site inspections is required, largely on the ground (e.g. at production and space launch facilities) but also in space by use of inspection satellites.²²⁷

Actually, almost 140 nations voted for the resolution entitled “Prevention of an Arms Race in Outer Space.” It recognizes “the common interest of all mankind in the exploration and use of outer space for peaceful purposes,” reaffirms the will of all states that the exploration and use of outer space “shall be for peaceful purposes and shall be carried out for the benefit and in the interest of all countries,” and declares “that prevention of an arms race in outer space would avert a grave danger for international peace and security.” Only two nations declined to support this bill – the United States and Israel. Both abstained.²²⁸

Beyond this, there are five relevant General Assembly resolutions. They are: the Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space (1963), which preceded the Outer Space Treaty and laid out most of its content; the Declaration on International Cooperation in the Exploration

224 Most developing countries have no communication satellites of their own – not only because of the cost but also because of the unavailability of appropriate slots in Geostationary Orbit (GSO). These slots were allocated to the big space faring nations by the ITU when most developing countries were yet to adopt a space program. It is also important to note that 90% of these slots are not being used, however are still unavailable to those who need them, particularly developing countries. G. Tleubayeva, Y. Takaya, H. Klein, N. Djanji, N. Cox and F. Chizea, *Space Generation Summit Output 11-13 October 2002*, Houston, TX 2002. See also K. Baslar, *The Concept of Common Heritage of mankind in International Law*, The Hague 1997. R. Bender, *Launching and Operation Satellites: Legal Issues*, The Hague 1997.

225 See also B. Jasani (ed.), *Space Weapons, the arms control dilemma*, London 1985.

226 See P. Stares, *Space and National Security*, Washington 1987.

227 J. Scheffran, *Options for Rules in Outer Space*, paper, May 2-3, 2002. This paper summarizes the main conclusions of the author presented at: Reconsidering the Rules of Space: American Academy of Arts and Sciences, Project Planning Meeting and Workshop on Chinese Perceptions of US Space Plans, May 2-3, 2002, Cambridge, MA 2002.

228 K. Grossmann, *Master of Space*, in: *Progressive Magazine* (January 2000).

and Use of Outer Space for the Use and Benefit and in the Interest of All States (1996); and resolutions on Direct Television Broadcasting, Remote Sensing of the Earth from Outer Space (which seeks to ensure affordable access by developing countries to non-military satellite imaging), and the Use of Nuclear Power in Outer Space (which deals with limiting exposure in the crash landing of nuclear-powered satellites and the liability for such accidents).²²⁹

2.4. The Seabed Treaty

The Seabed Treaty of 1972, which commits parties not to emplace or implant any weapons of mass destruction or associated facilities in the seabed zone, marks another development in international cooperation towards verification.

First it drops the principle of reciprocity. Rather Article III gives any State Party the right to verify through observation using its own means or by seeking *full or partial assistance* of another party.

In addition, further encouraging international cooperation in the verification process, the Seabed Treaty foresees consultation among the parties in the verification process as well as the possibility of involving the UN Security Council “if consultation and cooperation ... have not removed the doubts” of a State.²³⁰ While not formally institutionalizing these ideas, the Seabed Treaty sets the precedent for multilateral versions of the Consultative Committee that was negotiated in the bilateral SALT talks that same year.

Article VII included a provision for a review conference to be held in five years. The Seabed Arms Control Treaty Review Conference was held in Geneva June 20 – July 1, 1977. The Conference concluded that the first five years in the life of the Treaty had demonstrated its effectiveness. The Second Review Conference, held in Geneva in September 1983, concluded that the Treaty continued to be an important and effective arms control measure. The Third Review Conference was held in Geneva in September 1989 and confirmed results of previous meetings. It was agreed that the next review conference would be convened in Geneva not earlier than 1996. In 1992, the Conference on Disarmament informally considered further measures and saw no need for a fourth review conference.

2.5. The Environmental Modification Convention (ENMOD)

The term for environmental modification by humans (ENMOD) refers to altering ocean currents, depletion of the ozone layer or production of greenhouse gases. Since 1946 ENMOD has included weather modification, primarily via cloud seeding in attempts to remove fog from airports, make it rain and augment snow packs.

In the 1950s, ENMOD held a convention to prohibit nations from using weather modification as a weapon. Since the 1960s governments have tried to alter the upper

229 The Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space (General Assembly resolution 1962 (XVIII) of 13 December 1963); The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting (resolution 37/92 of 10 December 1982); The Principles Relating to Remote Sensing of the Earth from Outer Space (resolution 41/65 of 3 December 1986); The Principles Relevant to the Use of Nuclear Power Sources in Outer Space (resolution 47/68 of 14 December 1992); The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries (resolution 51/122 of 13 December 1996).

230 See Treaty text Art III.

atmosphere by dumping copper needles into the ionosphere and trying to create an artificial ionospheric to enhance the reliability of radio communications. They also tried launching chemicals and suggested bacteria as well for communications enhancements. In the 50s and 60s, 300 megatons of nuclear bombs were exploded in the atmospheres which released large amounts of charged and radioactive particles as well as over 40,000 electromagnetic pulses. Between 1962 and 1983 hurricane modification experiments tried seeding with silver iodide which seemed to reduce peripheral winds by 10%.²³¹

The Enmod Convention of 1977 is not so well known, but is responsible for a landmark development in multilateral verification regimes. In prohibiting the military or hostile use of any environmental modification techniques, the parties agreed to consult and cooperate with one another to resolve any problems which may arise and recognized the UN framework as a suitable setting.

More important, however, Article V envisions the creation of a Consultative Committee of Experts to meet on an ad hoc basis to investigate complaints. The scope assigned to this Consultative Committee has been restricted to fact finding and expert views, in order to prevent any politicization and bias that might arise from the power to make judgements. There was talk of making the committee a permanent institution and expanding its duties to encourage more information exchange and research cooperation, but this idea received no support in light of the marginal significance of the issue of environmental modification.²³²

ENMOD does not include verification mechanisms for identifying attempts by Parties to develop environmental modification techniques. These omissions were not accidental; at the time of ENMOD's negotiation, the USSR and the US agreed that environmental techniques could be used for peaceful purposes.²³³ Having noted the progress made in the conclusion of each verification regime, one must also note that this progress can be deceptive. The coming years present common challenges to all of these treaties.²³⁴

231 Today radio frequency technology is attempting to use ionospheric heating to change temperature and alter weather. Heating the ionosphere (35 miles above the surface) can have the effect of reducing the air density in the region beneath the heating (as the column of air rises). Radio waves used to heat the ionosphere would interact with the charged particles found at that altitude. This would create a magnetic phenomena known as a mirror force which would push that section of air upward and outward. The radio waves could change the atmosphere to act as a lense for focusing sunlight and heat a specific part of the earth or manipulate local wind patterns. It could alter jetstream patterns to increase rain in drought areas and even reduce devastating hurricanes. See more information in Intelligence Newsletter, December 16, 1999 and Air University of the US Air Force, AF 2025 Final Report, available at www.au.af.mil/au/2025/ (emphasis added).

232 A.S. Krass, *The Environmental Modification Convention of 1977: the question of verification*, in: A.H. Westing (Ed), *Environmental Warfare: A Technical, Legal, and Policy Appraisal*, Taylor and Francis, 1984, p. 74, footnote 159.

233 A. Anastassov, *The Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques*, in: UN Institute for Disarmament Research (ed.), *Verification of Current Disarmament and Arms Limitation Agreement*, Geneva 1991, p. 272 f.

234 S. Pimiento Chamorro and E. Hammond, *Addressing Environmental Modification in Post-Cold War Conflict. The Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques (ENMOD) and Related Agreements*, an occasional paper of The Edmonds Institute, 2001.

First, having been written in a different era, however forward-looking they may be, these Treaties are liable to encounter difficult interpretation issues. For example, the Outer Space Agreement does not define whether or not peaceful purposes excludes “passive” or “non-aggressive” military installations. This will inevitably be an issue if the US decides to test or deploy the Brilliant Pebbles program (the successor to SDI) as a cooperative defense system. Likewise, the Seabed treaty prohibits the emplacement of nuclear weapons on the Seabed, but not their movement over the seabed in submarines. The Enmod convention prohibits the “hostile use” of environmental modification techniques with widespread, long lasting, or severe effects – thus qualifying its application in four major ways.

Second, despite the evolution of cooperative efforts towards verification, the divide between the “haves” and “have nots” is an ever present challenge to the legitimacy of such a verification regime. “Have nots” are inherently dependent on those countries with the technological capability to verify compliance at the bottom of the sea or in outer space.²³⁵ These few countries thus form a small club that only verify one another. The Antarctic Treaty provides the clearest example of the issues bound to arise within these agreements as more and more states perceive the possibility of exploring these distant regions and assert their right to an equal voice and possibility in monitoring the implementation of the agreements.²³⁶

2.6. The International Atomic Energy Agency and the Nuclear Non-Proliferation regime

The safeguards system of the International Atomic Energy Agency (IAEA) and the nuclear non-proliferation regime represents the most significant multilateral verification effort to date.²³⁷

The original idea of such international cooperation to control the use of nuclear materials and verify through inspection can be traced back to the Baruch Plan of 1946, which proposed to place all the world’s nuclear resources under the control of an independent international authority with the power to verify, by inspections. This proposal was, however, rejected by the USSR who proposed that the US first destroy all existing nuclear weapons, insisted on the maintenance of Security Council veto powers on the control of materials use and refused the concept of inspection, suspecting an unfavourable ideological bias within an international organization.

235 The south regions concerns are mainly reflected in their initiatives to impose limits on environmental damage from war making, including the Central American Water Tribunal, which imposes moral sanctions in cases of severe pollution and the Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora (“African Interpol”), established by six African countries in 1999 to fight wildlife crime. See M. Drumbl, *International Human Rights, International Humanitarian Law, and Environmental Security: Can the International Criminal Court Bridge the Gaps?*, in: *ILSA Journal of International & Comparative Law* 6/2 (Spring 2000), available at www.nsulaw.nova.edu/student/organizations/ILSAJournal/6-2/Drumbl%206-2.htm. The European Union established criminal responsibility for ecocide in 1988 with its Convention on the Protection of the Environment through Criminal Law. See S. Pimiento and E. Hammond, *Umweltaspekte in Konflikten in der Ära nach dem Kalten Krieg*, Die ENMOD-Konvention, The Sunshine Project, Hintergrundpapier Nr. 6, April 2001.

236 See Sohr’s intervention during the London Conference, in G. Plant, 1992, p. 115.

237 P.d. Klerk, *The Role of the IAEA in Promoting Nuclear Non-Proliferation and Nuclear Disarmament*, available at cns.miis.edu/cns/projects/ionp/klerk.htm, See also D.A. Fischer, *History of the IAEA: The First 40 Years*, New York 1997.

The principles of multilateral verification for the peaceful uses of atomic energy were revived in President Eisenhower's 1953 "Atoms for Peace" proposal to the UN General Assembly²³⁸ and started to be put into practice in 1961²³⁹ by the International Atomic Energy Agency (IAEA), which was established in 1957. In combination with efforts to promote the peaceful use of nuclear energy, the IAEA Statute aims to ensure that this technology is not diverted to military functions. Articles II, XI and XII lay out a system of safeguards, whereby the Agency can verify the peaceful use of any agreed upon nuclear materials or technology.²⁴⁰ The principle of inspection on which this verification rests is remarkable as one of the first departures from the diplomatic practice of accepting agreements on only the "good faith" of contracting parties. It was for years seen, by East, West and South, as a major encroachment on the state sovereignty of nuclear exporters and importers, yet such intrusiveness on the part of an impartial international organization was still more appealing than inspection by the vendor state. The IAEA safeguards system, revised and extended, is still used to govern agreements with certain countries on certain facilities, but has been superseded by a wider instrument for the management of more complete verification agreements – the NPT.²⁴¹

The Non-Proliferation Treaty (NPT) emerged from negotiations between the US, USSR, and UK in part due to the realization that the successful IAEA safeguards system needed to be expanded and universalized if it was going to maintain the confidence of participating states. Concluded within the Eighteen Nation Disarmament Committee of the UN, the NPT represents an unprecedented degree of international cooperation for intrusive verification. Article III(1) of the NPT calls for compulsory and comprehensive IAEA safeguards on *all* nuclear material produced, processed, or used on national territory and on *all* nuclear material and equipment transferred to any other State. International Safeguards thus took on the objective of verifying legal commitments to non-proliferation, by "the timely detection of the diversion of significant quantities of nuclear material from peaceful nuclear activities

238 UNGAOR, 8th session, 470th meeting, paras. 79-126.

239 In 1961, the IAEA Board of Governors adopted INFIRC/26, the first safeguards system. It was subsequently revised and extended to cover not only reactors, but conversion and fuel fabrication facilities. The current agreement, known as INFIRC/66 Rev. 2, is applied to non-NPT parties who negotiate for IAEA safeguards, primarily as part of export/import transactions.

240 Safeguards can be implemented under three types of agreements: 1) Agency projects, 2) "unilateral submission agreements" which generally cover material or equipment supplied by another State under a co-operation agreement or 3) trilateral safeguards agreements including the Agency, a supplier State and a State receiving nuclear material or equipment.

241 The United States signed an Additional Protocol to its IAEA safeguards agreement in 1998, but has not yet ratified it. President George W. Bush transmitted the protocol to the Senate for its advice and consent on 9 May 2002. In his transmittal letter, Bush wrote that U.S. ratification of an Additional Protocol will "greatly strengthen our ability to promote universal adoption" of Additional Protocols, which "will contribute significantly to our nonproliferation objectives." The United States is currently encouraging Iran to ratify its Additional Protocol after Tehran signed it in December 2003. The IAEA had reported a month before that Iran had repeatedly violated its earlier safeguards. Arms Control Association, Fact Sheets, The 1997 IAEA Additional Protocol At a Glance.

to the manufacture of other nuclear explosive devices or for purposes unknown, and the deterrence of such diversion by the risk of early detection.”²⁴²

2.6.1.1 Characteristics of the Regime

The NPT has created a unique international verification system in which sovereign states invite an impartial institution to inspect sensitive installations and their use of nuclear technology.²⁴³

NPT safeguards²⁴⁴ rely on two layers working as checks and balances. The first layer is composed of three procedures – materials accountancy, containment, and surveillance – and is regulated by the second layer – IAEA on-site inspections.

First, *materials accountancy* is a form of *information exchange* practiced by all parties to the NPT. Upon accession to the Treaty each party must make an inventory of materials, declare the quantities and location, of nuclear materials and installations present on the territory and submit design information for any related facilities. From this data, the IAEA is able to locate material storage sites and “key measurement points” (KMP) in the fuel cycle. The state is required to create its own national system of accounting and keep records of material flows and transport through KMPs; these are compared with results obtained through periodic on-site measurements by IAEA inspections.²⁴⁵

Second, *containment procedures*, such as the application of locks, seals and other devices, further impede the diversion of declared materials and alert officials in case of any tampering.

Third, *surveillance techniques* include the use of video cameras, closed circuit television monitors and on-site inspectors to detect any undeclared activity or tampering with safeguarded material and equipment.

Inspections provide the second layer to this system of verification. Agency inspectors, nominated by the IAEA Board of Governors and approved by the inspected states, may visit declared sites to examine records, make independent measurements, check control and measuring equipment, and take samples for Agency analysis. To minimize the intrusiveness of this system and protect the “safe and normal operation” of these institutions, inspectors' rights of access are, however, limited to pre-designated sites agreed by both the Agency and the state.²⁴⁶ Any significant discrepancies between the “book inventory” derived from national

242 At this time, the system depended on Agency involvement in projects or the forthcoming request by a State to apply safeguards. See International Safeguards and the Non-Proliferation of Nuclear Weapons, International Atomic Energy Agency, April 1985. From the Safeguards Agreement for NPT – INFIRC/153, paragraph 28.

243 L. Scheinman, *Assuring the Nuclear Nonproliferation Safeguards System*, The Atlantic Council of the US, October 1992.

244 There are two range of safeguards agreement that the Agency has concluded: a comprehensive safeguards agreement (CSA) and an additional protocol (AP) in force. See J.N. Cooley, Integrated safeguards: current status of development and plans for implementation, Proceedings of the 42nd Annual Meeting of the Institute for Nuclear Materials Management (INMN), July 2001; and J.N. Cooley, The conceptual framework for integrated safeguards, Proceedings of the 43rd Annual Meeting of the INMN, June 2002.

245 All of the information reported to the IAEA or collected during inspections is maintained in a computer-based information system named ISIS.

246 As will be discussed below, this notion is being challenged.

accounting records and the “physical inventory” measured by the IAEA are considered “anomalies”²⁴⁷ or “materials unaccounted for” (MUF), the latter being more serious,²⁴⁸ must be satisfactorily explained by further investigation. In this way, the IAEA inspections verify the functioning of state systems of accounting and control of nuclear materials, but are not allowed to verify that *all* such material is *declared*.

Safeguards²⁴⁹ make up the most significant aspect of the NPT verification regime, but a complete picture must also mention the confidence-building effect of other NPT provisions. Safeguards are not “police measures” and cannot by themselves physically stop non-compliance, but rather they are a part of a larger set of legal, political and commercial barriers to Treaty violation. Articles IV and V provide a political incentive not to violate the Treaty, by rewarding compliance with technical assistance in the peaceful uses of nuclear energy. Positive and negative security guarantees were provided at the time of signature in UN Security Council Resolution 255 and various unilateral declarations. Article VI, by committing Nuclear Weapons States (NWS) to halt the arms race and vertical proliferation, aims to build confidence in a mutual dedication to the ideal of a nuclear-weapon free world.

In June 1995, the IAEA Secretariat submitted to the Board of Governors a set of proposals on the implementation of Programme 93+2. The proposals were considered in two parts: activities with which the Secretariat believed it had the authority to proceed with (Part I), and those for which it considered. The need for additional authority (Part II). Part I activities included:

the collection of environmental samples at sites where the IAEA already had the right of access;

the acquisition of information for which it had not previously asked, including data on parts of the fuel cycle that precede the introduction of safeguarded material into a reactor or enrichment facility, such as mining, processing and conversion plants; and information on past operations.

2.6.1.2 Evaluation of the Regime

According to Article III of the Non-Proliferation Treaty (NPT) each non-nuclear-weapon state party to the treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency (IAEA) in accordance with its statute and safeguards system. The purpose of such safeguards is to verify the fulfillment of the state party's obligations under the NPT – to prevent diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices.²⁵⁰

247 Anomalies are fairly normal. The Agency discovers about 400 of them each year for which logical explanations are usually found rather quickly.

248 The discovery of MUFs are not necessarily grounds for judgements of non-compliance.

249 Safeguards are measures to verify that states comply with their international (ie Treaty) obligations not to use in the case of Nuclear Safeguards nuclear material for explosives purposes. the need for such verification is reflected in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

250 Article III of the Treaty on the Non-Proliferation of Nuclear Weapons. The treaty entered into force on March 5, 1970. According to Article III, procedures for the required safeguards “shall be followed with respect to source or special fissionable material whether it is being produced,

The limitations of the NPT safeguards regime have been the subject of analysis for years,²⁵¹ but the debate has taken on even greater significance in the shadow of the Gulf War and the discovery of Iraq's extensive covert nuclear weapon program – the first discovery of intentional NPT non-compliance – and in view of the preparation for the 1995 Extension Conference.²⁵² The general consensus is that safeguards did not fail in Iraq, but that given their authority to monitor only declared facilities and activities, they were unable to detect, much less prevent, non-compliance.²⁵³ This is the result of several weaknesses.

First, the IAEA possesses very *limited authority*. Safeguards are designed to confirm state declarations, and not to verify compliance in its entirety. This is reflective of the IAEA's intergovernmental status; it operates between and not above sovereign member states. The Agency accepts baseline data from each state at its accession to the Treaty, and it is this “official” data, which is verified at the declared facilities²⁵⁴. The inspectors have the right to only limited access in the facilities they visit. *They may not search for undeclared sites and must give advance notice of their inspection*. Agency inspectors must be approved by the states to which they are sent, a process which often results in delays and difficulties in obtaining necessary visas.²⁵⁵ These

processed or used in any principal nuclear facility or is outside any such facility. The safeguards required shall be applied to all source or special fissionable material in all peaceful nuclear activities within the territory of such state, under its jurisdiction, or carried out under its control anywhere”. For the full text of the treaty, see the United Nations, available at disarmament.un.org/wmd/npt/npttext.html.

- 251 R.G. Johnston and M. Bremer Maerli, *International vs. Domestic Nuclear Safeguards: The Need for Clarity in the Debate over Effectiveness*, Issue No. 69, February – March 2003; T. Nottberg and O. Prygoda, *Countdown to the IAEA Report on Bushehr*, 2003, available at www.eisenhowerinstitute.org/CountdowntoBushehr.htm (The Eisenhower Institute); J. Carlson, *Nuclear safeguards: developments and challenges*, in: *Verification Yearbook 2001*, Verification Research, Training and Information Centre (VERTIC), London 2001, pp. 61-78; P. Leventhal, *IAEA's Safeguards Shortcomings: A Critique*, Washington, DC 1994; D.A.V. Fisher and P. Szasz, *Safeguarding the Atom: A Critical Appraisal*, Stockholm 1985; A.S. Krass, *Verification: How Much is Enough*, SIPRI, Stockholm 1985.
- 252 At this conference, the parties must decide whether to extend the Treaty provisionally or indefinitely, as is or with revisions. For more information see, inter alia, G. Bunn and C.v. Doren, *Two Options for the 1995 Extension Conference Revisited*, LAWS, 1992; G. Qester, *The Multilateral Management of International Security: The Nuclear Proliferation Model*, CISSM Project on Rethinking Arms Control, March 1993; Washington Council on Nonproliferation Consensus Report, *Towards 1995*, July 1993.
- 253 Traditionally, IAEA safeguards have been primarily concerned with verifying nuclear activities declared by the state – that is, determining the correctness of states' declarations. Failure to address adequately the possibility of undeclared nuclear activities being conducted – the issue of the completeness of states' declarations has, since the 1990-91 Gulf War, been recognised as a serious shortcoming in the classical safeguards system. See J. Carlson, *Nuclear safeguards: developments and challenges*, in: *Verification Yearbook 2001*, Verification Research, Training and Information Centre (VERTIC), London 2001, pp. 61-78.
- 254 Before the strengthened safeguards reforms were initiated, the IAEA had not been expected to look for undeclared nuclear activities, unless these were revealed through the agency's detection of diversion. While the IAEA has the right of special inspection, which can be applied to undeclared as well as declared locations, this right had never been exercised. It was generally considered that it should not be invoked unless there was substantial evidence of a safeguards breach. J. Carlson, op. cit., 2001, p. 62.
- 255 Some governments have, however, since 1995 accepted a voluntary recommendation that all inspectors whose appointments had been approved would, in absence of notice the contrary, be assumed acceptable.

delays, of course, provide ample time for a non-compliant state to conceal any evidence present at the facility to be inspected.

This limited authority is, however, being challenged. Recent interpretations of paragraphs 73 and 77 of the inspection protocol,²⁵⁶ have suggested that “special inspections” can provide access to undeclared locations, *but only with the consent of the concerned state*. The Board of Governments has recently confirmed the Agency's right to inspect these undeclared locations, in keeping with their obligation that safeguards will be applied to *all* source or fissionable material in all peaceful nuclear activities, if plausible evidence of undeclared materials or non-compliance can be presented.²⁵⁷

A second constraint is that the NPT safeguards system is material-oriented. The safeguards agreement (INFCIRC/153) limits itself to “source²⁵⁸ or special fissionable material”, operating under the assumption that by focusing on the flow of fissionable material “they should be able to detect any suspicious event or situation involving nuclear material in time to raise an alarm and thereby interdict its misuse.”²⁵⁹ Thus, a state need not declare data on any nuclear research installation until the presence of nuclear material is introduced and the Agency may not perform inspections in a facility that is not known to contain these materials.²⁶⁰ This presents another weakness of the regime: the Agency's access to information about possible violations.

The Director-General of the IAEA has said that “the most fundamental requirement for successful inspection is information. ... Inspectors must have *access to information* leading them to sites and installations of possible interest”.²⁶¹ NPT safeguards were designed primarily for open industrialized countries, with the object of minimizing the level of intrusiveness to protect industrial secrecy and reduce interference in research projects. Information is to be provided by the safeguarded states “as early as possible before nuclear material is introduced into the facility”, but

256 GOV/2554.

257 By 1995 the IAEA and member states had developed a detailed outline of strengthened safeguards measures. There was general acceptance that certain of the measures proposed (termed “Part 1” measures) could be carried out under existing safeguards agreements. The IAEA Board of Governors endorsed the implementation of these in March 1995, in time for the NPT Review and Extension Conference in April. The text of the model Additional Protocol (designated INFCIRC/540) was agreed by the Board of Governors in May 1997. For a detailed account of the development of the safeguards system and the NPT see D. Fischer, in T. Findlay (ed.), *Verification Yearbook 2000, Verification Research, Training and Information Centre (VERTIC)*, London 2000, pp. 43-56.

258 Source materials are those that are precursors to fissionable material (i.e. natural uranium in any form).

259 B. Sanders, *IAEA Safeguards: A Short Historical Background*, in: Mountbatten Centre for International Studies, *A Nuclear Triad: The Non-Proliferation of Nuclear weapons, International Verification and the International Atomic Energy Agency*, PPNN Study Number 3, September 1992.

260 This is a characteristic of INFCIRC/153 that is not true of the original IAEA safeguards agreement, INFCIRC/66, Rev 2, in which safeguard procedures are extended also to facilities in order to ensure that nuclear supplies are not used for military purposes. For discussion, see B. Sanders, *op. cit.*

261 H. Blix, Speech at the ANS/ENS/USCEA Nuclear Energy Forum, Chicago, 17 November 1992.

the Agency has no recourse if the required data are not provided in time to work out appropriate safeguard procedures or are not provided at all. The IAEA thus has no independent source of information outside the declared data. In maintaining an impartial perspective, the Agency has not used information from national intelligence sources and one can also understand that national authorities are inherently hesitant to share sensitive data with an international organization.

This practice, however, is also changing as the Agency realizes “it cannot possibly close its eyes to any credible safeguards relevant information. It is expected to be a watchdog, not an ostrich.”²⁶² As is evident in the case of Agency policy towards the suspected North Korean violation, where US intelligence led to the IAEA request for “special inspections”, the Agency can now receive and act on information obtained by member states through national means.

A third limitation is found in the organizational culture of the Agency's verification system and is not the result of its legal possibilities. The mind-set and attitudes of inspectors regarding their responsibilities is an important aspect of safeguard practice. “Patterns of conservatism and self-constraint became internalised to the extent that the agency occasionally gave more ground than necessary in negotiating subsidiary arrangements that regulate the operational side of safeguard agreements. Moreover the emphasis on material accountancy has led to an almost obsessive focus on sharpening and improving the attainment of quantitative goals.”²⁶³ This conservatism and disregard for non-quantitative warning signs of illegal activity hinder the detection of non-compliance. In making national assessments, inspectors have been known not to take into account widely available information made public in other circumstances but regarding unclear transaction of the country inspected.

Financial limitations are a fourth restraint to the safeguards regime. Since 1983, the safeguards budget has been frozen at \$30 million per year and Russian difficulties in paying their contribution, which makes up about 13% of the budget,²⁶⁴ further tighten the situation. Yet, the number of sites subject to safeguards has augmented; the technical complexity of safeguards has increased and political expectations of safeguard effectiveness continue to grow. “Expanding safeguards tasks, in the long run, requires expanded resources.”²⁶⁵

One result of these financial constraints has been a growing pressure from industrialized countries to concentrate safeguards on “suspect areas”. This would adjust the current distribution of safeguards spending, which was designed in the late

262 Idem.

263 L. Scheinman, *Lessons from Post-War Iraq*, in: *Arms Control Today* (April 1993), p. 6.

264 About \$160 million of the \$385 million the IAEA budget of 2004 has been allocated to those safeguard programs – for the salaries of about 230 inspectors and 200 administrative personnel, the cost of conducting roughly 900 inspections worldwide each year, and the cost of purchasing safeguard equipment. See the Congressional Budget Office documented dated March 5, 2004 related to the costs associated with ratifying the Protocol Additional to the Agreement Between the United States of America and the International Atomic Energy Agency Regarding Safeguards in the United States (Treaty Document 107-7), available at www.cbo.gov/ftpdocs/51xx/doc5160/IAEA.pdf.

265 H. Muller, *The Fourth Review of the NPT*, in: *SIPRI Yearbook 1990: World Armaments and Disarmament*, p. 561. The IAEA's budget, which has not increased in real terms since 1985. The 1996 budget for safeguards, however, rose to US\$86 million; in addition some US\$14 million in extra-budgetary resources was contributed by individual Member States.

1960s to monitor the large fuel cycles of major industrial countries and still concentrates 70% of its resources on three industrial democracies (Canada, Germany, and Japan) rather than on small declared programs such as those of Libya, Israel, Iran.²⁶⁶ A redeployment of resources, however, would entail discrimination against certain countries by making them the object of relatively more frequent intrusive inspections than others, or would have to focus on more sensitive facilities (i.e. those for reprocessing and enrichment) at the risk of relaxing the rigour of an already-criticized system. Both options involve unacceptable losses of credibility for an impartial verification regime.

Finally, the NPT²⁶⁷ regime shares a weakness common to many verification regimes – lack of enforcement. The Agency has only largely formal powers to declare sanctions. Any real enforcement action is the decision of individual states outside the framework of the NPT system.²⁶⁸ The Iraq case, where a coalition of states under the UN Security Council framework intervened to dismantle the non-compliant installations, is a special case of a state defeated in war and voluntarily accepting disarmament and inspections as part of a peace treaty. Yet, it is also a precedent for Security Council enforcement of the NPT regime. An IAEA Action Team was created under the authority of Security Council Resolution 687 to conduct inspections, make inventories, and tag dual-use items, but even with this support from the Security Council and political resolve, it now relies on information from outside intelligence and not only on the structural possibilities of the verification regime.²⁶⁹

The IAEA's experience and expertise in the application of safeguards will be employed in a number of important areas in three near future.

One area is further development of verification arrangements under regional nuclear weapon-free zone treaties. Joint inspection teams of IAEA inspectors and national inspectors from the zone, thus providing added confidence to those States that no undeclared activities relating to the development of nuclear weapons were being undertaken by other States in the region. (See section of Nuclear Free Zone);

Second, steps are underway to establish – in the United States and Russia – an international verification of fissile material removed from nuclear weapon programmes and

266 An additional 8% to 10% of the safeguards budget is spent on selected plants in the NWS and the largest part of the remainder on countries with large civil nuclear programs, such as Belgium and Sweden. See D. Fisher, *The London Club and the Zangger Committee: How Effective?*, speech at the National Institute for Public Policy Conference on Proliferation and Export Controls, Washington, D.C., 29-30 January 1992, p. 6.

267 As called for in the Treaty, in 1995, 25 years after its entry-into-force, a Conference was held to determine the fate of the NPT. States parties could agree to make the Treaty permanent (indefinite extension, the position supported by the United States and most Western states), extend it by one or more set periods, or end the Treaty entirely (an outcome no one viewed as remotely possible). After months a heavy diplomatic lobbying before the Conference, and intense negotiations during it, states parties agreed to three interlinked decisions: indefinite extension of the Treaty; a set of Principles and Objectives for Nuclear Non-Proliferation and Disarmament; and an enhanced review process for the Treaty. See BASIC's page on the 1995 Review and Extension Conference for more information.

268 See J. Howes, *Nuclear Proliferation: Down to the Hard Cases, Project on Rethinking Arms Control*, CTSSM, University of Maryland, 1993.

269 See A. Fainberg, *Lesson from Iraq: Strengthening IAEA Safeguards*, CISAC, Stanford 1993.

Third, pursuant to a request by the United Nations General Assembly to the IAEA, the possibility exists of some form of future Agency involvement in verification arrangements for a multilateral and internationally verifiable treaty banning all further production of fissile material for nuclear weapons or other nuclear explosive devices.

3. Global regimes for controlling chemical and biological weapons

Chemical and biological weapons (CBW) have been on the arms control agenda for a long time. The first step was taken with the Geneva Protocol of 1925, which prohibits only the *use* in war of asphyxiating, poisonous and other gases and of bacterial methods of warfare, but lacks a verification regime.

The verification gap has to some extent been filled by more recent United Nations fact-finding missions which investigate allegations of use, but these missions have never resulted in sanctions on the state in question, nor have they deterred states from violating the Geneva Protocol²⁷⁰. Over the years, the application of chemical and biological technology in civil industry has grown, and is increasingly open to misuse for military production. The spread of ballistic missile technology in the past few years has added to the threat, with chemical weapons in particular having the potential of becoming the 'poor mans' nuclear bomb'.

There has thus been a need for verifiable global agreements prohibiting not only the use, as was the case in the Geneva protocol, but also the possession, production or transfer of biological and chemical weapons. The end of the Cold War and the example of Iraq (representing the danger of proliferation of weapons of mass destruction) have opened the way for successfully negotiating such agreements.

In 1992 the Chemical Weapons Convention was concluded and possibilities for a verification regime to the 1972 Biological Weapon Convention are now seriously being examined. Even so, verification in the field of CB arms control remains an extremely difficult task, since most chemical and biological agents can be used for both civil and military purposes. Intrusive inspections are needed in order to be able to detect military production, and such measures touching upon national sovereignty require extensive negotiations in a global framework where many different viewpoints have to be melted into an agreement acceptable for all.

3.1. The Chemical Weapons Convention

The Chemical Weapons Convention (CWC) was opened for signatory in January 1993 and entered into in force April 1997. As at 21 May 2005, 168 countries are States Parties to the Chemical Weapons Convention.. CWC obligates states not to use, develop, produce or otherwise acquire, stockpile, or transfer chemical weapons. It also prohibits to assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under the convention, in language similar to that used in the nuclear Non-Proliferation Treaty. The CWC is the first global arms control agreement, which provides for intrusive verification of banning an entire category of weapons.

The convention took 25 years of negotiation in the United Nations Conference on Disarmament. Discussions remained fruitless for long, but the process accelerated in the late 1980's when the Soviet Union started to accept the principle of on site

270 See section on United Nations role in verification.

inspections (OSI). As in the case of INF, this came as a surprise to the US, who had thought that the 1984 Bush proposal of “anytime, anywhere” inspections for “effective verification” of a CW treaty would never be acceptable to the USSR. The US government, under pressure from the defence and intelligence community, began to express second thoughts about intrusive inspections as it was feared that these might expose sensitive military projects and trade secrets.²⁷¹ As a result, the US position moved in the direction of states like China and Pakistan, which in negotiations have always been eager to limit intrusiveness as much as possible.²⁷²

The final result of negotiations (the treaty of CWC) displayed a difficult balance between the initial objective of effective verification and the need for the protection of sensitive information. This is a classic dilemma of verification that has been particularly evident in the case of chemical weapons; distinguishing peaceful uses of chemicals from military purposes requires intrusive inspections in both military and civil production facilities (the fact that CW are relatively quickly and cheaply produced makes the detection of possible cheating even more complicated). Although Western countries in principle support such intrusiveness for the purpose of detecting CW production in Third World countries, they do not like to expose their large chemical industries (often relying on patented technologies) to far-reaching international inspection.

3.1.1 Implementation

The responsibility related to the implementation of the treaty has been entrusted to the Organization for the Prohibition of Chemical Weapons (OPCW), which is established in The Hague, Netherlands in 1997 by the countries that have joined the Chemical Weapons Convention (CWC) to make sure that the Convention works effectively and achieves its purpose.

The OPCW is made up of three organs: The Conference of States Parties (supreme body), the Executive Council (rotating membership of 41 members according to UN standards of equal geographic distribution) and the Technical Secretariat, which will carry out the inspections and day-to-day activities.

The OPCW is responsible for efficacious implementing of the verification regime by doing the following activities:

assessing declarations made by its member countries on a regular basis – this amounts to thousands of pages of documents in six languages;

conducting regular on-site inspections of declared military or industrial sites and/or facilities to check (i.e. verify) the accuracy of the declarations made;

conducting challenge inspections; and

investigating any report that chemical weapons have been used.

271 US ambassador Stephen J. Ledogar stated: “We have some very sensitive sites having to do with ‘black’ programs, intelligence activities, nuclear weapon design, command and control and so forth. As we got a little bit deeper into the implications for ourselves, the idea of inspections being anywhere, immediately, in light of what could be the losses to our intelligence and technology lead, became very worrisome. It was then, about three years ago that we started to modify this slogan.” *Interview*, in: *Arms Control Today* (October 1992), p. 9.

272 For a good summary of the negotiations, see G.M. Burck, *The Chemical Weapons Convention Negotiations*, in: *Verification Report*, op. cit., 1992, pp. 122-130.

Chemicals covered by the CWC are listed in three “schedules”, corresponding to the risk they pose to the objectives of the treaty.

Schedule 1 concerns supertoxic agents such as mustard and nerve gas, which have little use other than as chemical weapons. These chemicals must be destroyed, except for a small quantity.

Schedule 2 chemicals pose a “significant risk”, being either highly toxic or used as direct precursors for schedule 1 chemicals.

Schedule 3 includes a variety of other chemicals which pose a risk to the purpose of the convention, and are mostly produced on a large scale in the commercial industry. Production of such agents must only be declared if it goes beyond a certain level.

The verification provisions are different for each schedule; the higher the number the less intrusive. In a first phase of CWC implementation states must give extensive declarations of production facilities and provide plans for the elimination of chemical weapon stocks and CW production capabilities. These data provide baselines for inspections.

The implementation of the Chemical Weapons Convention's (CWC) verification regime is done by means of inspections. The CWC relies on two important types of inspections: routine²⁷³ and challenge inspections as well as investigation of alleged use of chemical weapons. Routine inspections take place at declared sites only, for which the convention specifies a list of rights and obligations for inspection teams and host countries. Inspectors, for example, have the right to interview personnel, inspect documentation and records, take pictures and samples and obtain clarifications of ambiguities, which may arise.

The provisions of the CWC, foresees several types of inspections²⁷⁴ that can be conducted, in military and industrial sites:

Military Sites that are:

1. At former Chemical Weapons Production Facilities (CWPF);²⁷⁵
2. At Chemical Weapons Storage Facilities (CWSF);
3. At sites of Old Chemical Weapons (OCW);²⁷⁶

273 D. MacEachin, *Routine and challenge: two pillars of verification*, in: The CBW Conventions Bulletin 39 (March 1998), pp. 1-3, available at www.fas.harvard.edu/~hsp/bulletin/cbwcb55.pdf.

274 181 inspectors from 53 countries carry out inspections for OPCW. For more information OPCW website, www.opcw.org. See also G.D. Rowe, Using Airborne Remote Sensing to Verify the CWC, in: The Nonproliferation Review 3 (Spring-Summer 1996), available at www.cns.miis.edu/pubs/npr/vol03/33/rowe33.pdf.

275 In 2002, 30 CWSFs were under systematic verification. Between entry into force and 31 December 2002, 11 States Parties had declared 61 CWPFs. According to paragraph 30 of Part V of the Verification Annex and a decision of the Conference (C-I/DEC. 29, dated 16 May 1997), States Parties were required to destroy 40% of their aggregate production capacity by 29 April 2002, 5 years after entry into force. By that date, all States Parties with declared CWPFs had met this destruction deadline, and 5 – China, France, Iran (Islamic Republic of), Japan, and a State Party – had destroyed 100% of their aggregate production capacity. By the end of 2002, 28 CWPFs had been completely destroyed, and 8 had been converted for purposes not prohibited by the Convention. Of the remaining 24, 12 were to be converted, and the rest (including 3 that had been converted temporarily for chemical weapons destruction purposes) were to be destroyed. (OPCW, 2004).

4. At sites of Abandoned Chemical Weapons (ACW);²⁷⁷
5. Continuous monitoring of destruction of chemical weapons at Chemical Weapons Destruction Facilities (CWDF).²⁷⁸

In Industrial and Research Sites inspections are made in:

1. Facilities dealing with the chemicals listed in the Annex on Chemicals of the CWC, Schedule 1 chemicals and facilities are subject to the most stringent verification measures, which are more comprehensive than in any other arms control agreement. Included are rights to unimpeded access, to tag equipment, take samples and leave continuous monitoring devices behind. This also applies for CW production facilities, which have been converted for nonmilitary uses. Initial inspections require a 72-hours notice, subsequent inspections only a 24 hours notice.²⁷⁹
2. In Facilities, which produce, consume or process the chemicals listed in the Annex on Chemicals of the CWC as Schedule 2 chemicals. On facilities producing schedule 2 and 3 chemicals, access must also be granted, but may be restricted to a certain extent, and some measures may need the prior consent of the host state. For production facilities pertaining to schedule 2, access is restricted to certain areas and equipment made explicit in the treaty.²⁸⁰

276 So far only three State Parties of the CWC – Canada, Slovenia, and United States – had destroyed all the OCWs they had discovered and declared, though new discoveries were still expected.

277 Four State Parties – Belgium, Germany, Italy, and United Kingdom – operate a number of CWDFs for OCWs on a semi-continuous basis.

278 Between entry into force and 31 December 2002, OPCW inspectors confirmed the destruction of a total of 7,169 metric tonnes of chemical agents in the 4 States Parties (India, Russian Federation, the United States and ...) that had declared chemical weapons stockpiles. In 2002, seven declared full-scale CWDFs were operating at one time or another in four States Parties: one in India, one in the Russian Federation, four in the United States, and one in a State Party. In addition, a Category 2 chemical weapon, phosgene, which had been drained from munitions in 2001, was destroyed at one other facility in the Russian Federation. Two States Parties also destroyed or treated a limited number of Category 1 chemical weapons that were in a hazardous condition. (Sources: 2004, opcw. www.opcw.org).

279 As at 31 December 2002, 21 States Parties had declared a total of 26 Schedule 1 facilities subject to systematic verification through regular inspections: 8 single small-scale facilities, 17 other facilities for protective purposes, and 1 other facility for medical, pharmaceutical, and research purposes.

280 As at 31 December 2002, 33 States Parties had declared 438 Schedule 2 plant sites. These figures are based on annual declarations of activities over the previous 3 years and of anticipated activities for 2002. One hundred and fifty-six of the 438 declared Schedule 2 plant sites in 21 States Parties involved in production, processing, or consumption activities were above the inspection thresholds stipulated by the Convention. A combined total of 378 Schedule 2 plant sites, or 86%, were declared by 11 States Parties – Australia, China, France, Germany, Italy, Japan, Netherlands, Spain, Switzerland, United Kingdom, and United States – each of which declared 10 or more Schedule 2 plant sites. One hundred and twenty of the 156 inspectable Schedule 2 plant sites, or 77%, were located in 7 States Parties – China, France, Germany, Italy, Japan, Switzerland, and United States. Each had 10 or more inspectable Schedule 2 plant sites. (For further details on declared and inspectable Schedule 2 plant sites, see Annex 8).

3. Facilities, which produce the chemicals, listed in the Annex on Chemicals of the CWC as Schedule 3 chemicals.²⁸¹
4. And in other chemical production facilities. These are facilities that produce unscheduled discrete organic chemicals more than 200 metric tons per year, or produces unscheduled organic chemicals containing phosphorous, sulphur and fluorine, called PSF chemicals, more than 30 metric tons per year. Under schedule 3 such access needs the prior consent of the host country, and that also applies to taking samples and reviewing records. The precise inspection standards for schedule 2 will be determined by "facility agreements" negotiated in the OPCW Preparatory Commission (PrepCom) and approved by the Executive Council, in a manner similar to that of "facility attachments" used by the IAEA for the implementation of NPT agreements. The number of inspections in each state is limited; annually a maximum of two per site, and an overall maximum of 20 per country.²⁸²

Table 5: Facilities, by Type, declared as at December 31 2002 and related details

Schedule 1	21	26	26/21
Schedule 2	33	438	156/21
Schedule 3	34	497	437/34
OCPFs [3]	60	4,117	3,990/58

By June 2002, OPCW inspections had carried out about 1200 inspections at more than 500 sites in 51 countries²⁸³ throughout the world.²⁸⁴ As in previous years, most OPCW inspection activities were devoted to chemical weapons-related facilities – 60% of all inspections and 81% of all inspector days for 2002. Forty-four rotations or missions were conducted to monitor the destruction of chemical weapons at CWDFs. Inspection teams also continued to verify the destruction or conversion of CWPfFs (40 inspections) and the non-removal, except for the purpose of destruction, of chemical weapons from CWSFs (31 inspections). Five inspections of ACWs, and 7 of OCWs, were also conducted in 2002.

281 As at 31 December 2002, 34 States Parties had declared 497 Schedule 3 plant sites. These figures are based on annual declarations of activities in 2001 and of anticipated activities for 2002. 2.14 Of the 497 Schedule 3 plant sites declared, 437 in 34 States Parties were above the inspection threshold. Three hundred and sixty Schedule 3 plant sites, or 82% of all inspectable facilities, were located in 7 States Parties – China, France, Germany, India, Japan, Russian Federation, and United States – each of which had 10 or more inspectable Schedule 3 plant sites. (For further details on declared and inspectable Schedule 3 facilities, please see Annex 9).

282 By 31 December 2002, 60 States Parties had declared 4,117 plant sites that produced discrete organic chemicals (DOCs). Of these, 3,990, in 58 States Parties, were above the inspection threshold (for details on declared and inspectable DOC facilities, see Annex 10).

283 See annexes.

284 OPCW, 2003, available at www.opcw.org/html/global/ar/2k2/chapter_2.html.

Table 6: A summary of all inspections conducted in 2002

Type of Facility	No. of Inspections Budgeted	No. of Inspections Completed	No. of Sites	No. of Inspector Days
CWDF	95	44	9	5,444
CWPF	33	40	21	953
CWSF	35	31	30	915
ACW	5	2	2	77
OCW	7	6	6	94
EDCW/DHCW	n/a	2	n/a	171
Schedule 1	18	9	9	168
Schedule 2	40	21	21	564
Schedule 3	42	23	23	436
OCPF	32	32	32	572
Total	307	210	152	9,394

3.1.2 Non-compliance

If states have serious compliance concerns about a certain country, they may request challenge inspections at any site. Such a request can only be turned down by a three quarter majority of the Executive Council, and must be accepted by the challenged state. Such intrusiveness is unprecedented in arms control agreements. A member country does not have the right to refuse a challenge inspection or to block access to the challenged site. No member country has yet requested a challenge inspection against another member country. And the OPCW has never had to carry out so far an inspection to check whether chemical weapons have been used.

However, access to facilities is limited in two ways. First, the host country can negotiate with the inspection team about the location of the perimeter within which the inspection will take place. Second, inside the perimeter the formula of “managed access” may be applied, which requires negotiation over the extent of access to particular places and over certain inspection activities. For example, sensitive papers can be removed, sensitive equipment may be covered, computers logged off, and inspectors may only be allowed into a given percentage of rooms or buildings chosen at random.

Strict timetables have been set for the negotiations and transfers, which take place in the time between the request of a challenge inspection and the actual inspectors' entry into the site. The total delay can amount to a maximum of 120 hours, which according to most experts still makes it possible for an inspection team with sophisticated equipment to determine whether chemical weapons related material has been present at the site.²⁸⁵

The Convention does not specify how the decision on whether or not a state has violated the agreement, will be made. The US in particular has opposed that the Executive Council or the Conference of the States be explicitly given the power to make such determinations. The Conference of States does have the authority to “take the necessary measures to ensure compliance ... and to address and remedy any situation which contravenes the provisions of this Convention” (Article VIII, 20k), possibly leading to actions by the Security Council. Provisions have been made for settling disputes between states over application or interpretation of the Convention through the International Court of Justice, an improvement over many arms control agreements, which do not have such provisions.

285 See for example, C.C. Flowerree, *The Chemical weapons Convention: A Milestone in International Security*, in: *Arms Control Today* (October 1992), p. 5.

Information obtained by inspections is likely to be suggestive rather than speculative. As Micheal Krepon noted: “Perceptions are likely to rest heavily on information collected and released by national governments or the organization created by the treaty, the suspect state's efforts to satisfy concerns, and the standing of the states lodging and dodging accusations of cheating”.²⁸⁶

3.1.3 Evaluation

It is clear that the insistence on protecting sensitive information has allowed for serious gaps in the verification regime. Routine inspections relating to schedule 2 and 3 “dual use” chemicals may leave many questions unanswered, while challenge inspections only offer limited means to address concerns over compliance.

If the annual quantity of scheduled chemical processed, consumed and/or produced in a declared facility exceeds a specified threshold, the facility becomes liable to routine inspection by the OPCW Technical Secretariat. It is not obvious, in retrospect, that this simple quantitative method for triggering the international inspectorate into action within civil industry is really the best way of ensuring that all industrial 'dual use' facilities that are especially vulnerable to abuse are brought within the ambit of routine inspection. As set out in the treaty, the trigger is clearly a compromise.²⁸⁷

The most difficult task of verifying the CWC will relate to activities in undeclared facilities. These will have to be detected by national technical means and human intelligence,²⁸⁸ and subsequently subjected to challenge inspections. Since the entry into force of the Convention, no State Party invoked a challenge inspection in any other State Party in order to clarify and resolve any question concerning possible non-compliance; neither was the OPCW requested to carry out any investigation of the alleged use of chemical weapons in the year under review.²⁸⁹

Critics of the Convention have argued that with relatively lean challenge inspections, cheating would be most likely to take place in undeclared facilities, thus rendering the costly routine inspection regime useless. Even if undeclared facilities would be detected and inspected, it would be very difficult to come up with hard evidence of non-compliance. Cheating would hardly be prevented in this way.

286 M. Krepon, *Verifying the Chemical Weapons Convention*, in: *Arms Control Today* (October 1992), p. 23.

287 J.P. Robinson, *Strengthening the Biological Weapons Convention*, Briefing Paper No 11, The CWC Verification Regime: Implications for the Biotechnological & Pharmaceutical Industry, 1998, p. 9.

288 The experience of UNSCOM (see section on UN) has born out the importance of intelligence information in detecting undeclared activities. At the same time, this brings up the question of unequal access to the necessary means for doing so. Only a few states have the technical means to provide evidence for triggering challenge inspections. Most of those means are in the hands of the United States.

289 The Secretariat did, however, participate in a trial challenge inspection in the United Kingdom and in a similar exercise in the Netherlands jointly organised by that country and the United Kingdom. The Secretariat also took part in a tabletop challenge inspection exercise in the United States. In addition, all inspectors who might be assigned to challenge inspections or investigations of alleged use took regular refresher courses with a view to maintaining a high level of readiness. (OPCW, 2004, available at www.opcw.org).

Another view is that it is sufficient to create a certain risk for cheaters to be detected, and thus deter states from non-compliance.²⁹⁰ Verification of the CWC is not an impossible task: if it is indeed difficult to pinpoint CW production in the early stages of activities, it is equally difficult to hide traces of CW once they have been produced. Cheating would most probably only be possible in low quantities. In response to the criticism concerning the cost of routine inspections, it has been stressed that such inspections have an important confidence building aspect.²⁹¹ Further, routine inspections are very intrusive with respect to schedule 1 chemicals, and pose a significant risk of detection for misuse of schedules 2 and 3 chemicals. Without these inspections there would be no minimum guarantee against cheating, nor would verification be provided for the destruction of declared CW stockpiles and production facilities.

The question whether the costs of verification will outweigh the benefits is an important one, though. During the negotiation of the CWC, Kathleen Bailey, among others, has argued that estimated annual implementation costs of \$500 million (plus one time costs of \$1 billion) and additional costs borne by national governments and industry, are too heavy a burden compared to the limited effectiveness the verification measures would have.²⁹² The issue becomes even more pertinent when taking in mind that most of the routine inspections will take place in Western industries, where non-compliance is least likely.²⁹³

OPCW's cash shortfalls in 2002 had lead to less destruction activity at CWDFs during the year 2002 than had been expected, of the 307 inspections originally budgeted for the year 2002, only 210, or 68%, were conducted. Only 85, or 64%, of the 132 industry inspections budgeted for were carried out in 2002. Because of the cash Article VI inspections were substantially cut back in 2002. Nine of the 18 Schedule 1 inspections budgeted for, 21 of the 40 Schedule 2 inspections budgeted for, and 23 of the 42 Schedule 3 inspections budgeted for were conducted in 2002.²⁹⁴

However, in the final analysis, the choice is between an imperfect (yet far-reaching) treaty or no treaty at all. Most observers have concluded that the first option is to be preferred. Patricia Bliss McFate, for example, noted: "The CWC will not stop proliferation and its verification regime will be far from perfect. On balance,

290 J.B. Tucker, *Verifying a Multilateral Ban on Nuclear Weapons: Lessons from the CWC*, in: The Nonproliferation Review 5 (Winter 1998), available at cns.miis.edu/pubs/npr/vol05/52/tucker52.pdf.

291 See T. Bernhauer, *The Control and Disarmament of Chemical Weapons*, in: S. Sur (ed.), *Verification of Disarmament and Arms Limitation Agreements*, UNIDIR, Geneva 1992.

292 For an excellent overview, see K. Bailey, *Problems with a Chemical Weapons Ban*, in: *Orbis*. A journal of world affairs (Spring 1992), pp. 239-251. The costs estimates she presents are from the US Congressional Budget Office. Lower costs have been mentioned. Brad Roberts, for example, mentions \$150 million a year, dropping more than a half per year once the destruction phase is completed. See B. Roberts, *Chemical Disarmament and International Security*, Adelphi Paper 267, Spring 1992, p. 32. The costs are to be shared following the United Nations weighted assessment system.

293 It has been proposed to substitute a large part of routine inspections by an "ad hoc" inspection regime which would provide a register of activities in the entire chemical industry that would be subject to some form of periodic inspection by the OPCW or national authorities. This proposal, however, met strong resistance mainly from the so-called non-aligned countries and China.

294 OPCW 2004.

however, a CWC that slows the proliferation of chemical weapons is in the interest of the international community even if there are major flaws in its verification regime.”²⁹⁵

Many observers have stressed the need for complementing the verification measures with protective measures and export controls.²⁹⁶ In this respect it is worth mentioning that the Convention contains provisions, which prohibit any trade or assistance in the field of chemistry to non-parties, and suggest the lifting of export control for those states, which adhere to the treaty. The so-called Australia Group has made arrangements for implementing these 'carrots and sticks' in its export control regime.²⁹⁷ Another 'carrot' for countries to adhere to the treaty, is the provision that assistance will be given to states being threatened or attacked with chemical weapons.

A true assessment of the verification regime can only be made when actually put all the instruments of verification specially challenge inspection to the test. At the international level, the Secretariat has carried out over 1,000 routine inspections accepted by militaries and chemical industries around the world. It has also processed a huge amount of national security and confidential business information, apparently with no significant breaches of its strict classification procedures. At the national level, many states parties have enacted legislation to implement the CWC and enforce its prohibitions. Many National Authorities have a much clearer picture, not just of activities involving scheduled chemicals on their territory, but of activities involving all toxic chemicals and precursors. The significance of these achievements cannot be understated.²⁹⁸

The effective implementation of the convention depends to the large extent as always on the political resolve of the unsolved issues of the CWC implementations.²⁹⁹ For example, will challenge inspections prove to be too heavy a political instrument, which rarely will be used, or will they be more of a routine procedure to address concerns? Other aspects also remain uncertain: can appropriate standards for facility agreements and access rights be established? What will be the frequency of inspections? Will countries live up to their financial obligations? How will improvements in verification techniques be incorporated over time?

295 P.B. McFate, *Where do we go from here? Verifying future arms control agreements*, in: Washington Quarterly (Autumn 1992), p. 81. While expressing concern over flaws in the verification regime, she also notes: “The regime meets the standard of military significance if only military use of chemical weapons is considered; it meets this standard because of the synergies inherent in the combination of on-site inspections and the advanced means of gathering multiple sources available to the United States. The convention is hardly the answer to chemical weapons proliferation, but it will provide the infrastructure for improving international security by setting a standard of compliance for its signatories...”

296 See, for example, G.S. Pearson, *Prospects for Chemical and Biological Arms Control: the Web of Deterrence*, in: The Washington Quarterly (Spring 1993), p. 156. See also, U. Cipolat, *The new Chemical Weapons Convention and export controls: towards greater multilateralism?*, in: Michigan Journal of International Law 21/3 (Spring 2000), pp. 393-444.

297 See section on export controls.

298 D. Feakes, *Evaluating the CWC verification system*, no. 4, 2002, pp. 11-23 available at www.unidir.ch/pdf/articles/pdf-art1822.pdf.

299 OPCW document C-VII/3 dated 10 October 2002. I. Kenyon, *The Chemical Weapons Convention and OPCW: The challenges of the 21st century*, in: The CBW Conventions Bulletin 56 (June 2002), pp. 1-2, available at www.fas.harvard.edu/~hsp/bulletin/cbwcb56.pdf.

3.1.4 Conclusion on the CWC verification regime

The verification regime of the CWC cannot but reflect the ambivalence of combining the obligation to accept inspections with the right to protect industrial national security secrets. It will be difficult to come up with hard evidence of non-compliance, and any interpretation of the facts will probably to a large extent depend on the reputation and status of the state concerned. In a global agreement many different viewpoints have to be incorporated, and the verification regime is thus inevitably a mixed result of compromises. Since accession to the treaty by as many countries as possible has been an important objective, verification measures could not be too stringent in order to be accepted by all concerned.

Despite its shortcomings, the convention is a remarkable achievement introducing intrusive challenge inspections in a non-discriminatory, broadly based global regime. The presence of an international inspectorate could induce actors entangled in regional disputes to sign the convention jointly, as, for example, Pakistan and India have done.³⁰⁰

3.2. Biological Weapons Convention

The conclusion of the Chemical Weapons Convention in 1992 has raised expectations about establishing a verification regime for the 1972 Biological Weapons Convention. In fact, there is a considerable degree of overlap between the two types of weapons as they share some important characteristics. However, biological weapons have distinct features, which make a ban on them even more difficult to verify than on their chemical counterpart.

3.2.1 Nature of weapons

Biological warfare agents are living organisms, which can produce and spread epidemic diseases. Toxins are generally considered to fall under this definition; they resemble chemical weapons in nature but have a biological origin. Biological weapons (BW) can be used in very small quantities, and once brought about, the epidemics can easily spread. One irresponsible country could in fact endanger the entire world.

Delivered under optimal conditions, the pound for pound killing capacity of biological agents exceeds that of nuclear weapons. It is estimated that in a major urban area the detonation of a one megaton hydrogen bomb would result in between 570,000 and 1,900,000 deaths. One hundred kilograms of anthrax spores delivered optimally would result in between one and three million deaths. Under less optimal conditions (sunny, windy, bright light, etc...) the same amount might kill between 130,000 and 1,400,000 people. Chemical weapons, while horrific, are comparatively less powerful. The same amount of sarin nerve gas, delivered on under optimal conditions, would be unlikely to kill in excess of 8,000 people.³⁰¹

300 I.R. Kenyon, *Chemical Weapons in the Twentieth Century: Their Use and Their Control*, in: The CBW Conventions Bulletin (June 2000), pp. 1-15. *The CWC at the Two-Year Mark: An Interview With Dr. John Gee*, in: Arms Control Today 29/3 (April/May 1999), pp. 3-9, available at www.armscontrol.org/ACT/aprmay99/jgam99.htm. *Prospects for Progress: Drafting the Protocol to the BWC: An Interview With Ambassador Tibor Tóth*, in: Arms Control Today 30/4 (May 2000), pp. 10-15, available at www.armscontrol.org/ACT/may00/intma00.htm.

301 From the United States Congress, Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, OTA-ISC-559, August 1993, pp. 53 f.

The development, storage and development of BW require the strictest safety measures. As in the case of chemical weapons, doubts have been expressed about the military utility of BW; the reaction over an area is delayed, it is dependent on meteorological circumstances, and an attack could backfire. However, rapid progress in bio-technology has caused a re-evaluation of the threat they present³⁰². Techniques have advanced and new fields have been opened for research, while the cost factor has been reduced. For example, dramatic improvements in fermentation technology permit the production of huge amounts of biological agents in small facilities.

“The outlook for biological weapons is grimly interesting. Weaponeers have only just begun to explore the potential of the biotechnological revolution. It is sobering to realize that far more development lies ahead than behind.”³⁰³

It is obvious that genetic engineering could easily be abused to construct more effective biological weapons. Anthrax and plague are already very dangerous and lethal diseases, but from a bioweaponeers point of view they are less than optimal to serve military purposes. Genetic engineering may help to change this. Microorganism can be made resistant to antibiotics or vaccines, even more lethal, easier to handle, harder to detect, or more stable in the environment.³⁰⁴

Many possibilities for the abuse of genetic engineering to create weapons have emerged. Examples³⁰⁵ are “Invisible” Bioweapons,³⁰⁶ Drug-Resistant Bioweapons,³⁰⁷ Making Harmless Microbes Deadly³⁰⁸ and Cloned Toxin Genes.³⁰⁹

302 See E. Geissler, *Strengthening the Biological Weapons Convention through Greater Transparency*, in: Verification Report, op. cit., 1992.

303 M. Meselson, *Averting the Hostile Exploitation of Biotechnology*, CBW Conventions Bulletin, June 2002, p. 16.

304 Sunshine project, backgrounder Series, Number 10, April 2002, An Introduction to Biological Weapons, their Prohibition, and the Relationship to Biosafety.

305 Sunshine project, idem.

306 In the 1990s, Russian researchers succeeded in altering the immunological properties of anthrax, making existing vaccines and detection methods ineffective against the new genetically engineered types. Russian researchers also developed a new vaccine that is effective against the artificial strain. Following the Russians, the US Department of Defence is now also genetically engineering anthrax. According to the US, the secret experiments are to test if the Russian microbe can defeat the US anthrax vaccine, idem.

307 The German Army’s Institute for Microbiology in Munich works with tularemia bacteria that are genetically altered to withstand antibiotic treatment. Tularemia is a top candidate for biological warfare and has been weaponized in several offensive programmes. According to the German Ministry of Defence, this project is basic research to better understand tularemia biology. The bacteria were equipped with the gene for a fluorescent protein to follow the infection pathway of the bacteria. As a so called marker, a second gene was introduced that codes for a resistance against the antibiotics tetracycline and chloramphenicol. The rationale behind this experiment might have been defensive, but at the same time the pathogens were conferred a better offensive potential as they could no longer be treated with these antibiotics.

308 D.L. Robertson, S.H. Leppla, *Molecular cloning and expression in scherichia coli of the lethal factor gene of Bacillus anthracis*, in: Gene 44/1 (1986), pp. 71-78. Genetic engineering can turn a previously harmless bacteria into a lethal biological weapon by introducing deadly genes from a pathogenic organism. This was done by US researchers as early as 1986. They isolated the gene for the lethal factor of anthrax and introduced it into Escherichia coli, a normally harmless gut bacteria. The US team reported that the lethal factor protein was active in the gut bacteria and displayed the same deadly effects as it does in its native B. anthracis.

Most experts would agree with the assessment of the United States that “the biological weapons threat is real, growing, extremely complex, and extremely dangerous”.³¹⁰

These developments are of great relevance to the civil industry, but have also caused international concern about the proliferation of BW, making verification of the BWC a more pressing issue. At the same time, the increasing relevance of biotechnology makes control over it even more difficult. Many biological agents are *dual-use* goods: they can be applied for either civil or military uses. Countries have a legitimate interest in access to biotechnology for civil purposes, but this implies an inherent capability to develop weapons with it. Biological agents can be made operational for military use within a relatively short time. This makes verification of a BWC a very difficult exercise.

3.2.2 *The Convention; an emperor without clothes*

The Biological and Toxin Weapons Convention was opened for signature in 1972 and came into force in 1975. It prohibits the development, production, stockpiling, acquisition and retention of microbial or other biological agents or toxins, which have “no justification for prophylactic, protective or other peaceful uses” (Article I). Some 120 states have signed and ratified the treaty. Only few countries have incorporated the treaty obligations into national law, and a considerable number of signatories, among which the five permanent Security Council members have preserved the right to retaliate against the use of BW. About 11 countries are believed to possess biological weapons programs.³¹¹

The BWC was the first international treaty to ban a whole category of weapons, but it lacks a verification regime. It only provides for consultation and cooperation in application of treaty provisions “through appropriate international procedures within the framework of the United Nations and in accordance with its Charter”. Complaints regarding non-compliance may be referred to the Security Council. Independent of the Convention, investigations of possible use can be carried out by UN fact-finding missions³¹². There have been several allegations of use, yet most have been supported by little evidence and have been impossible to prove. The most well known cases are the “Sverdlovsk” and “Yellow Rain” incidents. Both concerned US accusations against the USSR; in 1980 the US claimed that an outbreak of anthrax in Sverdlovsk had been caused by an accident in an illicit Soviet biological facility; in 1981 the Soviet Union was accused of using trichotecene mycotoxins in Laos, Kampuchea and Afghanistan. However, expert opinions differed whether the biological agents involved were accidents resulting from civil use and natural

309 The cloning of toxin genes in bacteria makes it possible to produce formerly rare toxins in large quantities. Also covered under the Chemical Weapons Convention, toxins include many of the deadliest substances on earth and pose threats to humans, animals, and plants.

310 US Department of State, Bureau of Arms Control, New ways to strengthen the international regime against biological weapons, Fact sheet, Washington, DC, 19 October 2001, available at www.state.gov/t/ac/bw/fs/2001/7909.htm.

311 These include China, Egypt, Iraq, Israel, Laos, Libya, North Korea, Syria, the former USSR, Vietnam, and possibly Taiwan. United Kingdom Defence White Paper, Statement on the Defence Estimates 1992, p. 74, para. 3.

312 See the section on the United Nations.

circumstances, or were related to military purposes.³¹³ UN fact-finding missions dispatched to investigate the “Yellow Rain” case in 1981 and 1982, did not produce any conclusions. In retrospect, it has become clear that the Soviets were in fact cheating in the biological area by their continued programs in the offensive domain.³¹⁴

3.2.3 *Review Conferences and Confidence-Building Measures; the path to verification*

The need to add verification measures to the BWC has been discussed at the three Review Conferences (scheduled every five years) held so far in 1980, 1986 and 1991. These discussions only resulted in the adoption of a series of voluntary measures to enhance transparency of activities involving biological agents. The Second Review Conference established the following CBM's:

declaration of laboratories

declaration of unusual outbreaks of disease

encouragement of publication of research results

encouragement of international contacts and conferences

At the Third Review Conference, these measures were made more precise, while declarations of biological defense programmes, vaccine production facilities, and of national legislation related to BWC were added to the list. However, the implementation of voluntary measures has been insufficient. Although the number of countries, which have submitted the required information to the UN, has increased over the years, only about a third of all signatories responded to simple yes/no forms in 1992.³¹⁵ Proposals for establishing an international committee to oversee the implementation of the CBM's and to systematize as well as assess the provided information have proved controversial, nor has it been possible to agree on making up a list of biological agents with military potential. Other proposals have concentrated on introducing declarations of items used for civil purposes, and monitoring export and import of material relevant to the provisions of the Convention.³¹⁶

It has been even more difficult to agree on developing actual verification measures. The United States, for instance, took the view in 1991 that the Convention is not effectively verifiable³¹⁷. At the 1991 Review Conference a compromise was found in

313 See, for example, E. Harris, *Sverdlovsk and Yellow Rain: Two cases of Soviet Noncompliance?*, in: *International Security* (Spring 1987).

314 B. Roberts, *Arms control and the end of the Cold War*, in: *Washington Quarterly* (Autumn 1992), p. 48.

315 G.S. Pearson, *Prospects for Chemical and Biological Arms Control: the Web of Deterrence*, in: *The Washington Quarterly* (Spring 1993), p. 156.

316 See J. Goldblat and T. Bernhauer, *Making the Ban on Biological Weapons More Effective*, in: Serge Sur (ed.), *Verification of Disarmament or Limitation of Armaments: Instruments, Negotiations, Proposals*, UNIDIR, 1992, pp. 111-118.

317 Statement by Ambassador Ronald F. Lehman to the Third Review Conference, 10 September 1991. In contrast, a conference of American experts, under the chairmanship of one of the most respected molecular biologists, concluded that a verification regime for the BWC is feasible, and elaborated a detailed proposal for such a regime.

establishing a mandate for an Ad Hoc Group of Governmental Experts (VEREX) to identify and examine potential verification measures.³¹⁸

At the first meeting of the group of experts in April 1992 (VEREX I), 21 potential verification measures were identified, and grouped according to whether they were off-site or on-site.³¹⁹ A second meeting in November-December 1992 (VEREX II) and following meetings have concentrated on examining the utility of each measure. The most likely proposal to emerge from discussions would be a system of on-site inspections mainly based on declarations by states and possibly on various other sources of information.³²⁰

At the Fourth Review Conference of the States parties to the BWC in 1996, the work of the Ad Hoc Group was discussed and the progress made thus far was welcomed. It also mandated the Ad Hoc Group to conclude its work on the future protocol at the latest by the Fifth Review Conference to be held in 2001.

On 23 September 1998, an Informal Ministerial Meeting of the States parties to the BWC was held in New York at the initiative of Australia in order to demonstrate high-level political support for the negotiations.

At its 24th session (23 July –17 August 2002), which was the last scheduled session before the Fifth BWC Review Conference, the Ad Hoc Group was unable to conclude the negotiations on the draft protocol.

The Fifth Review Conference was convened from 19 November to 7 December 2001 in Geneva. Due to persisting divergent views and positions on certain key issues, however, the Conference decided to adjourn its proceedings and resume its work from 11 to 22 November 2002 in Geneva.

The US particularly opposed mandatory non-challenge visits.³²¹ After more than two dozen negotiating sessions, talks on the Verification Protocol were suspended in November 2001 when the United States declared that it would not support, and not permit the conclusion of a binding multilateral verification agreement. Among the reasons that US officials cited for the refusal was that the US believes that other countries are cheating and that the US should not be subject to the same standards as the rest of the world, and that the intellectual property of the US biotechnology industry would be put at risk by spying inspectors.³²²

318 Final Declaration of the Special Conference (VEREX) held in September 1994, available at www.brad.ac.uk/acad/sbtwc/verex/verex1.htm. The mandate of the Ad Hoc Working group comprises, inter alia, Definitions of terms and objective criteria, such as lists of bacteriological (biological) agents and toxins (...); A system of measures to promote compliance with the Convention; Specific measures designed to ensure effective and full implementation of Article X (i.e., cooperation on peaceful purposes).

319 Off-site measures include information monitoring, declarations, remote sensing and parts of inspection activities which can be done off-site. On-site measures include exchange visits, inspections and continuous monitoring by instruments or personnel.

320 G.S. Pearson, *op. cit.*, 1993, p. 157.

321 A.P. Zelicoff of Sandia National Laboratory, Presentation at the Twelfth Nonproliferation Policy Reform Task Force Meeting 10 August 2000, in the Nonproliferation Policy Education Center, available at www.wizard.net/~npec/summary12.htm.

322 But the article, on 4 September the New YorkTimes reporting the three previously unknown US government biodefence projects which some experts argued were in violation of the BWC leads to suspicions that the government of US knew the work was questionable. The three

In May 1999, (former) US Secretary of Commerce William Daley rejected transparency visits on the basis that they “offer no national security benefits”.³²³ In addition, Pharmaceutical Research and Manufacturers of America (PhRMA) has lobbied heavily for a Protocol with limited declarations and without mandatory non-challenge visits.³²⁴

Despite the European Pharmacy industries, European countries conducted mock inspections of biotechnology facilities of a type likely to be required by the Verification Protocol. They concluded that intellectual property would not be put at risk by the inspection regime. NGOs pointed out that even if a very aggressive inspection regime posed minor risks to intellectual property, this is more than an acceptable price to pay for dramatically decreasing the chance of a biological arms race.³²⁵

The states-parties resumed the fifth review conference in November 2002. The participants failed to agree on any verification measures, including the proposed protocol. The states-parties agreed instead to hold three meetings before the next review conference in 2006. They will discuss non-proliferation measures during the meetings, but the agenda does not include any discussion of verification measures. No decision was taken regarding the Ad Hoc Group, and its future remains unclear.³²⁶

A major obstacle is that of confidentiality of information. On-site inspections need to be designed in such a way that they are flexible enough and yet still sufficiently intrusive.

sectre projects involved the building, construction and testing of a model of a Soviet-designed anthrax bomblet, the construction of a mock germ factory and plans to reproduce a genetically modified, allegedly vaccine-resistant strain of anthrax that had been produced by Russian scientists in the early 1990s. See J. Rissanen, *Continued turbulence over BWC verification*, in: Verification Yearbook VERTIC, 2002, p. 76 and for more details about US BW activities see, J. Miller, St. Engelberg and W. Broad, *Germs: The Ultimate Weapon*, New York 2001. and P. Eisler, *US, Russia tussle over deadly anthrax sample*, in: USA Today (19 August 2002), available at www.usatoday.com/news/acovmon.htm.

323 Letter from W.M. Daley to M.K. Albright, 24 May 1999, quoted in: M.I. Chevrier, Preventing Biological Proliferation, in: O. Thränert (ed.), *Preventing the Proliferation of Weapons of Mass Destruction: What Role for Arms Control*, Bonn 1999. See also A. Duncan and K.G. Johnson, *Strengthening the BWC: Lessons from the UNSCOM Experience*, in: The Nonproliferation Review 4 (Winter 1997).

324 In a July 2000 policy statement, PhRMA, the European and the Japanese Bioindustries objected to any non-challenge visits: “...clarification procedures (...) are regarded as appropriate but should not necessitate any on-site activities.” And: “(...) any routine on-site activity is not a useful concept under the Protocol.” In: Compliance Protocol to the Biological Weapons Convention: A Joint Position of European, United States and Japanese Industry, issued by the “Forum for European Bioindustry Coordination”, PhRMA, and the “Japan Bioindustry Association”.

325 *An Introduction to Biological Weapons, their Prohibition, and the Relationship to Biosafety*. This paper originally distributed as a Third World Network Briefing Paper in April 2002 at the Intergovernmental Committee for the Cartagena Protocol (ICCP-3) Meeting, Background Series, Number 10, The Hague April 2002.

326 See S. Brugger, *BWC Conference Suspended After Controversial End*, in: Arms Control Today (January/February 2002), available at www.armscontrol.org/act/2002_01-02/bwcjanfeb02.asp and M. Moodie, *The BWC Protocol: A Critique*, Washington, DC 2001, available at www.cbaci.org/protocolcritique.pdf and *The Biological Weapons Convention At a Glance February 2004*, available at www.armscontrol.org/factsheets/bwcatagance.asp.

But the main question remains whether biological weapon programmes can actually be detected, since the line between civilian and military applications is so very thin and the weapons can be quickly produced in small effective quantities. The UN Special Commission's experience in Iraq may offer some hope in this respect. Through on-site inspections, UNSCOM felt confident in making an assessment of Iraq's capabilities and the purposes of certain sites. Although no weapons, filling equipment or documents were found, the teams were able to identify indications of concealed activities³²⁷.

Critics of BW verification may argue that no tangible evidence has been produced and that Iraq represents a special case of maximum intrusiveness of inspections. Others, opposing an absolutist view on verification, have argued that it is sufficient to at least create a *risk* for states to be detected, and a climate of political unacceptability. *Deterring non-compliance* would thus be the objective of verification provisions.³²⁸

3.2.4 Conclusion on the BWC verification regime

Verification of the BWC is a very complicated issue³²⁹, but needs to be addressed considering the rapid growth and relevance of bio-technology. The position of the United States, as in the case of the CWC, will probably be a decisive factor. It remains to be seen whether the US will again be prepared to accept the formula of "managed access". It is certain that any verification regime for the BWC will have important flaws, but it seems important to at least create a risk of detection. Verification efforts in the context of the BWC could be complemented by export controls and regional arrangements for banning weapons of mass destruction.³³⁰

4. Regional Verification

The bilateral framework mainly refers to the restricted negotiations of the United States and the Soviet Union, while the multilateral framework has the disadvantage of having to accommodate very different opinions and situations around the world, but the regional framework offers a means of trying to address specific problems between certain countries in specific areas. This evidently poses the question of the relationship between regional arrangements and multilateral verification. In some cases, the regional framework provides an alternative, but more often it can provide an addition to the multilateral controls. This is probably due to two reasons, representing two sides of the same coin:

1. From an international verification point of view, states other than those in the immediately affected region will want an assurance of non-compliance, which may only be credibly provided by an international authority representing a collective international interest.

327 See K. Jansen, *Biological Weapons Proliferation*, in: S. Mataija and J.M. Beier (eds.), *Multilateral verification and the post-Gulf environment: learning from the UNSCOM experience*, Symposium proceedings, Toronto 1992, pp. 111-116.

328 See, for example G.S. Pearson, *op. cit.*, and J.R. Walker, *The UNSCOM experience: orientation*, in: S. Mataija and J.M. Beier (eds.), *op. cit.*, p. 92.

329 A good survey of the problems can be found in: B. Roberts, *Biological Weapons of the future*, CSIA, Washington 1993.

330 For example, Argentina, Brazil, Chile, Uruguay, Bolivia and Paraguay signed the "Mendoza Commitment", a Joint Declaration on the Complete Prohibition of Chemical and Biological Weapons, 18 September 1991.

2. From a regional point of view, distrustful states within the region may want to assure compliance with the arrangement by involving guarantees from outside states or that of an international organization.³³¹

In Europe, the CSCE and the MBFR negotiation process during the Cold War provided a means for building confidence between the two parts of the divided continent. As the tensions eased at the end of the eighties culminating in the end of the Cold War, several arms control agreements were concluded which addressed the transition to the new European realities.

In Latin America, the South-East Pacific and Africa, countries managed to establish Nuclear Weapon Free Zones, involving specific verification aspects. Their example could be followed in the Middle East too.³³²

The situation has been more complicated in South-East Asia, which is partly dependent on attempts to establish bilateral verification arrangements such as those between India and Pakistan, North- and South Korea, but also on relations with a regional nuclear superpower, China, in the wider international framework of non-proliferation.

By contrast, Argentina and Brazil have succeeded in overcoming their nuclear rivalry by a bilateral verification regime guaranteed by IAEA safeguards, as an alternative to signing the NPT, which both states rejected for reasons of principle. This agreement has paved the way for the full implementation of the Latin American Nuclear Weapon Free Zone (LANWFZ).

Yet another case is represented by the trilateral approach in the Sinai, in which it is a third country i.e. the United States, which carried the verification of the agreement between Israel and Egypt, while the United Nations was involved to some extent.

In discussing the bilateral approach to arms control and verification, one tends automatically to think of the United States and the former Soviet Union. There are, however, other relevant cases in which two adversaries have tried to overcome or control armed rivalry through verified agreements. These relationships bear resemblance to superpower arms control, but differ in specific characteristics in that they are more part of regional security settings and more susceptible to external pressures. Whereas the superpowers were more or less “untouchable” in their dealings, the regional bilateral endeavours suggest bilateral verification³³³ as an alternative to international efforts of arms control.

331 The negotiation of regional security regimes, and other limitation agreements, are outside the purview of the CD, which, as noted, is a global structure. Indeed, efforts by some States to use global institutions, including the CD, the UN, the IAEA, NPT Review Conferences, etc., to pressure States, whose vital interests are threatened by regional conflicts, to accept limits in the absence of a regional security framework, have been unsuccessful and counterproductive. See G.M. Steinberg, *The 1995 NPT Extension and Review Conference and the Arab-Israeli Peace Process*, in: *Nonproliferation Review* 4/1.(Fall 1996).

332 Egypt and Iran co-sponsored in 1974 a United Nations General Assembly draft resolution calling for “the establishment of nuclear – weapon – free zone the region of the Middle East” which was adopted by the U.N General Assembly in its 29th ordinary session. The U.N General Assembly continues to consider the issue in its successive sessions and to support the establishment of the zone without achieving any tangible result.

333 Regional security must consider mutual verification regimes on a regional basis. In this regard see S. Freier, *A Nuclear-Weapon-Free Zone in the Middle East and Effective Verification*, in: *Disarmament: A Periodic Review by the United Nations* 16/3, pp. 66-91; G.M. Steinberg,

Three cases will be dealt with, each of which concerns the verification of nuclear non-proliferation: India-Pakistan, North- South Korea, and Argentina-Brazil. These cases differ in the degree of conflict and mutual distrust, type of government, the stage of development of nuclear weapon programmes, incentives for bilateral cooperation, external influences, regional settings and specific circumstances. In each case, these factors influence the viability of arms control and particularly verification measures.

4.1. European Regional Agreements

Europe has formalized the principle of regional arms control agreements on an higher level than any other region to date. In fact, twentieth century conceptions of arms control verification date back to the end of World War I. Three historical examples deserve mention. First between 1920 and 1926 the victorious Allies set up the Inter-allied control Commissions (ICC) to verify Germany's compliance with the strict disarmament measures imposed by the Versailles Treaty. These commissions operated somewhat successfully in overseeing the initial force reduction efforts, but by 1923, the passive German resistance was transformed into open obstruction of Allied rights to supervision and rejection of the Versailles commitments and the allies did nothing to prohibit it.

Again in 1940, the concept of verified disarmament was imposed on a defeated power through the German and Italian Armistice Commissions, which monitored the demilitarized zones imposed on the parts of France left unoccupied. While these controls were fairly effective in preventing military buildup in the zones to which they applied, they were unable to impede some clandestine military organization and arms buildup, particularly in the North African territories.

The last effort to verify arms limitations was once again a post-war project to ensure defeated powers' compliance with "non-production" commitments. This time, however, verification was a cooperative effort, conducted under the auspices of the Western European Union (WEU) whose seven member countries (signatories of the Brussels Treaty of 1948) established the Agency for the Control of Armaments (ACA). Between 1954 and 1985 all WEU countries exchanged detailed information on their force levels and structures, about ten percent of which was randomly selected for verification through on-site inspections. Challenge inspections, although theoretically possible, were never de facto implemented.

From these historical precedents, one lesson from European regional efforts was made clear: In neither example of imposed verification regimes, was the regime capable of preventing the controlled side from cheating – technical capabilities and political will to ensure compliance were not sufficient to oppose a determined cheater.

Only in the WEU where common alliance members jointly delegated authority to a "supranational" agency (ACA), as the result the verification regime was able to implement its task fully. Whereas today's regimes may not all be "supranational", they are all based on voluntary participation, equality of membership, respect of sovereign states' rights. Technical capabilities and political will are addressed through verification provisions and institutions within each regime.

Arms Control and Regional Security in the Middle East, in: *Survival* 36/1 (Spring 1994). For a general discussion of the link between conventional weapons limitation and nuclear arms control, see H. Muller, *Reforming the CD Agenda*, in: *Disarmament Diplomacy* 5 (May 1996).

Three agreements form the pillars of European regional arms control today – the Conventional Forces in Europe Treaty, the Open Skies Treaty, and the Helsinki Agreement of 1975, which created the Conference on Security and Cooperation in Europe (CSCE). Each pillar is unique in its manner of addressing extra-regional participants, the availability of verification technology, and the sharing of information.

4.1.1 *The European Atomic Energy Community (Euratom)*

Two fundamental objectives of the European Atomic Energy Community (Euratom) Treaty are to ensure the establishment of the basic installations necessary for the development of nuclear energy in the Community, and to ensure that all users in the Community receive a regular and equitable supply of ores and nuclear fuels. The Euratom Supply Agency, operative since 1960, is the body established by the Euratom Treaty to ensure this supply by means of a common supply policy based on the principle of equal access to sources of supply. It has legal personality and financial autonomy. This Euratom safeguards system was established in accordance with the Euratom Treaty, which was signed in Rome in 1957, well before the NPT safeguards were established. The Treaty provides the framework for nuclear energy development in the EU member states and ensures that materials declared for peaceful use are not diverted to military use. In the EU, IAEA safeguards are implemented under specific agreements and IAEA inspection activities are carried out in close co-operation with inspection teams from Euratom.

An existing example of cooperation between an international organization and a regional/multinational system is the IAEA/Euratom interaction with regard to *the NPT and Safeguards in the European Community*, based on 3 Safeguards Agreements:

one between the IAEA, Euratom and Euratom's Non-Nuclear Weapons States (NNWS);³³⁴

one between the IAEA/Euratom and the UK;³³⁵

one between the IAEA/Euratom and France;³³⁶

4.1.1.1 The EURATOM Safeguards System.

In 1957, both the IAEA and Euratom were created. The former was an American initiative that was directly related to the Atoms for Peace programme: the US was willing to loosen its strict policy to a certain extent (also for commercial reasons) on the condition that an international watchdog organisation would be created. The main targets from the American point of view were the European states. Euratom in contrast aimed at establishing a European free zone for nuclear fuel, i.e. uranium. It would also control the civilian nuclear fuel cycle in the six member states. The treaty contained no explicit non-proliferation goals.³³⁷

334 See INFCIRC/193.

335 See INFCIRC/263 (UK/EURATOM/IAEA).

336 See INFCIRC/290 (France/EURATOM/IAEA).

337 B. Goldschmidt, *Proliferation and non-proliferation in Europa*, in: H. Müller (ed.), *A European non-proliferation policy*, Brussels 1995, p. 18.

The Euratom nuclear safeguards system was established in 1957 by the Euratom Treaty and is currently implemented, through Euratom Regulation 3227/76.³³⁸ The general objectives of the Euratom safeguards system, as defined in the Euratom Treaty include making “...certain, *by appropriate supervision*, that nuclear materials are not diverted to purposes other than those for which they are intended”.

The Euratom safeguards system is *based on European law*³³⁹ and includes, *as an ultimate step, strong sanctions for infringements*. It applies to all civil nuclear materials from the moment they are mined on Community territory or arrive, in any form, from non-Community countries. The system, whilst principally concerned with detecting diversion from peaceful to non-peaceful use is also concerned with checking that declarations of specific use are correct and that obligations imposed by material suppliers are respected.³⁴⁰

In order to translate the requirements of the Treaty into an applicable scheme of safeguards measures the obligations for operators of nuclear plants are clearly defined.³⁴¹

The details of the obligations are specific to each installation under safeguards, and are laid down in the so-called “Particular Safeguards Provisions” (PSPs), *a legally binding* document issued by the Commission according to the provisions of the Safeguard Regulation *after consultation* between the Commission, the Member State and the operator concerned.

The Safeguards applied follow more or less similar procedures to those of the IAEA and include inter alia:

developing and reviewing surveillance films;

evaluation of the analysis of samples which have been destructively analysed;

evaluation of shipper/receiver differences between installations;

evaluation of overall material balance data for each “material balance area” (MBA);

338 In the European Union (EU) there exists a very comprehensive regional system of safeguards operated by Euratom. This system was established in accordance with the Euratom Treaty, which was signed in Rome in 1957, well before the NPT safeguards were established. The Treaty provides the framework for nuclear energy development in the EU member states and ensures that materials declared for peaceful use are not diverted to military use. In the EU, IAEA safeguards are implemented under specific agreements and IAEA inspection activities are carried out in close co-operation with inspection teams from Euratom. See inter alia Euratom Regulation 3227/76.

339 The Treaty establishing the European Atomic Energy Community, commonly called the Euratom Treaty, constitutes the legal basis of Euratom Safeguards. It covers all civil nuclear materials in the European Union from the moment they are mined (in the European Union) or arrive, in any form, from outside the European Union. The responsibilities and rights of all parties are specified in Chapter VII of the above Treaty. The obligation to implement the Treaty provisions is given to the European Commission. On the actual development of Euratom, see the Report from the Commission to the European Parliament and the Council, Operation of the Euratom Safeguards Office 1999-2000. COM(2001) 436 final. Brussels, 26.07.2001.

340 Chapter VII (Articles 77-85) of the 1975 Euratom Treaty.

341 Idem.

assessment of certain performance data over a period of time, e.g. data on the book-physical inventory difference resulting from a physical inventory exercise, data on discards and wastes, etc.

In case of anomalies, which require an explanation, Euratom can initiate follow-up actions by following a graduated response such as:

a significant increase of inspection frequency and intensity, or a change in inspection strategy; and, ultimately,

sanctions as specified in article 83 of the Euratom Treaty, ranging in severity from a warning to the withdrawal of source or special fissile material.

4.1.1.2 Cooperation with the IAEA in the Safeguards area.

The IAEA and the Euratom Safeguards Office co-operate in the 13 Non-Nuclear Weapon States following the arrangements laid down under the New Partnership Approach (NPA) as agreed in 1992 between the European Commission and the IAEA.³⁴²

The tasks of the IAEA and Euratom are, to a large extent, similar. The IAEA deals with states, whereas Euratom deals with the individual nuclear operators. To implement the Non Proliferation Treaty a safeguard agreements exist between the IAEA, Euratom and its NNWS.³⁴³ It defines the application of NPT safeguards in Euratom Non-Nuclear Weapon States, maintaining the special role of Euratom as a multinational system through a regional protocol.

The two Nuclear Weapon states, the United Kingdom³⁴⁴ and France³⁴⁵, each made “Voluntary Offers” to accept IAEA safeguards on their territory. *All “civil”* nuclear material in both France and the UK is subject to Euratom safeguards under the Euratom Treaty on the same basis as that which apply in the NNWS.

There is of course a difference between a “State System for Accounting for and Control” and an established regional safeguards system – like EURATOM Safeguards. The State system has to follow the decisions of the State's authorities and may be instructed to perform or not non-peaceful activities.

The basic problem for the IAEA is how to take due account of such a regional system, or similar ones to be established in Nuclear Weapon free zones, for example

342 See the Report from the Commission to the European Parliament and the Council, Operation of the Euratom Safeguards Office 1999-2000. COM(2001) 436 final. Brussels, 26.07.2001. pp 15-16.

343 See IAEA INFCIRC/193.

344 The safeguards agreement between the IAEA/EURATOM, and the United Kingdom, (INFCIRC/268) is an example of the agreements concluded pursuant to the offers by the five ‘recognized’ nuclear-weapon states to accept IAEA safeguards on some or all of their civilian nuclear plants. To encourage the widest possible acceptance of the NPT, the United States and the United Kingdom made such offers in the late 1960s and included all their civilian plants in their offers (‘subject to exclusions for national security reasons only’ in the terms of the United Kingdom's offer). Since then France, the Soviet Union and, most recently, the People's Republic of China, have offered to accept safeguards on some of their civilian nuclear plants.

345 France offered to accept safeguards on a more limited selection of its plants. With this difference the agreement between IAEA/EURATOM and France (INFCIRC/290) is essentially the same as that with the United Kingdom.

in order to draw independent conclusions. The example of Euratom/IAEA cooperation augurs well in this respect.

4.1.2 *Verification and Confidence and Security Building Measures (CSBM) in Europe: the CSCE*

The end of Soviet domination of Eastern Europe and the collapse of the USSR itself radically changed Europe's needs for arms control. The situation now is in sharp contrast with the sphere of mutual distrust that marked the negotiations of the Helsinki Final Act of 1975, founding the Conference on Security and Cooperation in Europe (CSCE)³⁴⁶. The series of confidence building measures (CBM's) then adopted -while limited in military relevance- were a remarkable result in the era of Cold War competition. They were designed to reduce the secrecy surrounding military activities in Europe through such measures as prior notification and observation of military manoeuvres.³⁴⁷

It was not until the Stockholm agreement in 1986 that CBM's were extended and was made verifiable by inspections. These measures are widely believed to have contributed to overcoming the division of Europe by establishing a basis for confidence. The Vienna Documents of 1990 and 1992 further built on this, and adapted to a changing situation. With the threat of a massive surprise attack gone, CSBM's have obtained a new function. On the one hand, they are to create co-operative, positive relationships and on the other, they aim to prevent, defuse and manage new threats, emerging no longer from the East-West confrontation but within individual states or across borders -mainly along ethnic lines.³⁴⁸

4.1.3 *Definition*

Discussions on Confidence and Security Building Measures (CSBMs) are ongoing across the globe in the Americas, Africa, Europe, East Asia and the Pacific, and the Middle East. CBM's (they were later called CSBM's so as to include the rather ambitious goal of "security-" in addition to confidence building) represent a relatively new phenomenon of arms control in the world. Other than the traditional method of limiting *numbers* of military personnel or weapons, CSBM's refer to practices and conditions, which aim to limit *abilities* to use force.³⁴⁹ Their main

346 See, H.G. Brauch, G. Neuwirth (eds.), *Confidence and Security Building Measures in Europe – From the Stockholm to the Vienna Document*, 1992; H.G. Brauch, G. Neuwirth (eds.), *Confidence and Security Building Measures in Europe II – From Vienna 1990 to Vienna 1992*, 1992.

347 V.-Y. Ghebali, *Confidence- and Security-Building Measures within the CSCE Process: Paragraph by paragraph analysis of the Helsinki and Stockholm Regimes*, UNIDIR Research Papers, No. 3, New York 1989. H.J.v.d. Graaf, *The Stockholm Document on Confidence- and Security-Building Measures and Disarmament in Europe*, in: S. Sur (ed.), *Verification of Current Disarmament and Arms Limitation Agreements: Ways, Means and Practices*, Aldershot 1991, pp. 311-340. *Confidence- and Security-Building Measures*, in: S. Koulik and R. Kokoski, *Conventional Arms Control: Perspectives on Verification*, Oxford 1994, pp. 133-155.

348 See J. Borawski, *From the Atlantic to the Urals: Negotiating Arms Control at the Stockholm Conference*, Washington, DC 1988, p. 261. J. Borawski, *Stability through Openness: The Vienna Negotiations on Confidence- and Security-Building Measures in Europe*, in: J.B. Poole (ed.), *Verification Report 1991: Yearbook on Arms Control and Environmental Agreements*, London and New York 1991, pp. 67-72.

349 CSBM's aim limiting or reducing the level of fear among parties in conflict is essential for building confidence and a sense of security. Confidence-building measures (CBMs) aim to

thrust is to lessen unjustified fears of aggression and thus to avoid feeding a reciprocal escalation of fear among states finding threats in each other's security measures. CSBM's can contribute to mutual confidence by reducing misperceptions of the purpose of military moves. They do so by restricting opportunities to use force, by making early warning of attack likely, and by providing credible information to show absence of aggressive intent.³⁵⁰

CSBM's can be categorized as “constraints” (on the locations, deployment, training and exercise of forces) and measures to increase “transparency” of forces' capabilities and purposes. Distinctions between the two concepts are not always clear, however, nor are distinctions between constraints and arms limitations. In fact there has been considerable overlap between the CSBM negotiations and the CFE treaty.³⁵¹

4.1.4 Development of CSBM's in Europe

CSBM's were partly born out of the belief of many Western and non-aligned countries in Europe that the CSCE should include a military dimension, and the frustration over failing talks on conventional arms reduction in MBFR, which both NATO and Warsaw Pact members preferred to place outside the CSCE framework³⁵². The CSCE has been marked for a long time by an ambivalence resulting from Soviet efforts to gain recognition and stabilization of the East-West division through the CSCE, while Western governments emphasized a role for this institution to overcome the status-quo. For both it served the purpose of detente.

The ambivalence affected the positions East and West would take on CSBM's. NATO governments, facing large offensively oriented Warsaw Pact forces, insisted on a technical-military oriented approach to CSBM's including disclosure of forces' locations, armaments and operational principles, and limitation of activities that appeared threatening. The USSR and its allies long advocated “political” CSBM's, meaning plans for collective security arrangements and unilateral declarations that forces and strategies were solely for defense. The inclusion of CBM's in the Helsinki Final Act of 1975 had been a relatively small concession from the Soviets to achieve

lessen anxiety and suspicion by making the parties' behavior more predictable. Although 'CBMs' may refer specifically to the Helsinki Final Act of 1975 and 'CSBM's' to the 1986 Stockholm Agreement on Confidence- and Security-Building Measures and Disarmament in Europe, the terms are often used interchangeably in the academic literature. CSBM's is preferred as the generic term in this article since it makes explicit the goal of building military security. See M. Efinger and V. Rittberger, *The CSBM Regime in and for Europe: Confidence-Building and Peaceful Conflict Management*, in: M. Pugh (ed.), *European Security – towards 2000*, Manchester 1992, pp. 104-123.

350 Such a definition has been suggested by J. Mackintosh, *Confidence Building Measures; a conceptual exploration*, in: R.B. Beyers, F.S. Larrabee and A.Lynch (eds.), *Confidence Building Measures and International Security*, New York 1987, pp. 15-17.

351 CSBM and CFE negotiations used to be strictly divided, because the latter focused on reducing specific military items among a limited group of 23 countries (NATO and Warsaw pact), while CSBM's had a more general political objective negotiated by the 35 CSCE members. In the 1992 Helsinki Document they have been brought together in a “Forum for Security Cooperation”.

352 See S. Lehne, *The Vienna meeting of the CSCE in Europe 1986-1989; a turning point in East-West relations*, Boulder, 1991. See M. Bandini, *The CSBM negotiations in Vienna: a commitment to build a new European military security system*, in: *NATO Review* 5 (October 1990), p. 12. As of end December 1990, 44 inspections had been conducted.

their larger objective: recognition of the East-West division in Europe. Negotiations to strengthen the regime remained deadlocked for 11 years.

In 1986, after Gorbachev had come to power in the Soviet Union, significant progress was made with the adoption of the Stockholm Document on CSBM's. This agreement requires notification, observation and annual forecasts of military activities above 13.000 troops, as well as on-site inspection with no right of refusal. The accord broke new grounds in arms control as the first international agreement in which the Soviet Union accepted verification on its own territory. Also, provisions were made for the first ever -limited- aerial inspection regime, which would become an important precedent for the INF and Open Skies agreements. The Soviet willingness to agree on inspections most probably originated from Gorbachev's desire to show the West that he was serious about taking away the perception of a Soviet threat.

4.1.4.1 CSBM's in a new Europe

After the far-reaching events in 1989, negotiations were made for an agreement to be endorsed at the Paris CSCE summit in 1990, which was designed to adjust the CSCE process so as to reflect the "new realities of Europe". The so-called Vienna Document of 1990 built upon previous provisions and developed CSBM's in new ways such as:

1. annual exchange of information on military manpower, equipment, deployment and budgets;
2. establishment of a communications network among the participating states for CSBM and the Conventional Armed Forces in Europe (CFE) purposes;
3. an annual meeting to review CSBM implementation;
4. improved inter-military contacts, including mandatory visits to airbases;
5. mechanisms giving states the right to an explanation of unusual or hazardous military activities and, to call a bilateral or a full CSCE meeting if the explanation is not satisfactory;
6. CSBM's were tied to the newly established Conflict Prevention Centre, which would maintain a databank compiled on the basis of exchanged military information.

A few additional CSBM's were agreed to in the 1992 Vienna Document.³⁵³ These include reduced ceilings on exercises requiring notification (9,000 troops or 250

353 Summarizing implementation of the Vienna Document CSBMs through 1993:

Notifications. Four activities were notified in 1991, all by NATO states; six others which had been forecast (mostly by Eastern states) were either cancelled or reduced below notifiable level. Five activities were notified in 1992, all by NATO states. Two activities were notified in 1993, one by NATO states and one by Sweden; five others which had been forecast (all by NATO states) were cancelled or reduced below notifiable levels.

Observations. Two programs were hosted in 1991, four in 1992, and two in 1993. All but one were hosted by NATO states, with the exception (in 1993) hosted by Sweden.

Inspections. During 1991, four inspections were conducted (two by NATO states and two by the USSR). Four were conducted in 1992 (two by NATO states, two by Russia). A significant increase was noted during 1993, when 11 inspections were conducted (ten by NATO states and one by Russia).

tanks), new ceilings on exercises open for observation (13,000 troops, 300 tanks or 3,500 amphibious or parachute troops), public demonstration of new weapons and the obligation to report large reserve formations to be called to duty for three weeks.

At the Helsinki Summit in July 1992, it was decided to set up a “Forum for Security Cooperation” with an extensive “Programme of Immediate Action”. This Forum is to negotiate conventional disarmament measures, provisions to harmonize obligations arising from various international instruments, as well as CSBM's. Negotiations on CSBM's will complement those of the Vienna 1992 Document and develop new measures.

So far no agreement has been reached on CSBM's on naval and air forces. The US, supported by its NATO partners, has been reluctant to accept limits on the US ability to control the seas and transport material over them, and seeks to retain flexibility in its manoeuvres. As to air forces, NATO countries -which have always relied on their air superiority- have argued that methods to verify air force exercises would either be too intrusive or too weak to be reliable.³⁵⁴

4.1.4.2 Verifying CSBM's: the inspection regime

Although the concept of CSBM's has some aspects of verification of its own by increasing transparency, adding inspections to provisions for notification and observation gave the regime a means for checking compliance with the agreed measures. The use of inspectors meant an important improvement over the previous reliance on observers. The latter are relatively passive as they are guided by their hosts and see little that their hosts do not want them to see. Inspectors are far more intrusive and enjoy greater freedom. Their capabilities were enhanced in the two Vienna Documents which allowed equipment such as video cameras and night vision devices.

As of 1993, the main modalities of inspections are that:

Each participant state may inspect on the territory of another;

A request cannot be refused;

Permission must be given within 24 hours and the inspection may begin within 36 hours. No state is obliged to accept more than three inspections or more than one inspection by the same state;

Certain areas and objects cannot be inspected;

Inspections are allowed from the ground and the air;

Per team no more than 4 inspectors are allowed; the teams may be multinational.

In the Vienna 1990 Document, the so-called evaluation visits were added to the regime to check information provided under the provisions on 'Information on

Evaluations. This compliance-verification activity has amassed an impressive implementation record since the provisions came into force on July 1, 1991, to include significant participation by NNA states. 24 evaluation visits were conducted during 1991, 46 during 1992, and 54 during 1993. A total of 22 (of the 52 CSCE) states have conducted evaluations of the information provided by a total of 33 states. (Seven states reporting military forces have not yet been subject to evaluation visits: Croatia, Cyprus, Ireland, Malta, Portugal, Slovakia and Yugoslavia.).

354 See, for example *Interview with US Ambassador John Maresca*, in: *Arms Control Today* (May 1990).

Military Forces and on Information on Plans for the Deployment of Major Weapons and Equipment Systems'.³⁵⁵

The implementation of CSBMs has been a success in so far that there have been very few examples of non-compliance.³⁵⁶ Observations, notifications and inspections have become more accurate and complete over the years, and there has been an increasingly cooperative and flexible attitude in implementing obligations.³⁵⁷ However, CSBM's have long been fairly modest in nature. Compliance with the Helsinki 1975 provisions have been mixed. Aside from the flagrant Soviet violations incited by the events in Poland in 1981, there were errors in notification and the amount of information they contained varied greatly. As to the measures adopted since 1986 and their satisfactory implementation, it could be argued that these were the results rather than the initial causes of the sharp lessening of rivalry. The safest overall judgement would perhaps be that the CSBM regime facilitated the process of transition in Europe while at the same time adjusting to it.

During the first years following the Stockholm agreement extensive use was made of the inspections. Although several technical problems and questions of interpreting the Documents arose and several parties criticized each others' performance, no formal complaints were filed, and all have expressed general satisfaction with procedures.³⁵⁸ Most parties have been quite flexible in applying the Document's provisions during visits, thus confirming an expectation voiced by an American officer leading the first inspection of a Soviet military exercise, that some items of implementation must be worked out on the ground; that is at the scene during the actual inspection. There seems to be some evidence that this first experience of undergoing inspections showed the Soviets that it did not threaten their national security, and they learned to tolerate CSBM's as means to enhance transparency instead of suspecting them to be intelligence gathering activities.³⁵⁹

From 1989 on the number of inspections undertaken decreased gradually to very small numbers in 1992. This has had much to do with reduced defence budgets and fading threat perceptions both leading to reduced field training exercises and more reliance on war-gaming and simulations. It would also be plausible to attribute the decline to increased confidence resulting from previous satisfactory inspections.

355 For further details on the CBM s stipulated in the Vienna Document, see S. Koulik and R. Kokosik, *Conventional Arms Control: Perspectives on Verification*, Oxford 1994, pp. 144-155.

356 V. Rittberger, M. Efinger and M. Mendler, *Confidence- and Security-Building Measures (CSBM): An Evolving East-West Security Regime?*, in: *Journal of Peace Research* 27/1 (1990), pp. 55-74 (reprinted in: D. Dewitt and H. Rattinger (eds.), *East-West Arms Control. Challenges for the Western Alliance*, London 1992, pp. 89-118).

357 See J. Garrison, *Confidence Building-Measures: Foundation for stability in Europe*, in: *The Journal of Strategic Studies* 15/3 (September 1992).

358 See D. Stovall, *The Stockholm accord; On site inspections in Eastern and Western Europe*, in: L.A. Dunn and A.E. Gordon, op cit., 1990.

359 See D.O. Stovall and M.R. Audritsch, *The future direction of on-site inspections in arms control through the provisions of Confidence and Security Building Measures*, in: *Arms Control* (December 1992), pp. 421-422. These authors even suggest that the CSBM experience induced the Soviets to agree on the inspection measures in the INF treaty.

4.1.4.3 Prospects for CSBM's in Europe: issues of contention

The end of East-West confrontation has made intensive security cooperation possible. The dissolution of the Soviet Union has expanded the number of CSCE members to 53 and its geographical scope now stretches from “Vancouver to Vladivostok” (instead of only the Urals). Unfortunately, this has also added an area of new states full of lingering or already existing conflicts. It is still unclear how the former Soviet republics will make use of the CSBM arrangements.

CSBM's may help to provide a framework which could try to suppress any tendency of a multi-centred Europe to return to its old patterns of rivalries. (For regions where this has already happened, it is needless to say that CSBMs have limited relevance.)

In October 1998 the OSCE, with the approval of the United Nations, undertook its largest mission to date, the Kosovo Verification Mission (KVM).³⁶⁰ The KVM was supposed to verify that all sides of the conflict were in compliance with UN resolutions.³⁶¹ It was also directed to monitor elections and help establish a police force and other institutions in Kosovo. The Mission had to be withdrawn in March 1999 before NATO initiated its bombing campaign against Yugoslavia. Within the framework of a political settlement for Kosovo, concluded in June, the OSCE was responsible for democracy – and institution- building under the auspices of the UN. OSCE monitors were deployed to assess the human rights situation throughout the region, and in August a new OSCE-administered police training school was inaugurated. Later in the year the OSCE commenced the training of judicial and administrative officers. At that time the OSCE mission consisted of 1,400 personnel.

The Vienna Document 1999 represents the latest review of the OSCE's confidence- and security-building measures (CSBMs).³⁶² The Vienna Document 1999 contains provisions regarding the exchange and verification of military information between participating states, including:

an annual exchange of military information (including the size of defence budgets, the location, size and strength of military units and formations);

prior notification of certain military activities (i.e. major troop exercises and movements);

observation of certain military activities;

exchange of annual calendars of military activities;

constraining provisions for military exercises;

verification measures (inspections and evaluation visits);

360 From October 1998 to March 1999, the Kosovo Verification Mission (KVM), the largest and most challenging OSCE operation up to that date, was deployed to verify FRY compliance with United Nations Security Council Resolutions 1160 and 1199; to verify the cease-fire, monitor movement of forces, and promote human rights and democracy-building. Following a deterioration in the security situation, the KVM was withdrawn from Kosovo in March 1999. See OSCE Mission in Kosovo Programmatic Priorities for 2004.

361 The OSCE Mission in Kosovo was established by the OSCE Permanent Council on 1 July 1999. It forms a distinct component of the United Nations Interim Administration Mission in Kosovo (UNMIK).

362 M. Desjardins, *Rethinking Confidence-Building Measures*, IISS, Adelphi Paper 307, London 1996.

military contacts and co-operation (visits to airbases, military facilities, exchange of observers, demonstrations of new weapons systems);

There is still a lot of room for improvement and extension of existing measures, especially in the relatively underdeveloped area of constraints. Specific attention is likely to be given to measures designed for regional (or even bilateral) problems within Europe.

There may also be a problem in the fact that the current system relies heavily on *challenge* inspections. In the current cooperative political climate most states hesitate to demand the inspection of one another, since this might be interpreted as a sign of distrust. Inspections on a routine basis possibly could avoid this problem. Challenge inspections can be very useful, however, in the case of unannounced military exercises or possibly dangerous build-ups near borders.³⁶³

The Dayton Peace Accord, signed in Paris on December 14, 1995, lent a new quality to regional arms control and confidence-building is the first implementation of the CBM's verification regime.³⁶⁴ The Verification agreement is modelled on the Vienna Document 1992. Three sets of negotiations of relevance to arms control are specified in Annex 1-B of the treaty, devoted to "Regional Stabilisation":

Confidence and security-building measures in Bosnia and Herzegovina (Article II)

Disarmament and arms control in Bosnia and Herzegovina, the Federal Republic of Yugoslavia and Croatia (Article IV)

Establishment of a regional balance in and around former Yugoslavia under the aegis of the OSCE (Article V), the Stability Pact for South Eastern Europe concluded on June 10, 1999 also reflects the approach towards arms control and CSBM measures adopted in Dayton. In the debate on the "Security Issues for Arms Control" Germany was the driving force behind the establishment of a Regional Arms Control Verification and Implementation Assistance Centre (RACVIAC) for South Eastern Europe in Croatia. The latter was opened in October 2000 and has since been providing support in implementing the arms control provisions agreed on in Dayton. In addition, the RACVIAC is doing preparatory work for further confidence- and security-building measures. The Bundeswehr Verification Centre provided significant support in planning, establishing and operating the RACVIAC.

The following are subject to inspections:³⁶⁵

(a) declared sites, which are those containing one or more objects of inspection, such as: any formation or unit at the organisational level of brigade/regiment, wing/air regiment, independent battalion squadron or equivalent as notified in the Exchange of Information; any storage site not organic to formations and units, such as maintenance units holding armament/equipment limited by the agreement; units below the level of battalion holding conventional armaments and equipment directly subordinate to a unit or formation above the level of brigade/regiment; or reduction sites.

363 See Stovall and Audritsch, op. cit., 1992, p. 429.

364 See P. Dunay, *Verification of Conventional Arms Control*, in: T. Findlay (ed.), *Verification Yearbook 2000*, Verification Research, Training and Information Centre, London 2000, pp. 101-114.

365 Agreement on Sub-Regional Arms Control, Protocol on Inspection, section 1: Definitions.

At least two lessons can be drawn from the Dayton verification regime: the importance of access to information OSCE inspectors are at a disadvantage vis-à-vis the entities because they do not have access to all of the JCC's amendments to inspection procedures.³⁶⁶ The ineffectiveness of short-notice changes to the annual inspection schedule for Confidence Building Measures to all parties, an annual inspection schedule is prepared by the Personal Representative based on input from the parties and has to be approved by them. However, this annual inspection schedule is subject to short-notice changes, which makes it difficult for countries with small verification agencies to be always in a position to nominate inspectors as well as to perform as effectively as those who are well prepared in advance.³⁶⁷

The Open Skies³⁶⁸ agreement concluded in 1992 offers the possibility to add to the limited provisions for aerial verification in the CSBM documents.³⁶⁹

While negotiations on CSBM's will continue, considerable overlap could emerge with the North Atlantic Cooperation Council (NACC).³⁷⁰ This institution was designed in 1991 by NATO to respond to requests from Eastern European countries and Soviet successor states looking for shelter in the North Atlantic security framework. NACC was described as a forum for discussing political and security issues, and includes such objectives as improving communications between the military establishments of its members. The first cluster offers *standard-type CSBMs*: a programme for military contacts and cooperation (now overtaken by NATO's more sophisticated Partnership for Peace programme), a set of provisions on Defence Planning (aimed at enhancing transparency in an unprecedented military cooperation

366 The JCC has taken approximately 30 decisions so far, some of which have directly altered the agreement. Since these decisions are incorporated in the minutes of the JCC meetings, it is currently impossible for inspectors to know whether they are following the latest procedures. However, an updated version of the agreement on CSBM's may be issued later in 2001. See Personal communication with Senior Operations Staff Officer, Office of the Verification Co-ordinator, OSCE, Vienna, 3 April 2001.

367 See D. Rothbacher, *Verification of the Dayton arms control agreements*, in: *Verification Yearbook 2001*, Verification Research, Training and Information Centre, London 2000, pp. 173-185.

368 The Treaty on Open Skies entered into force on 1 January 2002, and currently has 30 States Parties. The Treaty establishes a regime of unarmed aerial observation flights over the entire territory of its participants. The Treaty is designed to enhance mutual understanding and confidence by giving all participants, regardless of size, a direct role in gathering information about military forces and activities of concern to them. Open Skies is one of the most wide-ranging international efforts to date to promote openness and transparency of military forces and activities.

369 Provisional application of portions of the Treaty took place from signature in 1992 until entry into force in 2002. During that period, participants conducted joint trial flights for the purpose of training flight crews and testing equipment and sensors. With entry into force of the Treaty, formal observation flights began in August 2002. During the first Treaty year, States Parties conducted 67 observation flights. For 2004, States Parties have planned 82 missions. The OSCC continues to address modalities for conducting observation missions and other implementation issues. Open Skies Treaty Enhances Mutual Understanding, Fact Sheet, Bureau of Arms Control, Washington, DC 14 August 2002.

370 See L. Zannier, *Relations between the OSCE and NATO with particular regard to crisis management and peacekeeping*, in: *The OSCE in the maintenance of peace and security*, The Hague 1997.

field) and a regime for the global exchange of military information (noteworthy by its world-wide area of application and naval armaments component).³⁷¹

Another area of overlap concerns the CFE treaty. In 1992, most functions of the former CFE and CSBM delegations have been brought together in the CSCE Forum of Security Co-operation, where harmonization of the separate regimes of CSBM's and CFE is one of the issues on the agenda. There is indeed an unintended symbiotic relationship between the two arrangements. For example, evaluation visits, exercise observations, and inspections under the Vienna Document could assist in determining TLE numbers and personnel numbers within CFE. On the other hand, different objectives make it difficult to melt inspections into one common regime. An inspection to verify equipments counts is not the same as an inspection to clarify what may be a dangerous military mobilization, out of garrison or near a border. It is also relevant to note that unlike in the CFE treaty, CSBM inspections may not be refused.

4.1.5 *The Conventional Forces in Europe (CFE) Treaty*

The Conventional Forces in Europe treaty marks extraordinary progress in the political will to verify conventional weaponry, yet twentieth century conceptions of conventional arms control verification in Europe date back to the end of World War I. Three examples deserve mention. First, between 1920 and 1926 the victorious Allies set up the Inter-allied Control Commissions (ICC) to verify Germany's³⁷² compliance with the strict disarmament measures imposed by the Versailles Treaty. These commissions operated somewhat successfully in overseeing the initial force reduction efforts, but by 1923 passive German resistance was transformed into open obstruction of Allied rights to supervision and rejection of the Versailles commitments.³⁷³

Again in 1940 the concept of verified conventional disarmament was imposed on a defeated power through the German and Italian Armistice Commissions which monitored the demilitarized zones imposed on the parts of France left unoccupied. While these controls were fairly effective in preventing military buildup in the zones to which they applied they were unable to impede some clandestine military organization, particularly in the North African territories.

The last effort to verify conventional arms limitations was once again a post-war project to ensure defeated powers compliance with "non-production" commitments. This time, however, verification was a cooperative effort, conducted under the auspices of the Western European Union (WEU) whose seven member countries (signatories of the Brussels Treaty of 1948) established the Agency for the Control of

371 V.-Y. Ghebali, *After the Budapest Conference: The Organisation for Security and Cooperation in Europe*, in: NATO Review 43/2 (March 1995), pp. 24-27.

372 For the European context, especially Germany, see T.G. Ash, *In Europe's Name: Germany and the Divided Continent*, New York 1993 and P. Zelikow and C. Rice, *Germany Unified and Europe Transformed: A Study in Statecraft*, Cambridge, Mass. 1995. For the American view, consult M.R. Beschloss and S. Talbott, *At the Highest Levels: The Inside Story of the End of the Cold War*, Boston 1993. For the state of the Soviet Union, see J.B. Dunlop, *The Rise of Russia and the Fall of the Soviet Empire*, Princeton, NJ 1993.

373 R. Falkenrath, *Shaping Europe's Military Order*, Boston 1995, pp. 1-77. See also T. Graham and J. Mendelsohn, *Features on CFE*, in: Arms Control Today (April 1996).

Armaments (ACA).³⁷⁴ Between 1954 and 1985 all WEU countries exchanged detailed information on their force levels and structures, about ten percent of which was randomly selected for verification through on-site inspections. Challenge inspections, though theoretically possible, were never implemented.

From these historical precedents, two lessons can be drawn as regards contemporary efforts at conventional arms control verification. First, it is difficult if not impossible to verify manpower limitations, as these forces are easily concealed in para-military or other organizations. Second, in neither example of imposed verification regimes was the regime capable of preventing the controlled side from cheating – technical capabilities nor political will to ensure compliance were not sufficient to oppose a determined cheater. Only in the WEU, with ACA was able to fulfill a verification task.³⁷⁵

CFE is an unusual example of a regional arms control regime in that it emerged from negotiations between what were once two hostile camps. The Mutually Balanced Force Reduction (MBFR) negotiations began in 1973 as an effort to establish parity between NATO alliance and the Warsaw Treaty Organization (WTO). While these negotiations never achieved an agreement, the negotiation format (bloc-to-bloc) was maintained. In 1989, in answer to Soviet General Secretary Mikhail Gorbachev's 1986 proposal for a more comprehensive reduction of forces (both conventional and nuclear) in an expanded geographic region stretching from the Atlantic to the Urals (ATTU) and the conclusions of a NATO High-Level Task Force on Conventional Arms Control,³⁷⁶ a CFE mandate was agreed

“to strengthen stability and security in Europe through the establishment of a stable and secure balance of conventional armed forces, which include conventional armaments and equipment, at lower levels; the elimination of disparities prejudicial to stability and security; and the elimination, as a matter of priority, of the capability for launching surprise attack and for initiating large-scale offensive actions.”³⁷⁷

The Treaty on CFE was signed on November 19, 1990 by each NATO and WTO member, placing limits on five categories of conventional armaments – battle tanks, artillery, armoured combat vehicles, combat aircraft and attack helicopters – and limiting deployment of a sixth – armoured vehicle launched bridges. The signatories accepted obligations as individual sovereign nations but also as members of “groups of states”. The treaty was due to progress in four phases:

1. The Baseline Validation phase (first 120 days), it involved inspection to verify the initially declared levels of Treaty Limited Equipment (TLEs) in each state.

374 See Protocol IV of the Brussels Treaty of 1948.

375] V. Kunzendorff, *Verification in Conventional Arms Control*, Adelphi Paper 245, pp. 19-20.

376 Brussels Declaration on Conventional Arms Control, December 11, 1986; North Atlantic Treaty Organization, NATO Communiqués 1986; NATO Information Service 1986, pp. 31-32.

377 *Mandate for Negotiation on Conventional Armed Forces in Europe*, reprinted in: SIPRI Yearbook 1989: World Armaments and Disarmament, Oxford 1989, pp. 420-421.

2. The Reduction phase scheduled to last three years began November 15, 1992. During this time equipment was to be destroyed during verified reduction events or re-categorized according to Article VIII.³⁷⁸
3. The Residual Level Validation phase allowed 120 days for baseline data to be reverified after the completion of reductions
4. The Residual phase to last indefinitely under a regime of challenge inspections at declared and undeclared sites, each state being obliged to accept a certain quota of them each year.

Since the treaty's signature, WTO – has been dissolved, the Soviet Union – has decomposed into several states, and two of the signatories – the FRG and the GDR – have united and remained in NATO. Consequently, the Joint Consulting Group (JCG) established by the treaty as a forum of discussion and interpretation has played a role in mediating the assumption of treaty responsibilities. Within the JCG in October of 1991, it was agreed that USSR would ratify the agreement on behalf of all republics that had not yet been recognized as independent. NATO invited all former WTO states and Soviet republics to participate in a forum of discussion – North Atlantic Co-operation Council (NACC) – and established a High Level Working Group to negotiate the rights and obligations of all of these states under the CFE.³⁷⁹ Although the participants consented that “treaty obligations assumed by the former Soviet Union should be wholly accounted for by all the newly independent states in the area of application and apportioned among them in a manner acceptable to all Parties to the Treaty”,³⁸⁰ it seems some TLE's have remained unaccounted for during the confusion between the time initial levels were declared and July 17, 1992 when the Treaty entered into force.

The politico-military setting has changed in a number of ways since the first wave of NATO enlargement in 1999, when the Czech Republic, Hungary and Poland joined the alliance and the 1990 Treaty on Conventional Armed Forces in Europe (the CFE Treaty)³⁸¹ was reshaped by the 1999 Agreement on Adaptation of the CFE Treaty (Agreement on Adaptation).³⁸²

378 Each country must have reduced 25% of their declared liabilities by November 15, 1993, 60% by the following year and 100% by the third year of the reduction phase. Reduction can be accomplished through destruction of the TLE's – in which case the destruction event must be observed by other parties to the treaty – adaptation of the equipment to non-military functions (within guidelines set out in the treaty), or transfer of the items to other treaty parties who must then accept liability for these items. The latter transaction – called “cascading” – allows, for example, the United States to transfer more modern equipment once held in Germany to allies in the south, where older equipment will be destroyed.

379 For a description of CFE negotiations regarding the WTO and USSR dissolution, see J.O. Sharp, *The CFE Treaty and the Dissolution of the Union of Soviet Socialist Republics*, in: Verification Report, op. cit. 1992; J.B. Poole and R. Guthrie (eds.), *Verification Technology Information Centre*, Ule 1992, pp. 25-37.

380 HLWG Meeting on 10 January 1992: Chairman's summary, NATO Press Release, point 2.

381 The Treaty on Conventional Armed Forces in Europe, 19 Nov. 1990, available at www.osce.org/docs/english/1990-1999/cfe/cfetreat.htm.

382 Agreement on Adaptation of the Treaty on Conventional Armed Forces in Europe, Istanbul, 19 Nov. 1999, available at www.osce.org/docs/english/1990-1999/cfe/cfeagree.htm. A consolidated text showing the amended CFE Treaty as adapted in accordance with the 1999 Agreement on Adaptation is reproduced in the appendix to this volume. It was originally

4.1.5.1 Specific Characteristics of the CFE Verification Regime

Several aspects set the verification regime established through the CFE apart from others of its kind. First, the nature of the *object of verification (OOV)*, presents a unique verification dilemma. As the first agreement to cover the number of conventional weapons in Europe, this regime must consider over 100,000 items, a much larger number than earlier strategic arms agreements, and many of them small and highly mobile.

On the other hand, because a larger number of these items would be necessary to create a meaningful military advantage, it is reasonable to accept a lower standard of numerical precision from the monitoring regime while still guaranteeing “adequate verification”. Thomas J. Hirschfield describes an example whereby if one country successfully hid 100 operational SS-20 intermediate-range missiles and could deploy them, Western Europe could be devastated. Yet the military advantage of successfully hiding 100 tanks in an environment where treaty members possess 20,000 of them would be negligible.³⁸³

The second unique aspect of the CFE pertains to the *methods of verification* envisaged by the treaty. Whereas many previous verification arrangements had relied solely or primarily on the use of NTM to verify compliance, CFE involves a far more intrusive system combining on-site inspections, detailed information exchanges and the possibilities of NTM. Each country began by declaring starting levels of liabilities through a detailed *information exchange* regarding the number and location of military forces within the region. These levels were then verified through *baseline inspections* throughout the first 120 days of the treaty. This data must be resubmitted annually and any permanent force structure changes or changes involving 10% of a country's TLE's must be pre-announced.

During the second phase of the treaty the parties notify one another when they are scheduling reduction events and these are verified through *passive OSIs* to ensure that the requirements of Art VIII, detailing acceptable means of reduction, are met. *Challenge inspections* can be conducted at any specified area where a TLE is suspected to exist. Quotas reflect the number of such inspections that each state must accept and are determined according to the number of OOVs declared.³⁸⁴

If a state refuses a challenge inspection, it must provide reasonable evidence that no TLEs are present at that site. While the treaty permitted such inspections during the baseline inspection period and continues to permit them during the reduction period, few countries have yet taken advantage of this possibility.

In the last phase of the treaty these inspections will likely be far more important as a means of monitoring continuous compliance with agreed levels and locations. *NTMs* or *multinational technical means*, though not as useful in verifying the levels of CFE

presented in SIPRI Yearbook 2000: Armaments, Disarmament and International Security, Oxford 2000, pp. 627-642.

383 T.J. Hirschfield, *The Toughest Verification Challenge: Conventional Forces in Europe*, in: Arms Control Today (March 1989), p. 17.

384 During the baseline inspection period (the first 120 days after the treaty enters into force) the quota of challenge inspections that had to be accepted was 20% of declared OOVs, during the three year destruction period, the quota is 10%, during the post-destruction validation period (120 days) the quota is 20% and each year thereafter it is 15%.

items, are recognized under the treaty and can be anticipated as a valuable means for individual nations to select potential sites for challenge inspections.

Follow-on talks also offer the opportunity to negotiate additional methods of verification, much discussed in the context of CFE verification but not included in the original treaty – among these are aerial inspections (taken up by the Open Skies Treaty), production monitoring, the use of tags to identify equipment, and the use of short-range or remote sensing equipment for the monitoring of storage sites and borders.³⁸⁵

The signatories of CFE are another remarkable characteristic of the treaty and its verification regime. As the USSR and the Warsaw Pact have dissolved, the number of signatories has climbed from twenty-two to thirty and the original references to the respective East and West alliances have evolved. NATO has continued to play its originally-conceived role in establishing consensus among its members on treaty-related issues, and NATO states continue to hold to a commitment not to inspect one another. However, the former members of the WTO and Soviet successor states have virtually abandoned the cooperation anticipated by the treaty. For this reason, it is significant that, while the treaty referred to Groups of States (the WTO and NATO), the signatories were individual nation-states. The Soviet successor states that had not yet been granted independence at the time of the treaty agreed to accept the USSR's commitments as their own.

This issue leads us to another aspect of the CFE, the format for continuous multilateral cooperation and interpretation of the treaty. In some ways the CFE provisions are similar to those of other verified arms control agreements. First, the Joint Consulting Group (JCG), modeled after the ABM Treaty's Standing Consultative Commission, was established as a forum for resolving interpretation differences, working out technical questions of implementation, adopting additional measures to enhance the treaty and resolving compliance questions.³⁸⁶ Second, a series of review conferences such as those for the NPT, to be held each five years beginning six months after the end of the reduction phase or at the request of any three treaty members, offer the possibility of amendment. Finally, the treaty commits all parties to continue to pursue the CFE mandate through follow-on negotiations, such as the CFE IA talks on manpower limitations, which have already been signed and are considered politically binding.

Yet, the effects of political change in Europe since the treaty's signature in November of 1990 produced a unique framework of cooperation in implementing verification. First, the High Level Working Group which negotiated the redistribution of treaty obligations among Soviet successor states, has to some extent duplicate the objective of the JCG in serving as a forum for discussion of implementation problems of the treaty. A practical division of labour evolved whereby the JCG conducted day -to-

385 A wealth of literature exists on the various ways these technologies can be useful in verifying the CFE. Among the best is R. Kokoski and S. Koulik (eds.), *Verification of Conventional Arms Control in Europe: Technological Constraints and Opportunities*, Stockholm 1990. See also R. Maxfield and A.J. Meerburg, *Two Techniques for Verifying Conventional Reductions*, in: *Arms Control Today* (August 1989), pp. 18-21.

386 I.H. Daalder, *The CFE Treaty: An Overview and an Assessment*, The Johns Hopkins Foreign Policy Institute, 1991.

day work in Vienna , while high-level meetings in Brussels focused attention in NATO headquarters on their discussion of CFE issues.³⁸⁷

Second, in line with the treaty's provision for cooperation among alliance members, NATO established a Verification Coordination Committee (VCC) to oversee the organization of inspections in the East and distribute NATO's quantity of inspection quotas among the states. Since April of 1993, however, the VCC, has begun to organize Joint Multinational Inspection Teams that include the other parties to the treaty. Participating in about 20% of reduction inspections, these teams offer national inspection agencies the possibility to share the costs of inspections and interact with one another. While not yet a truly common inspection regime or database, the VCC efforts set a precedent for evolving cooperation in implementing national verification rights.

In addition, by inviting one another to participate in common inspections, NATO countries must not compete with Eastern countries for limited quotas of inspections and raise confidence in the quality the inspections performed by other teams. The Defence Threat Reduction Agency (DTRA) conducts on-site inspections under this Treaty. Initially, DTRA conducted 70 inspections per year of Eastern Group countries and escorted about 12 inspections per year of U.S. facilities in Europe. Following the conclusion of the residual level validation period, activity declined to approximately 25 inspections and nine escort missions from March 1998 to February 1999. DTRA inspectors have also been part of multinational inspection teams.

Moreover, recently NATO has agreed to open the VERITY database – storing information on declared liabilities and inspection reports – for use by all treaty members.

4.1.5.2 Potential issues of contention

Despite the success the CFE has exhibited in adapting to the rapidly changing European security environment, several issues must be mentioned as potential tripwires for these achievements: First, political developments in the east provide two types of disruptions to the regime: The first is increased sensitivity about who inspects who. NATO resolved concerns about Greece and Turkey inspecting one another by agreeing not to inspect alliance members, but at the time of treaty signature, WTO states, desiring to inspect the USSR, insisted on the possibility of examining one another. Now, with nationalist tensions the more dominant security threat, Rumania and Hungary for example or Russia and the Ukraine for another, are more interested in inspecting one another than inspecting an American base in Germany. Armenia and Azerbaijan are a stark example of how two states with the legal right to inspect one another, may not see it in their security interest to permit such inspections. As some writers on arms control have asserted “the CFE Treaty may not be viable over the longer term since it was intended to be implemented by two alliances, not by NATO on one side and, on the other, thirteen disparate and sometimes quarrelling states.”³⁸⁸ Secondly, the dissolution of the Soviet Union leaves many questions about the number and location of liabilities declared in the beginning. These liabilities were declared by the USSR before treaty ratification, but

387 P. Dunay, *CFE and the CIS: The Difficult Road to Ratification*, in: Peace Research Institute Frankfurt Reports 29 (February 1993), p. 9.

388 J. Dean and R.W. Forsberg, *CFE and Beyond*, in: International Security (Summer 1992), p. 77.

accountability for these TLE's is poor and some may even have been taken out of the ATTU region before baseline inspections began.

Second, the treaty specified dates within the reduction period, by which certain percentages of liabilities must have been destroyed. It is likely that at least one or two Eastern states will not be able to keep this commitment for financial or technical reasons. Depending on how the reduction is accomplished, it can cost more to destroy a TLE than to build it, and some small states, such as Belarus, are left with large numbers of liabilities during times of economic crisis. Other treaty participants thus have three options if one or more states fail to meet requirements: One can tear up the treaty in response to this non-compliance and try to renegotiate conventional arms control in the region.

This is ineluctable because the consequence would be high levels of conventional forces remaining in the troubled area of Eastern Europe. Even more dangerous some states that have been convinced to ratify the CFE and support arms control in the region, may, given time, decide that their security interests lie more in maintaining arms stockpiles than in appeasing Western wishes. Alternatively, one can agree to ignore, at least temporarily, this non-compliance and insist that the reduction process continue. Lastly, one can raise the issue of non-compliance within the JCG, perhaps offering assistance in meeting this commitment. The most likely form of assistance is technical advice on how to most efficiently reduce the TLEs – for example, Poland quickly and cheaply destroyed its tanks by smashing them with a large steel ball while the Czech Republic disassembles each tank and stores the scrap metal for eventual meltdown and reuse. A less likely but non-excludable possibility would be to offer financial assistance or security guarantees to those unable or hesitant to comply with their treaty commitments.

Third, the CFE verification regime risks the development of “have” – “have not” divisions among its participants. Already several participants have expressed inability to participate in inspections due to the financial burden. Because CFE provides national responsibility for verification, each national agency must bear the costs of organizing and conducting inspections, as well as the handling of data, inspector and escort training. Moreover, as the reduction phase ends, high technology national technical means should play a much greater role in verification.

To quote a United Nations report, “The other participant will have to rely on less sophisticated means or will have to rely on the willingness of the 'have's' to get the necessary information. History has proven that states should not expect too much of the latter. This inequality violates the principle that each participant should be able to detect possible violations in a timely manner.”³⁸⁹ The Open Skies Agreement attempts to bridge this gap by permitting equipment sharing and joint overflights and the increasing capabilities of commercial observation technology narrows the gap still more.

389 H.J.v.d. Graaf, *Conventional Arms Control Verification*, in: S. Sur (ed.), *Verification of Disarmament or Limitation of Armaments: Instruments, Negotiations, Proposals*, UNIDR, Geneva 1992.

A last issue is that of overlapping responsibilities between the CFE verification regime and the confidence building measures incorporated in the OSCE.³⁹⁰ It is sufficient to note here that the information exchanged within these two regimes and the nature of the objects and activities inspected is similar enough to raise doubts about the cost-efficiency of duplicating such efforts and the bureaucracy that accompanies them.

4.1.6 A WEU Satellite Centre

As the relevance of verification in Europe increased through such agreements as the CFE treaty, CSBM's and the emergence of conflict prevention mechanisms under the CSCE, it becomes increasingly strange to note that an indigenous European capability for satellite imagery analysis was lacking, especially since the European Community after the Maastricht treaty took up a stronger role in European security.³⁹¹ The WEU satellite centre,³⁹² established in 1991, possibly provides the initial means for the purpose. The centre has been placed in Torrejón, Spain, and was in an experimental phase until 1995, when WEU member states may reconsider their participation. In the mean time, a study group in Paris was examining "the necessity and desirability of a medium and long term realisation of a European space based observation system".

The European Union Satellite Centre (EUSC),³⁹³ located in Torrejón de Ardoz in Spain, is now the successor of the Western European Union Satellite Centre (WEUSC). Its initial infrastructure has been provided by the WEU.

At present the Centre's main activities concern the development of interpretation methods, training, and responding to tasks concerning treaty verification, crisis monitoring, and environmental monitoring.

Initially, use was to be made of satellite images from SPOT, LANDSAT and ERS. In addition, high quality imagery is available from the French/Italian Spanish HELIOS programme. EUSC will continue to exploit commercial imagery as its prime data source. For specific tasks, France, Italy and Spain make limited quantities of higher resolution imagery from the HELIOS military satellite available. Some of its products have been made available to the EU and NATO and it has carried out specific tasks for the former. The transformation of the Centre into an EU asset provide Europe with a dual military/civil earth observation facility.

The WEU data centre, after having gained experience with a limited group of participants, can open the organisation to other interested European states as well. At

390 J.D. McCausland, *Endgame: CFE Adaptation and the OSCE Summit*, in: *Arms Control Today* 29/6 (September/October 1999); W. Boese, *Executive Summary of the Adapted Conventional Armed Forces in Europe Treaty*, in: *Arms Control Today* 29/7 (November 1999).

391 For details on regional satellite monitoring agencies, see B. Jasani, *A Regional Satellite Monitoring Agency*, in: *Environmental Conservation* 10/3 (1983), pp. 255-256. B. Jasani and S. Mara, *The Western European Union Satellite Centre*, in: *Journal of the British Interplanetary Society* 46 (1993), pp. 209-211.

392 Now called The European Union Satellite Centre (EUSC), located in Torrejón de Ardoz in Spain.

393 The EUSC was set up in 2002, based on a Council Joint Action on 20th of July 2001, (OJ L 200, 25th July 2001). Its task consist of providing material resulting from the analysis of satellite imagery and collateral data, including aerial imagery as appropriate to the Union, Member States, the Commission, Third States and International Organizations.

the same time perhaps data analysis should not be restricted to data obtained from Western sources, but also include producers like the Russian Soyuskarta. One could also consider linking the WEU satellite centre to the CSCE machinery, since without extensive monitoring capabilities of their own the emerging European institutions could not react quickly and adequately to events in and outside Europe, for which they claim responsibility.³⁹⁴

4.1.7 *The Open Skies Treaty*

The Open Skies agreement was originally proposed by President Dwight B. Eisenhower in 1955 as a confidence-building measure³⁹⁵ whereby the US and USSR could monitor one another's strategic arsenals, but was rejected by Nikita Khrushchev as a “bald espionage plot” according to standing Soviet policy on verification. Faced with radically different political and technological circumstances, US President George Bush resurrected Open Skies in a 1989 proposal and on March 24, 1992 all members of NATO and the former Warsaw Pact, including three successor states to the USSR, signed the Open Skies Agreement.

The treaty entered into force on January 1, 2002. Of the original 27 treaty signatories, all but Kyrgyzstan have ratified the accord and are now states-parties. Since the treaty entered into force, Finland, Latvia, and Sweden have become states-parties. Bosnia and Herzegovina, Croatia, Estonia, Lithuania, and Slovenia have also been approved by existing states-parties to join the treaty.

Russia conducted the first observation flight under the treaty in August 2002, while the United States carried out its first official flight in December 2002.

In this unprecedented agreement, the twenty-nine state parties³⁹⁶ agreed to allow short-notice inspection by unarmed surveillance aircraft equipped with sensing devices. The agreement provides full territorial coverage, without exceptions, of the area from “Vancouver to Vladivostok” – including all of North America, Europe, and the Asian part of Russia. Unlike other agreements discussed in this paper, however, Open Skies does not verify any particular commitments, but rather serves as a complementary verification tool and a confidence-building measure within its extended region.³⁹⁷ Now that the treaty has entered into force, members of the Organization for Security and Cooperation in Europe not party to the accord may

394 See H.J.v.d. Graaf, op. cit., 1992, pp. 132-138.

395 The Treaty on Open Skies, represents the most wide-ranging multinational effort so far to enhance military transparency and confidence building through mutual aerial observation flights. Its purpose is to facilitate the monitoring of compliance with existing or future arms control treaties and to strengthen the capacity for conflict prevention and crisis management. R. Wiemker, *Brief on the Open Skies Treaty*, for the Handbook of Confidence-building Measures for Regional Security, CENIS, University of Hamburg, The Henry L. Stimson Centre, Washington 1998, available at www.informatik.uni-hamburg.de/PROJECTS/censis/osbrief.html.

396 Belarus, Belgium, Bulgaria, Canada, the Czech Republic, Denmark, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Italy, Latvia, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Turkey, Ukraine, the United Kingdom, and the United States.

397 Regarding the negotiation of the treaty see P. Jones, *Open Skies: events in 1992*, in Verification Technology Information Centre (VERTIC), Verification 1993, London and New York 1993, pp. 146–161 and R. Hartmann and W. Heydrich, *Der Vertrag über den offenen Himmel [The Open Skies Treaty]*, Baden-Baden 2000.

apply to accede. If no state-party objects to a country's application, the country may join the treaty. Finland, Sweden, and Cyprus have expressed interest in acceding. After July 1, any other country may also ask to join the accord.³⁹⁸

In principle, any state party has the right to overfly the territory of any other participant it chooses. The inspecting party must provide advance notice of an overflight and designated point of entry, and upon arrival must submit a detailed flight plan, permit a 24-hour inspection of the aircraft and sensors, and take on two host-country monitors for the duration of the flight. The treaty while attempting to maximize the openness of the host country provides a strict ban on SIGINT sensors and recorders and a ban on "loitering" over a given point in order to provide as much protection as possible to sensitive military communications.

Although Open Skies may have begun primarily as a political initiative, it has a significant role to play in the field of verification³⁹⁹. First, Open Skies permits *independent monitoring* and verification by participants that do not have observation satellites. The means of aerial surveillance permitted by the treaty are limited to those equally available to all participants on an unrestricted commercial basis and the treaty provides the possibility of borrowing or sharing surveillance equipment for the purpose of inspection.

Second, Open Skies demands that the *United States and Canada* share the burden of intrusive monitoring by bringing North America into the territory covered by the agreement.

Third, as a *confidence-building measure*, Open Skies enables participants to satisfy themselves regarding the peaceful intentions of the other side.⁴⁰⁰ "It would be virtually impossible to hide plans for a conventional attack from frequent, random reconnaissance flights."

Fourth, Open Skies serves as a *stimulus to continued progress in arms control* as it will stand separately from any other arms control agreement and could help fulfill the verification requirements of current and future accords⁴⁰¹. In fact, the timely conclusion of the CFE treaty can be at least partially attributed to the existence of the Open Skies talks because it allowed the negotiations to avoid lengthy debate over aerial reconnaissance guidelines, leaving them to be dealt with in Open Skies.

Finally, the aerial reconnaissance regime serves as a valuable *complement to existing technical means of verification*. One of the fundamental criticisms of the agreement is that it has been rendered largely obsolete by the substantial surveillance capabilities of the United States and Russia. Yet, overflights offer several advantages over conventional satellites including additional coverage of objects of interest, ability to fly below cloud cover, and the possibility of carrying air-sampling devices for detection of chemical or nuclear weapons production. Moreover, because the photographs taken during overflights are not highly classified (as is most NTM

398 W. Boese, *Open Skies Treaty Enters Into Force*, in: Arms control Today (January/February 2002).

399 K.M. Tracey, *Open Skies and UN peacekeeping*, in: Survival (June 1990).

400 See P. Jones, *Open Skies: a new era of transparency*, in: Arms Control (May 1992).

401 D. Koplow, *Legal Implications of Open Skies Inspection for Arms Control*, in: California Law Review (March 1991), pp. 421-496.

intelligence), they can be made public and employed as an effective political instrument in times of crisis.

While not as intrusive a regime as originally intended, Open Skies is an important step forward in aerial verification. As a major confidence-building measure, it may have an important impact on related security fields. The treaty may also expand its scope, as it establishes provisions to expand the membership of the treaty, (especially to CSCE member states) if the demand arises. Further, it is possible that non-military sectors, such as environmental monitoring may eventually be incorporated.⁴⁰² While aerial verification undoubtedly suffers from disadvantages in terms of cost, complexity, and technology transfer, it still has a significant role to play in verification regimes. The flexibility of use and its accessibility to the majority of states are significant advantages. Moreover, the Open Skies agreement lays the groundwork for the creation of an aerial reconnaissance regime, which might be applied to other arms control agreements.

Even though, the 1993 Chemical Weapons Convention (CWC) does not foresee aerial inspections. However, images of chemical weapon sites from Open Skies trial flights have been very informative. Delegates at the Organisation for the Prohibition of Chemical Weapons (OPCW) in The Hague, Netherlands, have used the information successfully in bilateral exchanges. The general disclosure of such imagery to all CWC states parties will require the consent of the observed state. This should be supported by diplomatic efforts.⁴⁰³

4.2. Nuclear Weapon Free Zones (NWFZ); the regional approach

In contrast to the multilateral NWFZ treaties concerning Antarctica, Outer Space and the Moon, the treaties of Tlatelolco⁴⁰⁴ and Rarotonga prohibit the presence and development of nuclear weapons in *populated regions*, respectively Latin America and the South Pacific and the 1992 Declaration on the Denuclearization of Korea have entered into force, while two other such agreements – the 1995 Treaty of Bangkok regarding Southeast Asia and the 1996 Pelindaba Treaty regarding Africa have been opened for signature.⁴⁰⁵

These regional arrangements provide a tool for nuclear non-proliferation, which can substitute, reinforce or even go beyond obligations contained in the nuclear Non-Proliferation Treaty (NPT). In General Assembly Resolution 3472B of 11 December 1975, a nuclear weapon-free-zone was basically defined as follows: “the total

402 For example, in 1995 a German–Russian trial flight over Siberia monitored huge amounts of weapon systems which had been brought over the Ural Mountains from the European part of Russia shortly before the conclusion of the CEF Treaty. Open Skies flights have a much wider area coverage than on-site inspections under the CEF Treaty.

403 E. Britting and H. Spitzer, *The Open Skies Treaty*, in: Verification Technology Information Centre (VERTIC), Verification 2002, p. 232.

404 All 33 States in the region of Latin America and the Caribbean have signed, ratified and have waived Article 28 of the Treaty of Tlatelolco. The Member States of the Treaty of Tlatelolco are: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, and Venezuela have all signed are all full Parties to the Treaty.

405 See P. Gasparini Alves and D.B. Cipollone (eds.), *Nuclear-Weapon-Free Zones in the 21st Century*, Geneva 1997.

absence of nuclear weapons within a delimited area, which is subject to an international system of verification and control in order to guarantee compliance”.⁴⁰⁶

4.2.1 *The Treaty of Tlatelolco*

The Treaty for the Prohibition of Nuclear Weapons in Latin America, known as the Treaty of Tlatelolco, for long was the only proud example of its kind in the world, but has suffered from the lack of recognition by the region's major countries. For this reason the far-reaching regional verification machinery largely remained a “sleeping beauty”, as a result of amendments to the treaty, submitted by Brazil, Argentina and Chile, and adopted in August 1992.⁴⁰⁷

The treaty of Tlatelolco established a nuclear-weapon-free zone including all Latin American and Caribbean states, and a portion of the adjoining Atlantic and Pacific seas.

The treaty was signed in 1967, and entered into force in 1968 before negotiations on the NPT were completed. The treaty was to a great extent a reaction to the Cuban crisis in 1962, which highlighted the dangers of a nuclear build up in Latin America.⁴⁰⁸

It was no surprise that Cuba was not one of the signatories. Argentina signed, but did not ratify the treaty. Brazil and Chile did, but invoked Article 28, which provides that the treaty does not enter into force until all parties have agreed to it. Other Latin American countries, including some non-NPT members, have waived Article 28 and have abided by the treaty. In addition, Argentina, Brazil and Chile, which became parties to the NPT only after 1993, considered to be discriminatory in dividing the world into have's and have-not's as far as nuclear capabilities are concerned. Argentina and Brazil have been the only two countries known to have nuclear-weapon potential.

The relevance of the Tlatelolco treaty has thus been to a large extent dependent on overcoming their rivalry. However, in their July 18, 1991 agreement for the exclusive peaceful use of nuclear energy, both countries undertook to prohibit in their respective territories the testing, use, manufacture, production, or acquisition by other means of any nuclear explosive device, as long as no technical distinction can be made between nuclear explosive devices for peaceful purposes and those for military purposes.⁴⁰⁹

One possible weakness of the treaty is that, like the NPT, it permits “peaceful nuclear explosions”, which were thought to have great economic potential at the time it was signed. The US and also the IAEA have considered it impossible to distinguish

406 J. Goldblat, *Nuclear Weapon Free Zones: A History and Assessment*, in: *The Nonproliferation Review* (Spring/Summer 1997) pp. 18-32.

407 See: M. Barletta, *Argentine and Brazilian Nonproliferation: A Democratic Peace?*, in: H. Sokolski and J.M. Ludes (eds.), *Twenty-first Century Weapons Proliferation*, Portland, OR 2001, pp. 148-167.

408 Several other factors played a role as well. See J.R. Redick, *The Tlatelolco regime and nonproliferation in Latin America*, in *International Organization* (Winter 1981).

409 The withdrawal clauses of the Treaty of Tlatelolco and the Treaty of Pelindaba, which refer to the “supreme interests” of the parties, are too permissive. (The Treaty of Rarotonga and the Treaty of Bangkok concede the right of withdrawal only in the event of a material breach of the parties’ obligations.) J. Goldblat, *Nuclear-Weapon-Free-Zones: A History and Assessment*, in: *The Nonproliferation Review* (Spring-Summer 1997).

between peaceful or military uses of nuclear explosions.⁴¹⁰ Another problem is that the treaty does not expressly ban the transport or the transit of nuclear weapons through the region, the right of which the US has been eager to reserve and which has been contested by others. Outside states have been involved through two protocols; the first requires those that control territory within the zone to apply the terms of the treaty, the second commits nuclear weapon states to respect the NWPZ and not to use, or threaten to use nuclear weapons against treaty members.

4.2.2 *The Treaty of Rarotonga*

The South Pacific Nuclear Free Zone Treaty, known as the Treaty of Rarotonga, was signed in 1985 on the fortieth anniversary of Hiroshima Day by the members of the South Pacific Forum: Australia, New Zealand and eleven small island states⁴¹¹. The treaty established a Nuclear Free Zone comprising a vast area, most of which is ocean.⁴¹² The treaty entered into force for its parties in 1986⁴¹³. The treaty's provisions are similar to those of Tlatelolco: banning the acquisition, development, stationing and testing of nuclear weapons. However, Rarotonga goes even further:

it bans the dumping of radioactive waste in the seas. For this reason it has been referred to as a Nuclear Free Zone, even though the use of nuclear energy is not prohibited.

it explicitly bans “peaceful” nuclear explosives. The creation of a NFZ originated mainly in a strong anti-nuclear sentiment resulting from an excessive amount of foreign nuclear tests in the region.⁴¹⁴

410 J.B. Wolfsthal, *Nuclear Weapon Free Zones coming of age?*, in: *Arms Control Today* (March 1993), p. 4.

411 Those states are: the Cook Islands, Fiji, Kiribati, Nauru, Niue, Papua New Guinea, the Solomon Islands, Tonga, Tuvalu, Vanuatu and Samoa.

412 This presents a specific problem since coastal states only possess jurisdiction over their own internal waters (within 200 kilometers of the coast). Apart from these areas, all states enjoy the right of innocent passage. For this reason Rarotonga required the agreement from nuclear weapon states in order to make the zone effective.

413 The 5 September 1995 French nuclear test in the Mururoa Atoll solidified public and political support for rapid accession of the nuclear-weapon states to the South Pacific NFZ protocols. Because the French testing facilities, on Mururoa Atoll and Fangatau in French Polynesia, are both inside the South Pacific zone, had the Treaty been universally in force among the nuclear-weapon states, the tests could not have been legally conducted. In fall 1995 Washington decided that it would accede to the three protocols, and on 20 October the United States, France, and the United Kingdom jointly announced their intention to sign. Reuters North American Wire, 20 October 1995 (LEXIS/NEXIS). M.E. Rosen, *Nuclear-Weapon-Free Zones. Time For A Fresh Look*, 1996, available at www.nwc.navy.mil/press/Review/1996/autumn/free-a96.htm. In regarding to France position look: D.S. Yost, *France's Nuclear Dilemma*, in: *Foreign Affairs* (January/February 1996), pp. 108 ff.; and briefing by M. McCurry, White House Press Secretary, Federal Document Clearing House (hereafter FDCH) Political Transcripts, 11 April 1996 (LEXIS/NEXIS).

414 The South Pacific NFZ treaty places a heavy emphasis on environmental protection, leading to the conclusion of two additional treaties dealing with the management of natural resources within the exclusive economic zones (EEZs) of the parties and the dumping of wastes. Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, Noumea, 1986, entered into force 22 August 1990 (Senate Treaty Document 101-21, 101st Cong., 2nd Sess., Washington, DC 1990).

The relevance of Rarotonga has been disputed.⁴¹⁵ Neither of the small island states nor New Zealand have nuclear capabilities, while Australia (a signatory of the NPT) cannot develop a nuclear weapon program. Moreover, there are no serious tensions between the countries, and there is a long tradition of cooperation. Therefore, no need was perceived for a very rigorous verification regime.

Controversial aspects of the treaty lie mainly in the involvement of outside states, as the South Pacific is an important strategic area. Therefore, the treaty clearly spells out the rights of members states to individually approve or deny port calls and transit by vessels carrying nuclear weapons. This was agreed so as not to upset US involvement in the region. It means that the region *stricto sensu* is not nuclear weapon free. Several nuclear weapon states reserved the right to rescind non-use obligations under the treaty in case of aggression or non-compliance by one of the others. The US signed the two additional protocols for outside states (which are similar to those of Tlatelolco), only in 1996⁴¹⁶ because of its desire to maintain strategic naval operations in the zone in support of its regional security interests and obligations.⁴¹⁷ A special protocol aimed at restraining France from conducting nuclear tests in the zone has not been effective. France has conducted over 150 tests in the region since 1966. After having ignored Raratonga's provisions for some time, it announced an indefinite moratorium on tests in April 1992. France has signed the protocol of the treaty in 1998.⁴¹⁸

4.2.3 *The Treaty of Pelindaba (Africa)*

The African treaty was opened for signature in 1995, but its entry into force may depend on the ratification of its Arab parties, which will depend on the evolution of the situation in the Middle East. Even if the necessary number of ratifications is achieved, the effective implementation of the treaty will come only when there is a perception that Israel is keen to abandon its presumed nuclear weapons and effective Non-proliferation measures for Mass Destruction Weapons are implemented in the Middle East region.

The idea of an African NWFZ goes back to the 1960s, as a reaction against French tests in Algeria. Afterwards, the acquisition of some nuclear weapons by South Africa made impossible any improvement until this country was the first in the world to dismantle its nuclear arsenal. Currently, South Africa is the only party with nuclear power plants, whereas Egypt, Algeria, Ghana, Libya and Zaire have research reactors.⁴¹⁹

On 11 April 1996, over fifty African states and the United States, the United Kingdom, France, and China sent representatives to Cairo and signed the Treaty of

415 For an elaborate discussion, see G.E. Fry, *The South Pacific nuclear-free zone*, in: SIPRI Yearbook, 1986.

416 The United States, United Kingdom and France have signed the three Protocols to the South Pacific Nuclear Free Zone Treaty, also known as the Treaty of Rarotonga, according to a joint declaration from those countries. United Nations Daily Highlights 96-03-28.

417 J.B. Wolfsthal, op. cit., 1993, p. 6.

418 United Nations Daily Highlights 96-03-28.

419 The Kampala Document: Towards a Conference on Security, Stability, Development and Co-operation in Africa, 1991. Kampala: Africa Leadership Forum/Organisation of African Unity/United Nations Economic Commission for Africa, p. 12.

Pelindaba, named for the site of South Africa's former nuclear weapons complex.⁴²⁰ The Treaty created the African Nuclear-Weapon-Free Zone, embracing not only the African continent but also all islands, which have been declared by the Organization of African Unity (OAU) to be part of Africa.⁴²¹ Because the OAU has declared Mauritius to be part of Africa, and the government of Mauritius has in turn asserted a claim to the Chagos Archipelago, the treaty zone includes, for some purposes, the island of Diego Garcia. Diego Garcia, upon which the United States operates an important military facility, is, of course, a British Indian Ocean Territory; accordingly, the official treaty map of the African NWFZ contains a footnote that the island is shown within the Zone “without prejudice to the question of sovereignty”. In the definition of the zone there is a dispute over the sovereignty of Diego Garcia island, where the United States has a base for nuclear weapons-carrying aircraft. A reference in the agreement to the freedom of the seas is intended to preclude restrictions on the presence of nuclear weapons beyond the territorial sea limits of the parties.⁴²²

While sharing the indefinite duration and withdrawal with 12 months' notice with the Treaty of Rarotonga, the Pelindaba Treaty has several interesting innovations. First, it also bans research on nuclear explosive devices (i.e., implosion technology, hydronuclear testing and computer simulations), though it is uncertain how these activities can be monitored. Second, it requires the destruction of any nuclear device that a party might have had previously to signing the Treaty. This affects only South Africa. Third, Pelindaba prohibits dumping nuclear waste not only at sea, but in the whole region, though presumably controlled repositories are allowed. Finally, the agreement prohibits conventional attacks on peaceful nuclear facilities, which has important implications for future Middle East participation. The Pelindaba Treaty states support for peaceful nuclear activities, which Tlatelolco and Rarotonga do not mention.

As in Rarotonga, there is an explicit prohibition on testing any nuclear explosive devices, but the African treaty also permits visits of aircraft or ships carrying nuclear weapons. The Treaty of Pelindaba prohibits the manufacture, testing, stockpiling, or acquisition by other means, as well as possession and control of any nuclear explosive device (in assembled, unassembled, or partly assembled forms) by the parties. In addition – and this is an important novelty – research on, and development of, such a device are banned.⁴²³

420 Briefing by M. McCurry, White House Press Secretary, and Robert Bell, Senior Director, Defence Policy and Arms Control (National Security Council), FDCH Political Transcript, 11 April 1996 (LEXIS/NEXIS).

421 For a discussion of South Africa's nuclear weapons program and the Treaty's negotiation history, see D. Fisher, *The Pelindaba Treaty: Africa Joins the Nuclear-Free World*, in: *Arms Control Today* (December 1995), p. 10.

422 See W.M. Arkin, *Calculated Ambiguity: Nuclear Weapons and the Gulf War*, Washington, DC 1996, pp. 3, 10. Arkin's source for the B-52 report was former Secretary of State James Baker.

423 Verification of the uses of nuclear energy is to be performed by the IAEA, which must apply full-scope safeguards to prevent the diversion of nuclear material to nuclear explosive devices (Annex II). So far, four African states – Algeria, Egypt, Libya, and South Africa – have nuclear programs requiring the application of safeguards. Of these, only South Africa is in possession of nuclear power reactors. J. Goldblat, *op cit.*, p. 25.

Under Protocol II, open for signature by the five nuclear weapon states, the signatories should undertake not to test or assist in or encourage the testing of any nuclear explosive device within the African zone. Article 1 defines nuclear explosive device in exactly the same way it is defined in the Treaty of Rarotonga.

In a clear allusion to the past South African nuclear weapon program, Article 6 of the Treaty of Pelindaba requires the dismantlement and destruction of any nuclear device that was manufactured prior to the coming into force of the treaty, as well as the destruction of the relevant facilities or their conversion to peaceful uses⁴²⁴. All such operations must take place under the supervision of the IAEA. These provisions aim to dispel any lingering suspicion that some nuclear items have been hidden away in South Africa⁴²⁵ or that certain prohibited activities are still taking place there. Article 6 sets a precedent for future nuclear weapon-free-zone treaties concluded with the participation of nuclear threshold states.

Parties to the treaty may supply nuclear material or equipment to non-nuclear-weapon states only if the latter accept full-scope safeguards (Article 9c). Furthermore, the treaty obliges the parties to observe international rules regarding the security and physical protection of nuclear materials, facilities, and equipment in order to prevent their theft or unauthorized use (Article 10). Any action aimed at an armed attack by conventional or other means against nuclear installations in the African zone is forbidden (Article 11).⁴²⁶

4.2.4 Verification regimes for the Tlatelolco, Rarotonga and Pelindaba Treaties

Both the treaties arrange for IAEA safeguards to be carried out for the verification of the non-diversion of nuclear material to nuclear devices. Tlatelolco does not specify the scope of the safeguards, whereas Rarotonga and Pelindaba requires them to be full scope, i.e. covering all nuclear activities of the parties.

The *regional machineries* set up for verification are rather different, with the Latin American version being initially more institutionalized and more rigorous. The Treaty of Tlatelolco provided for the creation of the Agency for the Prohibition of Nuclear Weapons in Latin America (OPANAL) to which parties must submit semi-annual reports. OPANAL may request a *special report* from the parties, or initiate

424 W. Strumpf, *South Africa's Nuclear Weapons: From Deterrence to Dismantlement*, in: Arms Control Today 25 (1995/96), pp. 3-8.

425 In September 1991, IAEA became engaged in activities to verify the completeness and to assess the correctness of South Africa's initial report on its nuclear material subject to safeguards, following the conclusion of a comprehensive Non-Proliferation Treaty-related Safeguards Agreement between South Africa and the Agency. In March 1993, a new dimension was added when the President of South Africa announced that his country had previously developed a limited nuclear deterrent capability which had been dismantled and destroyed before South Africa had acceded to the Treaty. At the invitation of the South African authorities, Agency experts visited the facilities involved in the abandoned nuclear-weapons programme and reviewed the associated historical data for the purpose of assessing the status of the programme and verifying that all the nuclear material used in the programme had been fully accounted for and placed under Agency safeguards. That was the first occasion on which a State, which had covertly developed nuclear weapons and then dismantled them, subsequently invited IAEA to verify the fact of the discontinuance of its weapons programme and the dismantlement of the weapons. With full access to all relevant facilities. See submission by B. Pellaud, *Document of the Study Group SVG/CRP.13*.

426 See: S. Ogunbanwo, *Accelerate the Ratification of the Pelindaba Treaty*, in: Nonproliferation Review 10 (Spring 2003), pp. 132-136.

these itself. Upon the request of any party suspecting violations of the treaty, the Council (consisting of only five OPANAL members) must immediately arrange for *special inspections*. Legal and political qualification of the facts is subsequently left to OPANAL's General Conference, which may refer the case to the Organization of American States or to the UN if it is judged a violation endangering peace and security.⁴²⁷

Under Rarotonga every party has the right to receive the information about the conclusions of IAEA reports. Only 'significant' activities must be reported to a secretariat within the South Pacific Forum. The Consultative Committee, an assembly of state representatives meets at the request of a Party and has the authority to trigger an *inspection*. It may report violations to the South Pacific Forum, which is the supreme body for making decisions on compliance issues. No explicit sanctions are foreseen and no referral to the UN is provided for. Nuclear explosions can be verified by *seismographic* equipment in Australia and New Zealand.

Under the treaty of Pelindaba, the African Commission on Nuclear Energy (AFCONE), which will have its headquarters in South Africa, is to be charged with ensuring compliance with all the above undertakings (Article 12). It will be composed of 12 members elected by the parties for a three-year period, bearing in mind not only the principle of equitable geographical distribution, but also the advancement of the members' nuclear programs. The Chairman and Vice-Chairman are to be elected by AFCONE, while the Executive Secretary is to be designated by the Secretary-General of the OAU (Annex III).⁴²⁸

Neither treaty requires verification of the obligations to which the nuclear weapon states have subjected themselves in the respective regions. The NWS have not been willing to confirm or deny reports regarding the presence of their nuclear weapons in the prohibited areas.⁴²⁹

4.2.5 *The verification regimes in practice*

The IAEA safeguards have worked satisfactorily -in so far as they have been applied, but both regional verification machineries have not been put to test. In the case of Tlatelolco this has been a result of the non-participation by the region's major states, while the South Pacific area has been a zone of peace and quiet.

Latin America's rigorous (in comparison to Rarotonga) verification system has remained a dead letter. Since its creation, OPANAL has not performed any special inspections, nor has it set up a machinery which could carry them out. The agency, which has a small budget of USD 300,000 has not even requested or initiated special reports⁴³⁰. On August 26 1992, 18 members of the Tlatelolco treaty adopted

427 J. Simpson, *The Nuclear Non-Proliferation Regime After the NPT Review and Extension Conference*, in: SIPRI Yearbook 1996. See also J. Rissanen, *Contested Language in Main Committee II* (Safeguards and Nuclear Weapon Free Zones), Sixth NPT Review Conference, Briefing No. 12, 12 May 2000, available at www.acronym.org.uk/www.acronym.org.uk/npt12.htm.

428 S. Ogunbamwo, *Special Reference to the Establishment of an African Nuclear-Weapon-Free Zone*, OPANAL, 14 October 2002, available at www.opanal.org/Articles/cancun/can-Ogunbamwo.htm.

429 J. Goldblatt, *NPT and Nuclear Weapon Free Zones*, in: Arms Control (May 1990).

430 The Agency has been requested studies by the General Conference. In 1985 a Good Offices Commission was established and assigned the task of solving problems of interpretation

amendments which affect the treaty's inspection procedures and were designed to protect nuclear industrial secrets of member states. The amendments eliminate OPANAL's ability to conduct special inspections, authorizing only the *IAEA* to conduct them. The results of such inspections are to be transmitted to OPANAL and access to detailed technical reports submitted by member states is to be restricted.⁴³¹ With the adoption of these amendments, the three hold outs -Argentina, Brazil and Chile – have committed themselves to implement the treaty, while Cuba has indicated that it would adhere to the treaty once all the states in the region assume their obligations. These amendments were made possible by the bilateral agreement reached on 13 December 1992 between Argentina and Brazil in which they opened their nuclear installations for mutual inspections and accepted IAEA safeguards, but without acceding to the NPT.

As for Rarotonga, the conclusion of a UNIDIR report provides an accurate analysis:

“The verification system or the treaty of Rarotonga is, on the whole, well suited to the political, military and economic conditions in the South Pacific. It is lean, economical and relies heavily on the ‘Pacific way’ of consensus building and informality. Despite the hopes of its negotiators it is not, however, pathbreaking, since it lacks some of the rigour of the Treaty of Tlatelolco and subsequent arms limitation agreements. (...) In addition, apart from the involvement of the IAEA in applying nuclear safeguards, it is an inward looking system, perhaps suited to the “Pacific way” of managing conflict, but removed from the broader conflict resolution process of the international community.”⁴³²

4.2.6 *Conclusions on the NWFZ verification regimes*

The Tlatelolco case shows that regional arrangements for nuclear non-proliferation can provide an alternative for states which refuse to accede to the NPT, but agree to be subjected to international safeguards. It also gives the possibility to extend these safeguards with regional provisions. This may include regional institutions for dealing with non-compliance and inspections, and as in the case of Rarotonga, inclusion of provisions on the dumping of nuclear waste.

Even so, most of the verification effort has been entrusted to the IAEA as a credible independent agency. The amendments to the Tlatelolco treaty showed that Brazil and Argentina apparently did not want to put their trust in OPANAL for inspections, especially with regard to the protection of industrial secrets.

It is thus clear that the region's major powers can make or break the verification regime, and that it can operate only to the extent that the political situation allows it to. The difference between the Tlatelolco and the Rarotonga regimes makes clear as well that the specific political and other characteristics of the region, including the

concerning article 18 (peaceful nuclear explosions), drafting safeguard agreements, the scope of inspections and the protection industrial secrets. There have been plans for convening a seminar to discuss the difficulties concerning non-NPT members, but they never materialised. For further details see M.E. Estrada Oyuela, *The Tlatelolco Treaty*, in: S. Sur (ed.) *Verification of Current Disarmament and Arms Limitation Agreements: Ways, Means and Practices*, UNIDIR, Geneva 1991.

431 *Argentina, Brazil, and Chile to implement Tlatelolco Treaty*, in: *Arms Control Today* (September 1992).

432 T. Findlay, *The Rarotonga Treaty*, in: S. Sur (ed.), op. cit., 1991.

role which outside states play in the region, determine the nature of the arrangements.

An important aspect of the regional approach is that it can help diffuse regional tensions and instability that usually increase the incentive for countries to opt for nuclear weapons. The process of regional confidence building is often a sine-qua-non for countries to give up the nuclear option, and thus possibly provides a more credible basis for compliance than adherence to a global regime. The case of NPT-signatory, Iraq and North Korea illustrates that formal acceptance of non-nuclear weapon status is no guarantee against nuclear proliferation as long as the political will to acquire nuclear weapons exists and the necessary technology can be imported from advanced industrial countries. The Confidence building measure of ANWFZ are articulated in Article X that commits states to maintain high standards of “effective physical protection” of nuclear materials, and in Article 11 where by it prohibits state parties from making, assisting, or encouraging an attack by conventional or other means on “nuclear installations” inside the zone.⁴³³

The effective implementation of the treaties will depend for some of the treaties the interest and the condition of ratification of nuclear powers. For instance, the United States has no military facilities inside the Zone South Pacific Nuclear Free Zone, and unlike the Treaty of Tlateloco and SEANWFZ treaty, the zone, for most purposes, only encompasses the land territory, internal waters, and archipelagic waters of individual states. The ANWFZ treaty provides a legally binding to the so called negative security assurance (NSA)⁴³⁴ to neither use, nor threaten to use, nuclear weapons against “a party to the treaty”, or any territory within the zone for which a party is internationally responsible (eg., French and Spanish possessions). Further the ANWFZ has a clause in each relevant protocol requiring twelve months advance notice of a states' intention to withdraw for circumstances affecting its “supreme national interests”. There are at least two challenges, first, the presence within the zone of the U.S. Naval Facility in British Indian Ocean Territory of Diego Garcia poses political problems.

Despite the fact that ANWFZ does not pose any textual problems with respect to the legality of continued U.S. military operations at Diego Garcia, there is language in Article 2 of all three Protocols (which both the United States and the United Kingdom signed) requiring a state not to “. . . contribute to any act which constitutes a violation of this Treaty, or this Protocol”. That language could be used by

433 See African Nuclear Weapon Free Zone Treaty, Jun. 23, 1995, 35 I.L.M. 698 [hereinafter ANWFZ]. The Treaty of Pelindaba has been signed by all 53 eligible African Nations. See Arms Control and Disarmament Agency (visited Sept. 26, 1997), available at www.acda.gov/treaties/afnwsigs.htm.

434 The U.S. negative security assurance (in which the United States pledges not to use or threaten to use nuclear weapons against non-nuclear weapons states which adhere to the NPT norms) [hereinafter NSA] is discussed in detail throughout this article. See Cyrus Vance, U.S. Assurance on Non-Use of Nuclear Weapons, DEPT ST. BULL., Aug. 1978, at 52 (quoting President Carter, “The United States will not use nuclear weapons against any non-nuclear-weapons state party to the NPT or any comparable internationally binding commitment no to acquire nuclear explosive devices, except in the case of an attack on the United States, its territories or armed forces, or its allies, by such a state allied to a nuclear-weapons state or associated with a nuclear-weapons state in carrying out or sustaining the attack.”); A. Gore, *The Non-Proliferation Treaty: The Case for Indefinite Extension*, 24 April 1995, p. 353. The 1995 statement was endorsed unanimously by the UN Security Council. See S.C. Res. 984, U.N. SCOR, 50th Sess., 3514th mtg., para. 1, U.N. Doc. S/RES/984 (1995).

opponents of a U.S. nuclear capable presence in the Indian Ocean.⁴³⁵ Practically speaking, U.S. accession to ANWFZ has no legal significance on whether there will be political impacts associated with DOD's continued use of Diego Garcia. But, a possible harbinger of future political problems was manifest by Russia's last minute decision not to sign the Treaty because of its reservations with "U.S. use of the U.K.'s strategic island base of Diego Garcia."⁴³⁶

4.3. The opportunities and challenges of Regional Verification Regime

4.3.1 *The case of the Middle East*

One of the greatest challenges of pursuing non-proliferation would be to establish a NWFZ in Middle East. Political efforts to change this situation have focused on the possibility to establish a nuclear-weapon-free zone in the area.⁴³⁷ Back in 1974, Iran supported by Egypt raised the issue in the UN General Assembly.⁴³⁸ Since that time, the UN General Assembly has every year adopted a resolution recommending the establishment of a nuclear weapon-free zone in the Middle East (NWFZME). Since 1980, this annual resolution has been adopted by consensus, i.e. with the support of all Arab states, Iran and Israel.⁴³⁹ In 1990, President Mubarak of Egypt proposed the establishment of a zone free of weapons of mass destruction in the Middle East (WMDFZME).⁴⁴⁰

In such a tense, unstable and heavily armed region, a NWFZ would be an achievement of the utmost importance, but it seems that any settlement of the nuclear question in the region is dependent on a comprehensive political solution for overcoming patterns of rivalry in the area⁴⁴¹, most obviously the Israeli-Arab conflict. Israel is the only country in the Middle East, which has the capability of producing nuclear weapons within a very short time.⁴⁴² As a small country in a hostile environment without geographically close allies, Israel relies heavily on a nuclear deterrent to ward off aggression. It is not likely to give up the nuclear weapon option without a comprehensive political settlement and/or waterproof security guarantees.⁴⁴³ In turn, it is not likely that Arab countries will accept a NWFZ without the inclusion of Israel. (It could even be argued that Arab calls for

435 M.E. Rosen, *Nuclear Weapons Free Zones: Time For A Fresh Look*, unpublished paper, available at www.law.duke.edu/journals/djcil/articles/djcil8p29.htm.

436 S. Baynham, *Africa – A Nuclear Free Zone*, in: Jane's Intelligence Review Pointer (1 Januar 1997), available in LEXIS, News Library, Curnws File. Russia finally signed ANWFZ a month later.

437 J.F. Leonard and J.Prawitz, *The Middle East, as a NWFZ or WMDFZ application*, in: *Pacifica Review* 11/3 (October 1999), pp 263-264.

438 UN Document A/RES/3263 (XXIX).

439 UN General Assembly on 4 December 1998, UN Document A/RES/53/74.

440 Document CD/989, 20 April 1990.

441 Karsh, Navias, Sabin, *Non Conventional Weapons Proliferation in the Middle East*, Oxford 1993, for an overall view of the problems.

442 See, for example, *Revealed: the secrets of Israel's Nuclear Arsenal*, in: *Sunday Times* (5 October 1985); F. Barnaby, *The invisible bomb; the nuclear arms race in the Middle East*, London 1989.

443 See A. Cohen and M. Miller, in: *The Washington Quarterly* (Spring 1993), pp. 101-113.

establishing an NWFZ are aimed at putting international pressure on Israel, rather than born out of sincere concerns about nuclear proliferation.)

Other problems in establishing a NWFZ in the Middle East concern the scope of the area and involvement of outside states. The IAEA definition of what would be a significant zone runs as follows: “the area extending from the Libyan Arab Jamahiriya in the West, to the Islamic Republic of Iran in the East, and from Syria in the north to the People's Democratic Republic of Yemen in the South.”⁴⁴⁴

The presence of neighbouring states complicates the definition of an effective zone. In both the Tlateloclo and Rarotonga treaties, there were few neighbours around the periphery of the zones. In the IAEA definition, neighbouring states would include Afghanistan, Pakistan, Djibouti, Somalia, the Arab states west of Libya. It must also be noted that such a zone would border both NATO members and the territory of the former Soviet Union. Commitment of all of these states would have to contribute to the success of the zone. This would also apply to the desirability of including several of the international straits in the zone, as these are subject to the regime of transit-passage and are frequented by the naval vessels of several of the declared nuclear weapon states. The support of these states as guarantors of the zone is thus essential. This could be achieved through the use of additional protocols, similar to those used in the treaties of Tlateloclo and Rarotonga.

Of the parties present in the proposed zone, Algeria, Mauritania, Oman, the United Arab Emirates and Israel are the only states, which are not parties to the NPT. Nevertheless, Algeria, and Mauritania has accepted IAEA safeguards, and Oman and the UAE do not have nuclear facilities, which require safeguards⁴⁴⁵. As mentioned above, Israel is reluctant to commit itself to IAEA safeguards on its Dimona reactor, which is commonly cited as the source for Israel's nuclear weapon capability. If it did agree to do so, the Dimona reactor could not be used to produce weapons-grade fissionable material, although, from an Arab point of view, the introduction of safeguards at Dimona would not neutralize any stockpiles of material, which could already have been produced.

Apart from Israel, the conclusion of a NWFZ is complicated by the presence of NPT signatories Iraq, Iran and Libya. These three countries' commitment to non-proliferation is uncertain at best.

Just getting all parties into one room as part of the Middle East peace talks after so many years of mutual hostility has been a significant achievement. The participants in the arms control-working group have slowly begun to address the issue of establishing and verifying an NWFZ.⁴⁴⁶ The linkage with other questions relating to security is essential. As one analysis notes: “One would have to expect that the negotiation of a nuclear weapon free zone would become related to other measures to reduce the danger of hostilities and to strengthen Israeli confidence that a true and lasting peace was being built.”⁴⁴⁷ No state will associate itself with the nuclear-

444 Technical Study on Different Modalities of Application of Safeguards in the Middle East, IAEA-GC (XXXIII)/887, 29 August 1989.

445 Effective and Verifiable Measures Which Would Facilitate the Establishment of a Nuclear-weapon-free Zone in the Middle East, Disarmament Study Series 22, United Nations, New York 1991, p. 17.

446 J.B. Wolfsthal, *op. cit.*, p. 7.

447 Disarmament Study Series 22, *op. cit.*, p. 19.

weapon-free zone unless it feels that its security will be enhanced, and not diminished by such action.

A lengthy process of confidence-building, perhaps supplemented with security guarantees from nuclear weapon states, is most probably required to create the conditions in which the creation of an NWFZ and verification provisions could be accepted by all parties. Given the tense situation, even initial and modest confidence-building measures will require some verification procedures and possibly the involvement of outsiders, including the IAEA. In addition, progress in the nuclear disarmament proposals is closely intertwined with adherence to arms control agreements concerning chemical and biological weapons.⁴⁴⁸

Second, the verification regime would need to be more robust than those prescribed in the NPT as confidence-building measures among the countries in the region. In his report to the IAEA's General Conference in September 1992, the IAEA Director-General listed some intermediate steps that Middle Eastern states might take to improve chances for an NFWZ. These include unilateral or collective commitments to use nuclear technology only for peaceful, non-explosive purposes:

to ban research, manufacture, possession, or control or use of nuclear weapons or nuclear explosive devices;

to ban deployment or testing of nuclear weapons or nuclear explosive devices anywhere in their territories;

to ban research on, manufacture, possession, control or use of any nuclear weapons usable material;

to report all imports, exports and production of nuclear weapons and relevant equipment, and non-nuclear material;

to accept safeguards on all nuclear materials and installations located in their territories or under their control, including an undertaking to facilitate prompt access by inspectors and;

to report annually on all nuclear-related research and development.

Beside the UN efforts to establish a nuclear-weapon-free zone in the area⁴⁴⁹ the UN report was later followed Mubarak plan.⁴⁵⁰ Where by in 1990, President Mubarak of Egypt proposed the establishment of a zone free of weapons of mass destruction in the Middle East (WMDFZME).⁴⁵¹

448 Israel would undoubtedly insist Libya, Sudan, Algeria, and Tunisia each agree to sign the Middle Eastern Weapons of Mass Destruction Free Zone (MEWMDZ) before Israel surrendered any of its Weapon of Mass Destruction capabilities. M.E. Rosen, op. cit., 1996, p. 41 consider that a WMD zone makes better sense in the Middle East than does a Nuclear Weapons Free Zone.

449 Back in 1974, Iran supported by Egypt raised the issue in the UN General Assembly. UN. Document A/RES/3263 (XXIX). Since that time, the UN General Assembly has adopted (almost every year) resolution recommending the establishment of a nuclear-weapon-free zone in the Middle East (NWFZME). Since 1980, this annual resolution has been adopted by consensus, i.e. with the support of all Arab states, Iran and Israel.

450 J. Prawitz and J.F. Leonard, *A Zone Free of Weapons of Mass Destruction in the Middle East*, Document UNIDIR/96/24 (UN Sales No. GV.E.96.0.19).

451 Document CD/989, 20 April 1990.

Many Middle East scholar and diplomat like Mahmoud Karem promote the issue of establishing a nuclear-weapon-free zone in the Middle East.⁴⁵² Shai Feldman and Abdullah Toukan made important analytical contributions in 1997.⁴⁵³ Eric Arnett has analyzed the effect of a comprehensive test ban on nuclear proliferation risks in the Middle East, including Iran, Iraq, and Israel.⁴⁵⁴ Most recently scholars like, Ibrahim Karawan⁴⁵⁵ and Gerald Steinberg disused also the NWFZ in the Middle East.⁴⁵⁶

4.3.2 Argentina and Brazil

On 13 December 1991, Argentina and Brazil reached an agreement in which they accepted full-scope IAEA safeguards. In July of the same the year, the two countries had already decided to set up a control system for the mutual inspection of their nuclear installations, in order to verify that nuclear materials would not be diverted for military uses. These agreements came about after a decade in which a series of nuclear confidence-building and co-operation arrangements had been negotiated. The success of Argentina and Brazil in overcoming their nuclear rivalry may point to a promising bilateral approach both for non-proliferation and verification.

4.3.2.1 From competition to co-operation

Argentina and Brazil have since long competed for a leading role in Latin America. Especially during military rule, this was apparent in the nuclear sphere. Both countries have been involved in ambitious nuclear programmes. Although these programmes have only had limited success, each side had enough reason to worry about the nuclear capabilities of the other, and both states indicated that if one side would develop a nuclear weapon, the other would follow suit⁴⁵⁷. Both countries had achieved all the necessary requirements for an independent national fuel cycle. Argentina had already advanced considerably in developing ballistic missile technology.⁴⁵⁸

452 M. Karem, *A Nuclear-Weapon-Free Zone in the Middle East: Problems and Prospects*, New York 1988. The same author has later published *A Nuclear-Weapon-Free Zone in the Middle East: A Historical Overview of the Patterns of Involvement of the United Nations*, in: T. Rauf (ed.), *Regional Approaches to Curbing Nuclear Proliferation in the Middle East and South Asia*, Aurora Papers 16, Canadian Centre for Global Security, Ottawa 1992.

453 S. Feldman, *Nuclear Weapons and Arms Control in the Middle East*, Cambridge, MA 1997; S. Feldman and A. Toukan, *Bridging the Gap: A Future Security Architecture for the Middle East*, Lanham, MD 1997.

454 E. Arnett, *Nuclear Weapons After the Comprehensive Test Ban: Implications for Modernization and Proliferation*, SIPRI, Oxford 1996.

455 I.A. Karawan, *The Case for a Nuclear-Weapon-Free Zone in the Middle East*, in R. Thakur (ed.), *Nuclear-Weapon-Free Zones*, MacMillan Press Ltd, 1998, pp. 184-193.

456 G.M. Steinberg, *The Obstacles to a Middle East Nuclear-Weapon-Free Zone*, in R. Thakur, op. cit., 1998, pp. 194-209.

457 See R. Stanley, *Co-operation and control: The New Approach to Nuclear Non-proliferation in Argentina and Brazil*, in: *Arms Control* (September 1992), p. 201.

458 The development of the Condor-II medium-range ballistic missile having been virtually halted, made it possible for the US to conclude an agreement with Argentina enabling the latter to obtain advanced computer equipment, nuclear technology and aeronautical equipment. A memorandum of understanding provides for strict control on exports. See PPNN Newsbrief, Number 21, First Quarter 1993.

Since both Argentina and Brazil are not signatories to the NPT, they have had difficulties in getting access to all the necessary nuclear technology.⁴⁵⁹ Hampered also by economic difficulties, they set up co-operation agreements in 1980 for developing nuclear technology.⁴⁶⁰ However, it was evident that co-operation in such a sensitive area could not proceed very far without some kind of a mutual inspection system, especially since significant parts of the programmes were carried out in secret by the military. Distrust thus prevailed. By 1985 when Argentina and Brazil had returned to democratic government, there appeared to be room for a fresh initiative. A joint declaration in November of that year aimed at strengthening the institutional structures of co-operation through the creation of a joint working group, consisting of representatives of both foreign ministries, the two countries' atomic energy commissions, and their nuclear industries. This initiative was followed in subsequent years by further joint declarations, culminating in the creation of a common system for accounting and control of nuclear materials, approved by Presidents Collor and Menem in November 1990. A mix of several incentives probably enhanced these achievements:⁴⁶¹ the need for technological co-operation, economic constraints, returns to democracy, economic integration, and external pressures.⁴⁶²

4.3.2.2 A common system for mutual control and IAEA safeguards

In the Declaration of November 1990 it was established that within 45 days the first steps were to be carried out for laying the basis for a control system; this included exchange of information on lists of all nuclear facilities and inventories of nuclear materials, and reciprocal inspections of centralized register systems. An agreement on “the exclusively peaceful use of nuclear energy” of 18 July 1991 established a Common System of Accounting and Control of Nuclear Material (SCCC), to verify the non-diversion of nuclear activities into nuclear weapons or explosives. The SCCC is to provide for, inter-alia, a reporting system reflecting nuclear inventories, measuring systems, procedures for carrying out physical inventories, procedures for determining and evaluating non-accounted material; the implementation of containment and surveillance systems.⁴⁶³

For the purpose of administration and implementation the Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC) was set up. This is was the first bi-national verification organization in the world. The ABACC is

459 This has been the case especially since India's “peaceful” nuclear explosion in 1974, which induced nuclear suppliers to be more stringent in their export controls. A Brazil-FRG nuclear technology agreement of 1975, which envisaged the construction of eight nuclear power plants and the transfer of the complete fuel-cycle technology was never fully implemented. See K. Stahl, *Nuklearhandel zwischen Entwicklungsländern*, Saarbrücken 1990.

460 For a detailed account of the history of nuclear co-operation between Argentina and Brazil, see J.R. Redick, *Argentina and Brazil; an evolving nuclear relationship, Programme for Promoting Nuclear Non-Proliferation*, Occasional paper for the Centre of International Policy Studies, University of Southampton, July 1990.

461 For an elaborate discussion, see R. Stanley, op. cit., pp. 191-213.

462 The expectation was that the agreement would facilitate access to nuclear and other advanced technology, as well as helping to create a favourable climate in which to negotiate economic assistance. The influence of the United States, with which Brazil and especially Argentina have been building a close relationship, was an important factor.

463 See “Basic guidelines for the common system of accounting and control of nuclear materials”, Article VI of the Annex of the agreement.

made up of a Commission (two members from each state) and a Secretariat headquartered in Rio-de Janeiro. The Secretary of ABACC is a national of one of the two states, and is appointed by the Commission. The latter also appoints professional staff, and prepares a list of qualified inspectors upon which the Secretariat may draw to carry out on-site inspections. Inspectors of Argentina control Brazilian facilities and vice-versa, but are responsible exclusively to the Secretariat, which also makes the actual decision, under the guidance of certain rules and procedures set out by the Commission, of when and where an inspection will take place.

This bilateral framework enabled Argentina and Brazil in December 1991 to accept the IAEA safeguards in an arrangement very similar to that which non-nuclear weapon states of Euratom concluded with the IAEA; the SCCC takes the place of Euratom safeguards, whereas the ABACC takes up a task similar to that of Euratom. In fact, a comparison of the two agreements hardly reveals any differences of substance between them.⁴⁶⁴ The IAEA estimates that implementing the agreement costs USD 2 million for start-up and familiarization costs, and 500.000 annually for regular operations, which began in 1994.⁴⁶⁵

4.3.2.3 Conclusion

The success of Brazil and Argentina in overcoming their nuclear rivalry may be of relevance for other conflict areas. However, the specific circumstances must be kept in mind: relations between the two countries have never been as antagonistic as in other parts of the world, and the democratization of both countries as well as US pressure had an important influence. It must also be noted that Argentina and Brazil only had to worry about each other, where-as, for example, countries on the Korean Peninsula and the Indian subcontinent have to deal with a more complex situation. Even so, the development of an Argentine-Brazilian mutual inspection system has been a remarkable one, and several lessons can be drawn:

The process of confidence building by gradually increasing nuclear co-operation and opening of nuclear installations for inspections is essential. It seems that confidence and control are mutually reinforcing approaches leading to the same objective: a significant and verifiable arrangement.

The Argentine-Brazilian model provides an alternative to the NPT, while at the same time it applies IAEA safeguards.

The advantage over the global approach is that the sensitive question of have's and have-nots, which pervades the NPT is avoided.

Second, mutual inspections have confidence-building aspects as they bring the two countries together.

Third, there may be clear benefits arising from the reciprocal inspection and control system: increased efficiency and cost-effectiveness in the two nuclear industries, the possibility of embarking on new projects beyond the reach of the protagonists separately, and a strengthening of general economic integration and co-operation.

4.3.3 *North and South Korea*

An inter-Korean dialogue started in 1990 and resulted in several agreements, one of which concerned the denuclearization of the peninsula, but major obstacles stand in

464 See R. Stanley, op. cit., 1992, pp. 193-194.

465 See: Arms Control Today (January/February 1992), p. 51.

the way of implementing these agreements with verification measures. The admission by North Korea in October 2002 that they may be pursuing a non-safeguarded uranium enrichment program presents yet another obstacle to the goal of a nuclear weapons-free Korean Peninsula.⁴⁶⁶ The central issue has become North Korea's non-compliance with the NPT,⁴⁶⁷ which has raised the question of whether the crisis can be solved -if at all- through international concerted action, or through continuation of inter-Korean talks.

4.3.3.1 Background

Ever since the Korean War armistice in 1953, North and South Korea have been locked in a military stalemate backed up by Cold War competition. The Soviet Union and China supported the communist North, while American forces stationed along the Demilitarized Zone (dividing the peninsula) and American nuclear weapons guaranteed the protection of the South. For years, the Democratic People's Republic of Korea (DPRK) argued in favour of a nuclear-weapon free zone (NWFZ), aimed at having American tactical nuclear weapons removed from the peninsula. This would have been to the advantage of the North, which at that stage did not have nuclear weapons, and could count on conventional military superiority as well as backing from both Moscow and Beijing.

The situation started to change in the late 1980's, when the Soviet Union withdrew its support for North Korea, and the rapidly industrializing South gained the upper hand in the arms race by its much larger GNP.⁴⁶⁸ The nuclear option thus became more attractive to Pyongyang, as it would secure a military balance in a relatively cheap way. Since countries such as the US and Japan have indicated that the DPRK would only be given economic assistance if it would provide credible guarantees that it was not pursuing a nuclear weapons programme, North Korea has been caught in a dilemma: its crisis-ridden economy has been desperately in need of assistance (for which the most obvious sources would be South-Korea and Japan), but a nuclear deterrent against the much stronger South is also very much desired.⁴⁶⁹

4.3.3.2 North and South-Korean dialogue

The South-North High-Level Talks began in September 1990, but it was not until the Fourth round in October 1991 that the nuclear issue was brought up. North Korea proposed an NWFZ, and linked acceptance of IAEA safeguards to the withdrawal of US forces and nuclear weapons from South Korea. Further, the IAEA's inspections of North Korea's nuclear facilities should be performed simultaneously with the inspections of South Korea's military bases by the North. The proposal included a

466 D. Albright and C. Hinderstein, *Cooperative Verified Dismantlement of Nuclear Programs: An Eye Toward North Korea*, Prepared for the Institute for Nuclear Materials Management (INMM), 44th Annual Meeting Phoenix, AZ, June 1, 2003, Institute for Science and International Security (ISIS).

467 See section on the Non-Proliferation Treaty.

468 North-Korea is believed to be spending about 22% of GNP on defense, while the South's figure is close to 4%. Considering that South Korea's GNP is about ten times that of the North, it is clear that the defense budget is an enormous strain on the DPRK's economy. See T.W. Park, *Issues of arms control between the two Koreas*, in: Asian Survey (April 1993), p. 363.

469 See A. Mack, *The nuclear crisis on the Korean peninsula*, in: Asian Survey (April 1993), p. 349. Mack names several additional motives for North Korea to develop a nuclear weapon program, such as prestige, export possibilities, self-reliance and using it as a bargaining chip.

ban on the transit, landing and visiting rights of nuclear capable aircraft. This was unacceptable for the South, which preferred to keep the option of US nuclear protection open, but given the changed circumstances started it to study the proposal for denuclearization seriously.⁴⁷⁰

When US President Bush unilaterally announced the elimination of tactical nuclear weapons on 27 September 1991, including those deployed in South Korea, Seoul launched a diplomatic campaign to prevent Pyongyang from developing nuclear weapons.⁴⁷¹

At Round Five of the talks in December 1991, the 'Agreement on Reconciliation, Non-Aggression, and Exchanges and Cooperation' was reached, providing a framework for improving relations between the two countries. The agreement included provisions for a *hot line* between the two-sides military authorities, and the establishment of a South-North *Joint Military Commission* (JMC), which is supposed to negotiate and implement the following measures:⁴⁷²

the mutual notification and control of major military movements and exercises

the peaceful use of the Demilitarized Zone

exchanges of military information and personnel

verification of phased arms reduction including the elimination of weapons of mass destruction and surprise attack capabilities.

South Korea proposed South-North mutual inspection of nuclear related installations and materials, and suggested carrying out simultaneous pilot inspections of one military and one civilian site designated by each other. On 18 December 1991 Seoul declared South-Korea nuclear weapon free and pressed North Korea to sign an IAEA safeguard agreement, hinting that the 'Team Spirit' Korea joint military exercise would then be cancelled.

After two ad hoc meetings on the nuclear issue, North Korea dropped its previous position of insisting on the prohibition of US nuclear assistance and exercises in the South. At the third meeting on 31 December the two sides agreed to a 'Joint Declaration of the Korean Peninsula', which forbids testing, manufacturing, production, receipt, possession, storage, deployment, and use of nuclear weapons.

470 For a useful examination of the potential of specific verification measures in the context of North Korea, see J.B. Wolfsthal, *Freezing and reversing North Korea's plutonium program*, in J.B. Wolfsthal, F. McGoldrick and S. Cheon (eds.), *Verifying North Korean Nuclear Disarmament: A Technical Analysis*, Working Paper no. 38, Carnegie Endowment for International Peace, Washington, DC and Nautilus Institute for Security and Sustainability, Berkeley, CA, June 2003, pp. 10-14.

471 A.E. Smithson, *North Korea: A Case in Progress*, in: T. Bernauer and D. Ruloff (eds.), *The Politics of Positive Incentives in Arms Control*, South Carolina 1999, pp. 71-110. L.V. Sigal, *Averting a Train Wreck With North Korea*, in: *Arms Control Today* 28/8 (November/December 1998), pp. 11-15, available at www.armscontrol.org/ACT/novdec98/sgnd98.htm.

472 Article 12 of the Agreement on Reconciliation, Nonaggression, and exchanges and cooperation between South and North Korea, Effective February 19, 1992, available at www.unikorea.go.kr/eg/index.htm. See also: J.S. Bermudez Jr., *Exposing North Korea's Nuclear Infrastructure-Part One*, in: *Jane's Intelligence Review* (1 February 1999), p. 38, J.S. Bermudez Jr., *Exposing North Korea's Secret Nuclear Infrastructure, Part II*, in: *Jane's Intelligence Review* (1 August 1999); J.S. Bermudez Jr., *North Korea's Nuclear Infrastructure*, in: *Jane's Intelligence Review* (1 February 1994), pp. 74-79.

The declaration, which also provides for a *Joint Nuclear Control Commission* specifies that to verify denuclearization, the South and North will carry out *inspections* of objects that will be chosen by the other side and agreed upon between the two sides. From the activities subject to the declaration it could be derived that verification measures would aim at locating and monitoring civilian nuclear installations, as well as detecting existing nuclear weapons and stocks of enriched plutonium.⁴⁷³

As promised, North Korea signed a full scope safeguards agreement with the IAEA on 31 January 1992. At the sixth high-level talks, the above-mentioned agreements were formally brought into effect, but no consensus was reached on implementation. While the talks remained inconclusive, IAEA inspections proceeded in North Korea and raised questions of possible non-compliance with the NPT.⁴⁷⁴ Backed up by evidence provided mainly by US intelligence, the IAEA demanded special inspections of non-declared sites. North Korea refused and announced its withdrawal from the NPT, after which the case was referred to the UN Security Council.⁴⁷⁵ Negotiations between the US and North Korea followed, in which Pyongyang agreed to resume negotiations with the IAEA and restart bilateral talks with South Korea.⁴⁷⁶

North Korea's nuclear facilities – a small, plutonium-producing reactor, a fuel-rod fabrication plant, a reprocessing plant, and two partially completed larger reactors – had been frozen by the 1994 Agreed Framework with the United States. That agreement was concluded after a tense standoff following the International Atomic Energy Agency's (IAEA) discovery that Pyongyang had been diverting spent fuel from the reactor for a nuclear weapons program.

Seoul's response to North Korea's⁴⁷⁷ withdrawal from the NPT has been cautious, preferring not to isolate the North internationally. The South did, however, impose limited economic sanctions on its neighbour.⁴⁷⁸

In the spring of 2003, North Korea reportedly admitted to having nuclear weapons. Solution to the current crisis requires North Korea to accept verifications of its nuclear weaponization programs. In addition, North Korea will have to take other verification steps, including re-establishing the “freeze” over its plutonium production facilities and coming into compliance with its safeguards agreement with the International Atomic Energy Agency (IAEA), including resolving outstanding issues raised by the IAEA in the early 1990s.⁴⁷⁹

473 L.A. Nicksch, *Foreign Affairs, Defence, and Trade Division, North Korea's Nuclear Weapons Program*, Congressional Research Service, The Library of Congress, 5 April 2002.

474 For a good description see inter alia IAEA Doc GC (XXXVII)/1084 Add 1 report by the Director General on the implementation of the Agreement to the IAEA General Conference 1992.

475 For a full summarized account of these developments, see PPNN Newsbrief, Number 22, 2nd Quarter 1993.

476 *North Korea: All talk?*, in: The Economist (14 July 1993).

477 See L.V. Sigal, *Verifying a missile accord with North Korea*, in T. Findlay and O. Meier (Eds), *Verification Yearbook 2002*, The Verification Research, Training and Information Centre (VERTIC), London 2002, pp. 118-122.

478 *West poised for sanctions on N-Korea*, in: The Guardian (17 March 1993). In 1992 North- and South Korea exchanged about \$175 million in goods and trade.

479 D. Albright and C. Hinderstein, op. cit., 2003.

Positive development on the Korean Peninsula have important positive implications for the prospect of building a Nuclear Weapons Free Zone in East Asia. It can restrain the ongoing trend of military arms race between the U.S.-Japan alliance on the one hand, and China, on the other, by limiting the justification for fast rearmament of Japan and the ever more strengthening of the U.S.-Japan alliance. Second it will facilitate the implementation and institutionalisation of the denuclearization of the peninsula, which they agreed to in late 1991.

4.3.3.3 Obstacles to verification of North-South agreements

By 1993 there are several issues, which have not been resolved in South/North negotiations so far.⁴⁸⁰ The North had insisted that in exchange for accepting IAEA (regular) inspections of nuclear facilities, it wants to inspect US military bases in the South. Seoul argued that such a proposal is asymmetric in matching inspections of *civilian* facilities of the North with inspections of *military* bases of the South. Since South-Korea is already subject to IAEA safeguards, it wants to allow inspections of military sites only in exchange for similar inspections in North Korea. As a confidence-building measure, Seoul has proposed a North-South pilot inspection, separate from the IAEA safeguards, of nuclear facilities as well as of military bases. The South also pressed for an agreement on implementing the Joint Nuclear Control Commission, arguing that the nuclear issue is a litmus test for the North's determination to implement inter-Korean agreements. Pyongyang on the other hand demanded joint efforts to cope with nuclear threats from outside and an international guarantee on the denuclearization of the Korean peninsula. A complicating factor is that Pyongyang is highly sceptical about US/Seoul claims that nuclear weapons have been removed from South Korea. Verifying that that these weapons have in fact been removed is genuinely difficult, and it is hard to imagine a verification regime which could satisfy the North.⁴⁸¹

Since North Korea is an extremely closed society and basically opposed to the concept of openness, it will be difficult to agree to any verification measure. The DPRK has not even allowed an initial step in the arms control process such as exchanges of observers of military exercises and movements. Reference to verification has only been made without any specification. Another aspect of North Korea's closed society is that it is extremely difficult to determine what Pyongyang's motives really are: for example, did it accept IAEA safeguards because it thought it could get away with cheating and what has been the effect of the transition of power from Kim Il Sung to his son Kim Jung?⁴⁸²

480 For an elaborate discussion see S.W. Cheon, *Verifying a denuclearized Korean peninsula: current negotiating agenda*, in: S. Mataija and J. Marshall Beier (eds.), *Multilateral verification and the post-Gulf environment: learning from the UNSCOM experience*, symposium proceedings, Toronto 1993, pp. 173-186.

481 A. Mack, op. cit., 1993, p. 351.

482 IAEA has recently complained that the agency is not being given complete access to nuclear sites in the DPRK. See: FBIS Document ID: EUP20000911000239, IAEA Says North Korea Not Allowing Nuclear Access, Agence France Presse (Paris), 11 September 2000. At the IAEA General Conference in September 2000, member states "adopted a resolution that urged the DPRK to come into full compliance with its safeguards agreement, and to take all steps that the agency deems necessary to preserve relevant information for its verification." See WorldAtom press release, Nuclear Cooperation Targets Global Challenges: States Back Main Pillars of the IAEA's Work to Strengthen Nuclear Safety, Verification and Technology Transfer, 22 September 2000, available at www.iaea.org/worldatom/Press/P_release/2000/prn2400.shtml

The fact that the South has made the nuclear issue the litmus test for North-South cooperation, precludes a confidence-building process with verification measures for less contentious issues. Since worries over North's nuclear ambitions have developed into an international crisis, the situation has become even more complicated, as the credibility of the NPT has come to be at stake. Punitive action alone is not likely to produce a lasting solution.

Pyongyang's security concerns have to be taken seriously; it cannot count on external support anymore, and faces a much stronger opponent backed up by the United States. North Korea's desire for nuclear weapons can most probably only be dealt with by a package deal including international guarantees, bilateral arms reductions and economic assistance. It has perhaps been a mistake that no 'carrots' were offered to North Korea when it signed the safeguards agreement.⁴⁸³ Team Spirit exercises continued, inspections of military bases to verify withdrawal of American nuclear weapons were not allowed, and no change in political and economic relations with Pyongyang was made. Lack of South Korean diplomatic initiative in this regard might have been the result of the strong influence of the military. North Korea has continued to call on the United States to sign a "non-aggression treaty" with Pyongyang in order to resolve the current situation. North Korea's statement announcing its withdrawal from the NPT, however, suggested a softening in this position. It indicated that it might halt its nuclear activities if the United States "drops its hostile policy to stifle" North Korea – language suggesting that North Korea might want KEDO to resume fuel oil shipments.⁴⁸⁴

The question of who should perform the verification activities in North Korea is a matter of great sensitivity. It can hardly be expected that North Korea will grant the members of the verification regime its unconditional good faith. The deeply embedded distrust between North Korea and the international community, particularly the United States, will likely be a stumbling block in the initial phase of the verification process. In addition, the North has largely regarded the IAEA as representing the interests of the United States and other Western countries.⁴⁸⁵

Thus, various types of verification regimes would need to integrate the strategic interest of not only the two countries but also strategic partners: the difficulties are mainly demonstrative when it comes to the discussion of "limited nuclear free zone" (LNFZ) for Northeast Asia. Since the proposal would directly affect the United States' ability to fulfil its security commitments to Korea, Taiwan and Japan, Washington is unlikely to rapidly embrace the proposal. Similarly, China is not likely to warm immediately to the proposal even though it officially advertises a "no first use" policy. A LNFZ would prevent China from using its nuclear arsenal for

The DPRK views requests for special inspections as unreasonable and "a grave challenge to the sovereignty of the DPRK." See Korean Central News Agency, Unreasonable Resolution of IAEA, in: Korean News (28 September 2000), available at www.kcna.co.jp.

483 For such an argument, see M. Mazarr, *North Korea at the Crossroads: Nuclear renegade or regional partner?*, ACA panel discussion, in: Arms Control Today (May 1993), p. 5, and *Lessons of the North Korean Crisis*, in: Arms Control Today (July/August 1993), pp. 8-9.

484 P. Kerr, *North Korea Quits NPT, Says It Will Restart Nuclear Facilities*, in: Arms Control Today (January/February 2003).

485 K. Boutin, *North Korea: the challenge of verifying a moving target*, in Verification Yearbook 2003, Vertic, p. 76.

intimidation purposes, or to defend against or deter an attack by one of its neighbours (with a smaller but far technologically superior conventional force).⁴⁸⁶

4.3.3.4 Conclusion

Verification has become a crucial issue in the arms control talks between North- and South Korea⁴⁸⁷. There are strong doubts about Pyongyang's willingness to accept verification measures, and renounce the option of a nuclear weapon program⁴⁸⁸. Yet, North Korea's international isolation and devastated economy are obvious incentives for better cooperation with South Korea. The nuclear question has grown into an international crisis with active involvement of the United States, Russia⁴⁸⁹, China and Japan.⁴⁹⁰

As such, the present bilateral approach might well be substituted to a trilateral or multilateral effort. So far, the international community has moved very cautiously, relying on quiet diplomacy to persuade North Korea to adhere fully to the NPT. Economic incentives and security guarantees will be important factors in these efforts. But significant progress in the field of verification can probably only be obtained by a process of confidence-building between the two Korea's. One of the possible option for building confidences is the reunification of the two countries.⁴⁹¹

The North Korea issue may be a test case for diverging views about verification: the absolutist or 'global' position that everyone must adhere to the same standards with equal enforcement and sanctions, versus the more regionalist or ad hoc view that inspection activities may have to be tailored to specific cases.⁴⁹² The key to successful verification of the dismantlement of the North Korean nuclear program depends primarily on determining how best to construct an effective and intrusive verification system that would achieve the goal of complete, accurate, and credible verification.⁴⁹³

486 M.E. Rosen, op. cit., 1996, p. 41.

487 See in this regard, K. Boutin, *North Korea: the challenge of verifying a moving target*, in: Verification Yearbook 2003, Vertic, p. 71.

488 See J. Olsen, *Regional Verification of a Denuclearized Korean Peninsula: A Strategy for Success After the Current Impasse Is Overcome*, CMC Paper, September 2003, p. 1.

489 By C. Chuen, *Russian Responses to the North Korean Crisis*, January 24, 2003 and J.C. Moltz, *Russian Policy on the North Korean Nuclear Crisis*, Presentations at the 13th annual International Security Conference of Sandia National Laboratories on "International Security Challenges and Strategies in the New Era", April 23-25, 2003, Albuquerque, New Mexico.

490 For details on the international crisis, see D.A. Pinkston and P.C. Saunders, *Seeing North Korea Clearly*, in: Survival (26 August 2003).

491 The German unification process was a peaceful one, but one of abrupt integration of one into another. Unlike this, if the peace process on the Korean Peninsula stays a gradual tension-melting process, it will mean that the Koreans will acquire the ability to play creative roles in building peace not only on the peninsula but also in the region as a whole. S. Lee, *A Nuclear Weapons Free Zone in Northeast Asia : The Political and Security Context*, For Presentation at the Seminar Nuclear Weapons-Free Zones: Crucial Steps Towards A Nuclear-Free World, Uppsala, Sweden, 1-4 September 2000.

492 See P. Bracken, *Nuclear Weapons and State Survival in North Korea*, in: Survival (Autumn 1993).

493 L. Kwang-chul, *Don't Just Trust, Verify – Dismantling North Korea's Nuclear Program*, in: Arms Control Today (May 2004).

4.3.4 India and Pakistan

Since Pakistan declared in February 1992 that it had developed the capability to produce a nuclear bomb, there has been growing international concern over a possible nuclear arms race between India and its smaller neighbour Pakistan.⁴⁹⁴ Although the two states have agreed to several confidence-building measures, there is hardly a sign of a promising process of nuclear arms control. Since India insists on retaining the nuclear option also for reasons other than its rivalry with Pakistan⁴⁹⁵, bilateral talks alone are not likely to offer significant prospects. In the area of conventional warfare, which is more of a bilateral issue, arms control might stand a better chance.

4.3.4.1 Background

After the violent partition of 'hindu' India and 'muslim' Pakistan in 1947, relations between the two states continued to be extremely hostile. Related to religious and ethnic tensions, the main conflict lies in the dispute over Kashmir, which resulted in wars between India and Pakistan in 1948 and 1965. In 1971, Indian troops sided with Bengali separatists in civil war in East-Pakistan, resulting in the creation of Bangladesh.

During the Cold War, India had special ties with the Soviet Union, while Pakistan had strong bonds with the United States. Although no longer influenced by superpower conflict, the bilateral relationship has remained problematic: "As was the case with the US-Soviet rivalry, relations between India and Pakistan are exacerbated by deep mistrust, a quick tendency to blame the other side for any misfortune, belief that the other side is dedicated to gaining the upper hand and, in Pakistan, the idea that India directly threatens the survival of the country."⁴⁹⁶

India demonstrated its nuclear capability in 1974, when it exploded what it called a "peaceful nuclear device". Like Pakistan, it claimed that no nuclear weapons had been developed, but that it has the option, or "defensive preparedness" to do so.⁴⁹⁷

Neither Pakistan nor India are not members of the NPT; Pakistan has stated its readiness to join if India does, while India has maintained that it only will renounce the nuclear option if all states do so, including the five acknowledged nuclear weapon states. India has pursued the nuclear weapons option with an eye on the regional superpower: i.e. China, rather than on Pakistan. The Sino-Indian war of 1962, when Chinese troops easily moved into disputed border areas and then halted, has been a traumatic experience.

494 H. Diamond, *India Conducts Nuclear Tests; Pakistan Follows Suit*, in: *Arms Control Today* 28 (22-23 May 1998). See also S. Ahmed, *Pakistan's Nuclear Weapons Program: Turning Points and Nuclear Choices*, in: *International Security* 23 (Spring 1999), pp. 178-204.

495 R.R. Subramanian, *Nuclear Proliferation in the Third World: Region-Specific Cases of India versus Pakistan*, in: *Brown Journal of World Affairs* 4/95-102 (Winter-Spring 1997).

496 J.J. Schultz, *Riding the nuclear tiger: the search for security in South Asia*, in: *Arms Control Today* (June 1993), p. 4. See also F. Khan, *Challenges to Nuclear Stability in South Asia*, in: *Non-Proliferation Review* 110/1 (Spring 2003); F. Khan, *The Dependence-Independence Paradox: Stability Dilemmas in South Asia*, in: *Arms Control Today* (October 2003); F. Khan, *The Nuclear Policy that Backfired*, in: *Financial Times* (8 March 2203).

497 Experts have confirmed both countries' nuclear capabilities. For a recent account, see D. Albright, *India and Pakistan's Nuclear Arms Race, Out of the Closet But Not in the Street*, in: *Arms Control Today* (June 1993).

4.3.4.2 A slow confidence-building process

The first real sign of an emerging dialogue was the 1972 Simla Summit, where reportedly some CBM's were discussed⁴⁹⁸. From 1978 on bilateral contacts between high officials increased, and summit meetings were organized both through the South Asian Association for Regional Cooperation (SAARC) and bilaterally. In 1983, India and Pakistan set up a Joint Commission to meet annually to try to promote cooperation in “the economic, trade, industrial, education, health, cultural, consular, tourism, travel, information, science and technology fields”, but the talks aborted in 1989.

Some progress was made after the military crisis of May 1990, which had resulted from military exercises too near to the border.⁴⁹⁹ In July of that year, the first foreign secretary-level talks started (followed by several other rounds), which have resulted in an Agreement on Advance Notice on Military Exercises, Manoeuvres and Troop Movements and an Agreement on Prevention of Air Space Violations and Permitting Overflights and Landings by Military Aircraft. The latter agreement establishes “no fly” zones near joint borders, while the former requires advance notification of military exercises involving division-size levels of armed troops and exercises within about 50 miles of the border, and also provides for exchanges of “military visitors”. The agreements are slowly being implemented. A “hot line” which had been established previously, is already working satisfactorily; and every week there is a phone conversation between top military commanders.

In January 1992, the 1988 agreement obligating both countries not to attack each other's nuclear installations was finally implemented, when India and Pakistan exchanged lists of the facilities involved.⁵⁰⁰ Confidence may also be built as a result of the two countries having jointly signed the Chemical Weapons Convention in 1993, a global agreement which will subject both of them to international inspection.⁵⁰¹

In May 1998 India and Pakistan each exploded several nuclear devices underground. This heightened concerns regarding an arms race between them, with Pakistan involving China, an acknowledged nuclear weapons state.⁵⁰² In the wake of the May

498 J. Alford, *The usefulness and the limitations of CBM's*, in: W. Epstein and B.T. Feld (eds.), *New Directions in Disarmament*, New York 1981, p. 141.

499 J.J. Schultz, op. cit., 1993, p. 6.

500 India and Pakistan swap lists, in: *Arms Control Today* (January/February 1992), pp. 46 f.; S. Ganguly, *India's Pathway to Pokhran II*, in: *International Security* 23/4 (1999), pp. 148-177. See also, R.W. Jones. and S. Ganguly, *Correspondance: Debating New Delhi's Nuclear Decision*, in: *International Security* 24/4 (2000), pp. 181-189; S. Ahmed, *Pakistan's Nuclear Weapons Program*, in: *International Security* 23/4 (2000), pp. 178-204; D.T. Hagerty, *Nuclear Deterrence in South Asia: The 1990 Indo-Pakistani Crisis*, in: *International Security* 20/3 (1995), pp. 79-114.

501 The nuclear tests carried out in May 1998 by India and Pakistan resulted in the suspension of military and foreign economic assistance to both countries as well as prohibitions on U.S. bank-backed loans or credits and denial of Export-Import Bank support for exports. Eventually, domestic and foreign policy considerations, accelerated by the need for allies in the war on terrorism after September 11, 2001, led to an easing and ultimate lifting of all sanctions. M. Miller and L. Scheinman, *Israel, India, and Pakistan: Engaging the Non-NPT States in the Nonproliferation Regime*, in: *Arms Control Today* (December 2003).

502 Spurring the international non-proliferation regime, and the global norm against nuclear testing embodied in the Comprehensive Test Ban Treaty (CTBT), India announced two sets of nuclear

1998 nuclear tests, U.S. diplomatic efforts focused on obtaining India's commitment to the Comprehensive Test Ban Treaty (CTBT), but India has still not become a member. In his speech to the UN General Assembly in September 1998, Indian Prime Minister Atal Behari Vajpayee said, “[the May 1998 tests]...do not signal a dilution of India's commitment to the pursuit of global nuclear disarmament... In announcing a moratorium [on further tests], India has already accepted the basic obligation of the CTBT.” Earlier that month, Vajpayee spelled out India's position on the Nuclear Non-Proliferation Treaty: “It is a discriminatory treaty...[that] has given the right to five countries to proliferate vertically in disregard of universal opinion against the very existence of nuclear weapons.”⁵⁰³

4.3.4.3 Problems and prospects

As long as the question of Kashmir remains unsolved, relations between Pakistan and India will continue to be tense. It seems that both sides are willing to take measures to avoid the risk of unintentional war, but there is little enthusiasm to go much further than that. There may be some possibility of establishing a verifiable demilitarized zone at the border. A significant part of the border area is desert, which may simplify verification procedures.⁵⁰⁴ The United Nations is already present, since 1949, monitoring at least part of the border, the so-called Line of Actual Control in Kashmir. In June 1989 Prime Ministers Gandhi and Benazir Bhutto apparently reached a “notional understanding” that the Indian and Pakistani forces would be withdrawn from the border area to the pre-Simla Agreement lines. Talks had begun in Beijing to that end, but change of government in the two countries left the agreement unclear.

The most difficult issue is the nuclear question. Pakistan has tabled several proposals: establishment of a nuclear-weapon-free zone, a system of bilateral inspections, simultaneous acceptance of IAEA safeguards, a bilateral or regional test ban treaty, and a conference on nuclear non-proliferation in South Asia.

India has not been prepared to accept any of these proposals for reasons already mentioned. An additional motive for India's reluctance to accept an NWFZ may lie in the fact that such an agreement might mean that the United States would resume some or most of its military and economic aid to Pakistan.

The US has taken strong interest in controlling nuclear build-up in India and Pakistan, fearing most of all export of nuclear technology from these countries. The US had already been urging Pakistan and India to negotiate bilateral measures including a ban on all fissile material production, a regional nuclear test ban, mutual security assurances and acceptance of IAEA safeguards on new (and some old) nuclear installations⁵⁰⁵. Thus, while experience from IAEA activities relevant to the

tests May 11 and 13, prompting Pakistan to announce its own tests on May 28 and 30. The first nuclear detonations since the CTBT opened for signature in September 1996, the Indian and Pakistani tests are feared to be the first steps toward a new and destabilizing arms race between the neighbor-states, which have gone to war three times in the past 50 years. See H. Diamond, *India Conducts Nuclear Tests; Pakistan Follows Suit*, in: *Arms Control Today* (May 1998).

503 India Nuclear Weapon Update 2003, in: *The Risk Report* 9/5 (September-October 2003).

504 See T. Findlay, *The non-European experience of CSBMs: Models for the Asia-Pacific region*, in: *Confidence and Security-building Measures in Asia*, United Nations, New York 1992.

505 See Report to Congress on the Progress Toward Regional Nonproliferation in South Asia, Washington DC 5 May 1993.

NPT in other parts of the world is important, the South Asian context raises unique difficulties. Present IAEA experience is primarily concerned with the detection of unauthorized production of fissile materials and international transfer of these and other materials related to fissile materials production.⁵⁰⁶

A strategy dealing with the nuclear issue in South Asia would probably need to combine global and regional elements.⁵⁰⁷ India however has promoted a global approach on such issues as opposed to the regional approach.⁵⁰⁸ Thus, also trilateral talks between India, Pakistan and China sponsored by the US and Russia (as proposed by the US) may not produce any tangible results.

Even if the India-Pakistani⁵⁰⁹ nuclear rivalry were solely a bilateral issue, the arms control process is constrained by the factor of strong nationalism: "Complicating things further is the fact that no political leader on either side can step away from a position half way on board the nuclear tiger without grave political risk; achieving nuclear weapons know-how is as much a symbol as a deterrent for the vast majority in India as it is in Pakistan, demonstrating, in their minds, how far their countries have come in less than half a century from the status of mere colonies." "National security concerns and threat perceptions of nations are no doubt key factors in the process of proliferation. But a major motivating force can also be a desire to seek or enhance international prestige."⁵¹⁰ India's nuclear weapons program is described by its government as a necessary minimum deterrent in the face of regional nuclear threats: that include a considerably larger Chinese nuclear arsenal as well as Pakistan's nuclear arms.⁵¹¹

However, India and Pakistan could learn from the experience of Argentina and Brazil which resisted moves to make them parties to the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco), which aims at establishing a Nuclear Weapon Free Zone (NWFZ) in Latin America, for over twenty years before signing a 'Declaration on the Common Nuclear Policy of Brazil and Argentina' on November 28, 1990. With this agreement Brazil and Argentina formally relinquished their nuclear weapons programs and committed themselves to using nuclear energy exclusively for peaceful purposes.

A key decision in this bilateral agreement was to establish a Common Systems of Accounting and Control of Nuclear Materials (SCCC) to verify that nuclear materials in all nuclear activities of both parties were used exclusively for peaceful purposes, and to start negotiations with the International Atomic Energy Agency (IAEA) for the conclusion of a safeguards agreement based on the SCCC. A bilateral body consisting of 50 inspectors, 25 of each nationality, was created by the name of

506 C.E. Singer and J.W. Neuhoff, *Nuclear Materials in South Asia*, The bulletin of the Program in Arms Control, Disarmament, and International Security, in: University of Illinois at Urbana-Champaign 4/4 (May 1990).

507 See, for example, J. Haus, *Non-proliferation: new energy, new direction*, in: Arms Control (April 1993), pp. 257-260.

508 See B. Chellaney, *The challenge of nuclear arms control in South Asia*, in: Survival (Autumn 1993), pp. 130 f.

509 In May 1998, India and Pakistan carried out 5 nuclear tests each in rapid succession.

510 B. Chellaney, *South Asia's Passage to Nuclear Power*, in: International Security 16/1 (1991), p. 43.

511 India and Pakistan, Nuclear Issues Briefing Paper 45, March 2004.

Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) to oversee the application of safeguards. A quadripartite agreement between the two countries, ABACC and IAEA was arrived at, which together with the Treaty of Tlatelolco will lead to a credible system of denuclearization of Latin America.⁵¹²

4.3.5 *A Trilateral Approach to Regional Verification – The Sinai*

The most successful example of a trilateral approach to verification is the Sinai Agreements signed between Israel and Egypt after the 1973 war. As a third party, the United States and the United Nations supervised verification procedures, successfully integrating several tasks, forming an early-warning, inspection, monitoring and verification system for the region. Responsibilities for verification were distributed amongst the parties involved in an interlocking fashion, which contributed to the overall confidence-building function of the verification regime and the eventual signing of a comprehensive peace treaty in 1979.

In the aftermath of the 1973 October War, Egypt and Israel signed a Six-Point Agreement on November 11, 1973, officially establishing a cease-fire. After intensive shuttle diplomacy by United States Secretary of State Kissinger, the Sinai I Agreement was signed on January 18, 1974, establishing a demilitarized buffer zone in the Sinai under UN control, flanked by limited force zones in which the nature of the armed forces and armaments, which could be deployed, would be limited.

In order to assure compliance with these restrictions, several verification procedures were developed. The limited force zones were to be examined through on-site inspections by the United Nations Emergency Force (UNEF), which would include both Israeli and Egyptian liaison officers. Further, American reconnaissance aircraft would monitor the deployment of forces in the zones regularly. The verification arrangements were implemented through consultations between the military representatives of Israel and Egypt. Convened by the United Nations, these consultations became known as the “Kilometre 101” talks. In an effort to establish a relationship between military confidence building and political progress on a final peace agreement, it was further agreed that forces would gradually disengage through phased withdrawal.

In 1975, Secretary Kissinger again sought to achieve a further disengagement of forces in the Sinai. The Sinai II Agreement, which was finalized on September 4, 1975, built upon many of the principles embodied by the Sinai I Agreement. Israel agreed to withdraw from the Mitla and Gidi passes which would then be included in an enlarged UN buffer zone. However, stressing its need for early warning (due to its reserve mobilization system), Israel refused to withdraw its strategic surveillance station at the western end of the Gidi Pass. To resolve this impasse, and to create strategic symmetry, Egypt was permitted to build a similar station at the eastern end of the Pass.

The major innovation of the Sinai II Agreement was the depth of American involvement as guarantor of the agreement. Agreeing to thus accept responsibility for verifying force levels through aerial reconnaissance of the zones specified by the talks, monitoring the national surveillance stations, and monitoring the Mitla and Gidi passes. In November 1975, the US Sinai Support Mission (SSM) was formed by

512 S. Pandey, *The Importance of Disarmament Initiatives*, 20 December 2001, available at www.sulekha.com/expressions/column.asp?cid=159093.

presidential directive to provide Egypt, Israel and the United Nations with early warning of any unauthorized movement of armed forces in the Mitla and Gidi passes. The United States established a Sinai Field Mission (SFM) to operate three watch stations (staffed with civilian personnel), four unmanned sensor fields, a support camp and a communications network. The sensor equipment installed utilized a variety of techniques, encompassing seismic, acoustic, infrared, magnetic, electromagnetic, pressure, electric and earth strain detection capabilities. Data from the sensor fields was monitored at the watch stations and supplemented with visual inspections. This technology enabled the number of support staff required to be kept at a minimum level.

The Egyptian and Israeli surveillance stations were limited to visual and electronic surveillance, and were monitored by US civilian liaison officers. US aerial reconnaissance flights were made over the buffer zone and limited force zones every seven to ten days, or upon request. The results of the reconnaissance were made available to both parties. UNEF itself was responsible for checkpoints escorts and observation posts within the buffer zone.

Between 1976 and 1980, there were ninety recorded violations of the zones, but all violations were deemed to be "... small infractions easily detected, identified, and corrected."⁵¹³ Many were attributable to the close proximity of reduced force zones to the buffer areas. All of these infractions were resolved without threatening the overall agreement. A Joint commission was established as a consultative mechanism to deal with ambiguous situations.

The final culmination of the Sinai I and II process was the Egyptian-Israeli Peace Treaty of March 26, 1979. Following a Soviet Security Council veto of UN participation in verifying the new treaty, the role of the existing US Sinai Field Mission (SFM) was expanded to encompass the supervision of the full Israeli withdrawal from the Sinai⁵¹⁴. This included inspections of Israeli technical stations and Egyptian military installations in the limited forces zones. U.S. aerial surveillance, which had begun early on in the Sinai process, continued on a regular basis. The SFM was disbanded in April 1982 after Israel's final withdrawal from the Sinai, and security arrangements were turned over to a more traditional peacekeeping force, the Multinational Force and Observers (MFO).

4.3.5.1 Evaluation

The Sinai agreements are considered to be one of the major successes of verification. The role of third parties in verifying the treaty arrangements was key, as the United States and United Nations provided not only an impartial observer force, but also the trained manpower, financial aid and technical support required to implement the verification procedures. The successful integration of the verification structures of the United Nations, United States, Egypt and Israel was mutually reinforcing and greatly enhanced the overall impact of the system.

Several key factors facilitated the success of the Sinai agreements:

513 B.S. Mandell, *The Sinai Experience: lessons in Multimethod Arms Control Verification and Risk Management*, Arms Control Verification Studies No. 3, Department of External Affairs, Ottawa 1988, p. 1.

514 See The United States Support mission, *Watch in the Sinai*, Department of State, Washington 1980.

Both parties to the conflict were committed to maintaining peace, and a credible third party was able and willing to perform a monitoring role.

The situation was simplified by the fact that there were only two parties to the conflict, and one contiguous border.

Further, the desert terrain, climate, and existence of natural barriers assisted in the ease of surveillance and detection.

The technology-intensive nature of the verification methods greatly reduced the requirements for large forces, and thus reduced possible concerns about sovereignty and intrusiveness.

On a more fundamental level, the fact that each successful agreement built upon previously-established verification arrangements served as incremental confidence-building measures which contributed to the willingness of the parties to conclude a peace agreement.

At the beginning of the process, both sides were primarily concerned with the need for early warning and prevention of surprise attacks. The verification system met these needs by reducing the risks involved in a cease-fire through reduction of forces in forward zones, immediate detection and notification of troop movements, and the reduction of incentives for a surprise attack. In this way, the requirements of the parties were satisfied. Mandell notes that: "In relinquishing strategic depth, Israel required a verification system that would warn of a rapid reinforcement of Egyptian forces."⁵¹⁵ The integration of technological verification with more traditional peacekeeping requirements accomplished this task.

Despite its success, the Sinai verification regime did experience a number of difficulties.⁵¹⁶ An initial problem of the verification regime was related to disagreement over the definition of allowable military structures, fortifications, and artillery. This was largely attributable to the differences between Israeli and Egyptian military organization and structure. The Joint Commission eventually resolved such issues. An additional complication was due to climatic factors: technical problems with the sensor equipment caused by dust and ground fog, however were quickly resolved through the addition of thermal imaging devices.

In conclusion, the verification process associated with the Sinai Agreements was clearly an incremental learning process, which facilitated the eventual commitment to a peace treaty. It effectively illustrates the significant role, which can be played by a third party in designing and implementing verification procedures. The use of applicable technology was also an important factor in lessening the apparent intrusiveness of these procedures, and thus enhanced their political acceptability.

The verification regime also succeeded in integrating ground and air surveillance by both third parties and by national means, forming an integrated package. However, by far the greatest accomplishment of the trilateral approach in the Sinai is that while it initially performed a risk-reduction function, the success of the agreements increased the confidence of the parties to such a degree that a fundamental political compromise was reached.

515 B.S. Mandell, op. cit., 1988, p. 1.

516 D. Barton, *The Sinai peacekeeping experience: a verification paradigm for Europe*, SIPRI Yearbook 1985, pp. 541-573.

5. The United Nations

Since the Gulf War in 1991 highlighted the danger of proliferation of weapons of mass destruction and the lack of control over it, there has been growing attention for establishing adequate international arrangements to limit arms build up. The Security Council summit in January 1992 proclaimed arms proliferation a threat to international security, thus clearing the way for further Security Council action in this area.

After the Iraqi withdrawal from Kuwait, the United Nations Security Council, through the binding cease-fire resolution 687, imposed a verification regime on Iraq for the destruction of its chemical and biological weapons, its nuclear potential and ballistic missiles. This represent a rather unique case of enforcement of such measures, and the first major United Nations exercise in verification of arms control.

However, UN intrusion on national sovereignty for verification purposes is still considered too sensitive an issue by most states. If UN involvement is to be expanded, this is most likely to happen in its more usual roles in verification as table 8 describes it includes: fact-finding, providing assistance with respect to data exchanges (including the UN arms register), and verification in the context of peacekeeping, elections and sanctions.

Table 7: Multilateral arms control treaties, their verification provisions and the UN role in implementation.

Year signed	Agreement (common name)	Major prohibition	Verification provisions in agreement	U.N. role in implementation a
1925	Geneva Protocol	Use of chemical and biological weapons	No provisions	Under General Assembly resolutions (incl. 42/37 C of 1987) b, Secretary-General is given mandate to conduct investigations in response to allegations made by any Member State
1959	Antarctic Treaty	Any measures of a military nature in Antarctica	Qualified parties may carry out on-site inspections and aerial observation any time, anywhere in Antarctica	Parties encouraged to develop cooperative working relations with U. N. specialized agencies having interest in Antarctica
1963	Partial Test Ban Treaty	Nuclear weapons testing in the atmosphere, in outer space and under water	No provisions	No provisions
1967	Outer Space Treaty	Nuclear weapons in outer space. Military use of celestial bodies	Parties may request to observe flights of space objects and may carry out on-site inspections on the Moon and other celestial bodies on basis of reciprocity	Parties to inform Secretary-General of their activities in outer space
1968	Non-Proliferation Treaty	Wider dissemination of nuclear weapons	IAEA safeguards applied to non-nuclear-weapons state parties	IAEA reports regularly to General Assembly, and is to report to Security Council and General Assembly in case of violations of safeguards
1971	Sea-Bed Treaty	Nuclear weapons on ocean floor	Parties may observe activities on the seabed using own means or with the assistance of another party of "through international procedures within the framework of the United Nations"	Any party may refer matters of non-compliance to Security Council. In review conference declarations, nations are requested to provide U.N. Secretariat with information, incl. On the regulatory measures taken.
1972	Biological Weapons Convention	Production and stockpiling of biological and toxin weapons	Security Council may initiate an investigation and each state party is obliged to cooperate	Any party may lodge a complaint with Security Council
1977	ENMOD Convention	Military or any other hostile use of environmental modification (ENMOD) techniques	Security Council may initiate an investigation and each state party is obliged to cooperate	Any party may lodge complaints with Security Council. Secretary-General must distribute summary of Committee's "findings of fact" and expert views to all parties

1979	Agreement on the Moon Other Celestial Bodies	Any hostile act on, or using, the moon. Placing nuclear weapons on, or in orbit around, the moon	Any party may carry out on-site inspections on its own or with assistance of another party or through "international procedures within the framework of the United Nations"	Secretary-General to receive information from parties carrying out relevant activities. Secretary-General to assist in settlement of certain disputes
1981	Excessively Injurious Weapons Convention	Uses of certain conventional weapons e.g., mines, booby traps and incendiary weapons against civilians)	No provisions	Under certain circumstances, parties must make available to Secretary-General or to a UN mission all information concerning minefields, mines and booby-traps.
1985	Treaty of Rarotonga	Nuclear explosive devices in the South Pacific	IAEA safeguards applied to parties Consultative Committee may initiate	No provision
1995	Treaty of Pelindaba	Nuclear weapons in Africa	Special regional organs created. IAEA c safeguards applied to nuclear activities. Special inspections may be carried out by IAEA or by regional organs	Reports may be submitted to Security Council and General Assembly through Secretary-General, in connection with inspections and in the event of violations

5.1. Forum for negotiation and discussion

Although not directly involving a UN verification effort in practice, the various fora of UN organs have played a role in the development of international norms of verification, and the negotiation of some of the global arms control agreements. Since its creation in 1945, the UN has gone through different phases. From the early 1960's to the mid-1970's,⁵¹⁷ a period which some have considered something of a “belle époque” for UN disarmament diplomacy, quite a number of agreements were brought about, such as the Non-Proliferation treaty, the Seabed treaty, the Biological Weapons Convention etc. As the multilateral disarmament agenda turned more and more to grandiose and overambitious objectives (much due to widening North-South and East-West cleavages), the superpowers preferred to conclude agreements with each other without involving the UN. Regional arrangements provided another alternative.

By the late 1980's, the changed international situation had greatly improved the atmosphere of debates on disarmament. The organs related to the UN General Assembly, as well as their agenda's were streamlined. This may lead to the abolition of the UN Disarmament Commission, while the format, size and membership (now 40) of the main negotiating forum, the Conference of Disarmament (CD) could be restructured.⁵¹⁸ The 1992 Chemical Weapons Convention has been one of the few successes of negotiation within the CD framework. It has been proposed to have the CD focus on well-defined and urgent matters, or function as a permanent review and supervisory body for some existing arms control agreements⁵¹⁹. The agenda of the First Committee of the General Assembly, which negotiates resolutions to be adopted in the Assembly's plenary session, was also being reconsidered.

In 1988, the General Assembly endorsed a set of 16 principles of verification,⁵²⁰ which is the guidelines in arms control agreements and negotiation. A study on the UN role in verification was completed in 1990 by a representative group of governmental experts.⁵²¹

The UN study recommended providing technical assistance through a UN data bank, and organizing exchanges between experts and government officials. The 1990 Experts Group agreed that the United Nations could play a useful role in making research and data relating to verification available to wider audiences. Increasingly, access to data and its availability have become essential building blocks for arms limitation and disarmament agreements and for confidence- and security building measures between States. The United Nations could take an active role in facilitating the operational international exchange of these data. Most of the data would be

517 The First Special Session of the UN General Assembly devoted to Disarmament in 1978 had already stressed the importance of adequate verification. The Final Document of that Session states: “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.” (UN-DocA/Res/S-10/2).

518 See J. Simpson, *Arms Control and the United Nations*, Bulletin of Arms Control, April 1993, pp. 11-16.

519 Report of the Secretary-General, New Dimensions of Arms Regulation and Disarmament, in: the Post-cold War Era, 27 October 1992, A/C.1/47/7.

520 See Annex, resolution A/43/81B.

521 Study on the role of the United Nations in verification, UN doc. A/45/372, 1991.

provided voluntarily by States and the data bank would be accessible by other States; it would be computer-based and would have facilities for storage and retrieval, on-line access and the capacity to interface with other relevant data banks to which Member States provide access.

The main question is that of creating a UN body for actually conducting verification activities, possibly equipped with technical means such as overhead imaging systems. Proponents of such a UN agency argue that it would provide expertise in verification techniques, thus making them accessible to nations with limited resources for verification. They also believe it would give an impetus for further arms control agreements and remove any grounds for arguing that such agreements would not be verifiable.⁵²²

Another view considers that verification is a treaty specific exercise, and the combination of techniques and capabilities employed under every individual agreement must be the product of negotiation and agreement by the states that would be parties to it.⁵²³ It has not been possible thus far to bridge the gap between these two views, although the UN study found some common ground in proposing to extend the (non-intrusive) UN fact-finding missions for the verification of certain arms control agreements.

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. In 1995 the UN Secretary-General submitted an in-depth study on verification in all its aspects, prepared with the assistance of a group of qualified governmental experts, which subsequently served as an important reference document.⁵²⁴

This development has resulted in the introduction of verification provisions in arms control agreements ever since.⁵²⁵ It has positively influenced implementation and compliance also in other areas of international law. Examples can be found in peacekeeping, disengagement and crisis prevention⁵²⁶ but also in other areas such as environmental law,⁵²⁷ where international cooperation to support fact-finding, conflict management and confidence-building is essential for effective compliance.

522 The strongest supporters of the principle of an integrated multilateral verification system within the UN are the countries represented in the Six-Nation Initiative: Argentina, Greece, India, Mexico, Sweden and Tanzania.

523 See F. Bild and P. Jones, *Multilateral verification, opportunities and constraints*, in: Disarmament 14/2 (1991).

524 Verification in all its aspects, including the role of the United Nations in the field of verification. Report of the Secretary-General, UN-Doc A/50/377 and Corr. 1, A/52/269, A/54/166, A/54/555. The General Assembly has reaffirmed the critical importance of, and vital contribution that had been made by effective verification measures in arms limitation and disarmament agreements and other similar obligations (A/Res/50/61, 52/31, 54/46).

525 S. Pawlak, *The Legal Aspects of Verification*, in: J. Dahlitz and D. Dicke (eds.), *The International Law of Arms Control and Disarmament*, UN Publications, 1991, pp. 127-144 (131-142).

526 A. Chayes and A.H. Chayes, *The New Sovereignty. Compliance with International Regulatory Agreements*, Cambridge MA 1995; T. Marauhn, *Die Durchsetzung von Rüstungskontroll- und Abrüstungsvereinbarungen*, in: *Die Friedens-Warte* 75/1-2 (1999), p. 159.

527 U. Beyerlin and T. Marauhn, *Law-Making and Law-Enforcement in International Environmental Law after the 1992 Rio Conference*, Berlin 1997, pp. 70 ff.

Adequate and effective verification is an essential element of arms limitation and disarmament agreements, promoting implementation, confidence building and compliance. The definition of verification, which is not agreement-specific, includes any commitment undertaken by a party or parties which they would then seek to have verified by collecting, collating and analysing data in order to make an informed judgement as to whether a party is complying with its commitments or obligations. There is also no single verification instrument, which could be sufficient for all situations. Essential principles of verification include equality, non-discrimination, reciprocity, and universality of the verification process, non-interference with agreed methods, procedures and techniques of verification and the protection of trade secrets. To build up confidence, it is also necessary to respect the social and cultural values of the nations involved. These principles are recognised as useful elements in negotiating and implementing arms limitation and disarmament agreements.⁵²⁸

One issue concerns a possible UN role in equalizing the opportunities of verification between rich and poor countries. Principle (10) deals with “All states have equal rights to participate in the process of international verification of agreements to which they are parties.” This principle is obviously flouted, since states are permitted to veto the appointment of inspectors, even when some agreements state that these cannot be objected to on the grounds of nationality.⁵²⁹

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),⁵³⁰ 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 Conference on Disarmament (CD),⁵³¹ the single multilateral forum devoted to negotiating disarmament agreements naturally also negotiates the accompanying

528 The International Law Association (ed.), Report of the Sixty-Seventh Conference, Helsinki 1996, p. 316. See also Difth Report of the Committee National and International Verification Measures, London Conference 2000.

529 Disregard for this principle occurred when the UN prevented Israel from participating in the process of verifying the elimination of Iraq’s nuclear, chemical, biological, and long-range missile programs, even though Israel consider as victim of Iraqi aggression during the Gulf War. Having adversaries participating in the verification activities assures the world of a less lenient approach and increases the probability of fulfilling the verification mission. E. Asculai, *Verification Revisited: The Nuclear Case*, Washington, DC 2002.

530 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.

531 The Conference on Disarmament (CD), established in 1979 as the single multilateral disarmament negotiating forum of the international community, was a result of the first Special Session on Disarmament of the United Nations General Assembly held in 1978. It succeeded other Geneva-based negotiating fora, which include the Ten-Nation Committee on Disarmament (1960), the Eighteen-Nation Committee on Disarmament (1962-68), and the Conference of the Committee on Disarmament (1969-78). As originally constituted, the CD had 40 members. Subsequently its membership was expanded to 66 countries.

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.

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.

5.2. Assistance in verification

A number of arms control agreements provide for referral to the United Nations organs, the Secretary-General, or the International Court of Justice (see annex I). In most cases those provisions relate to a monitoring or co-operative role, as through certain types of exchange of information, and to the settlement of disputes regarding a certain implementation of a treaty, but not exactly to rendering compliance judgements. Most of these provisions have never been implemented.⁵³² In practice, UN involvement in verification of arms control agreements has taken two forms: assistance in organizing data exchanges, and fact-finding:

1. The *UN assistance in data exchanges* has evolved mainly through a clause, which first appeared in 1971 in the Seabed Treaty, and provides for verification “through appropriate international procedures within the framework of the United Nations and in accordance with its Charter”⁵³³. This makes it possible for Review Conferences of multilateral treaties to voice concern about verification and compliance, and ask for UN assistance. For example, the Third Review Conference of the Sea-Bed treaty requested the UN Secretary-General to report on technological developments relevant to the treaty and to the verification of compliance.

The Second Review Conference of the Biological Weapons Treaty requested assistance with respect to data exchanges and a report on the implementation of confidence-building measures decided upon by States Parties, while the Third Review Conference requested the S-G to receive, compile and make available to States Parties information related to the implementation of the Convention and later

532 Study on the role of the United Nations in verification, UN doc. A/45/372, 1991, p. 29.

533 On this issue see H. Mann, *An international verification organization and the United Nations: some legal issues*, in: Ellis Morris (ed.), *International Verification Organizations*, Toronto, Center for International and Strategic Studies, York 1991, pp. 227-252.

decisions.⁵³⁴ The increase of requests for UN assistance in organizing data exchanges has raised the question of making the data more accessible. There is at present a lack of organization and translation of the incoming information, which is often very complex. The UN is therefore now trying to develop a computerized data bank as had been recommended by a study group of governmental experts.⁵³⁵

An additional effort has to be made in providing resources for making the *UN arms transfer register* operational. This register was established at the 46th General Assembly in 1991 and requires UN members to submit to the UN, on a voluntary basis, information on the import and export of conventional weapons, and background information on arms stockpiles, production of weapons and relevant policies.⁵³⁶ It is a confidence building measure, which in the longer term may form the embryo of a verification regime for restrictions on conventional arms trade.

The various data exchanges mentioned above are more of a confidence building nature than part of an actual verification process. Situating them in the UN has been convenient mostly for reasons of cost effectiveness, but as soon as these data exchanges develop more verification substance, one could well expect the consensus on having this function to be performed by the UN to evaporate.

2. *Fact Finding*. The Secretary-General may get involved in the verification of the arms control agreements as a function of executive organ of the GA and the Security Council (Article 98 of the Charter) and through Article 99 of the Charter which empowers him to bring to the attention of the SC any matter which in his opinion may threaten the maintenance of peace and security.

Although the legality of such an authority to intervene has been disputed,⁵³⁷ the Secretary-General has undertaken fact-finding missions mainly in response to the alleged use of chemical weapons.⁵³⁸ From 1980 to 1984 -in the absence of verification provisions in the Geneva Protocol of 1925 prohibiting the use of chemical or biological weapons in war- several General Assembly resolutions paved the way by calling upon the Secretary-General to carry out investigations on the alleged use of chemical weapons in South East Asia and Afghanistan. In 1987 this was supplemented by a consensus resolution on fact-finding requesting the further development of technical guidelines, the compilation and maintenance of lists of qualified experts, and arrangements for using them.⁵³⁹ The 1989 Paris Declaration of States-Parties to the Geneva Protocol expressed full support for this UN involvement.

534 See C.d. Jonge-Oudraat, *International Organization and Verification*, in: S. Sur (ed.), *Verification of Disarmament or limitations of Armaments: Instruments, Negotiations, Proposals* UNIDIR, Geneva 1992.

535 See UN doc. A/45/372, par. 262-266.

536 Resolution 46/36 L "Transparency in Armaments", adopted on 9 December 1991.

537 See C.d. Jonge-Oudraat, *op. cit.*, 1992.

538 For an elaborate discussion, see G. Cottureau, *The Geneva Protocol on Chemical Weapons and Biological Methods of Warfare (1925) and related procedures*, in: S. Sur (ed.), *Verification of Current Disarmament and Arms Limitation Agreements, Ways, Means and Practice*, UNIDIR, Geneva 1991.

539 General Assembly resolution 42/37 C.

However, the Assembly resolutions were not invoked when the SG undertook fact-finding missions from 1984 to 1988, in Iran and Iraq. These were based on requests by individual member states and/or Security Council resolutions. The Council's resolution 620 of 26 August 1988 made clear that action would be considered in case of any future use of chemical weapons in violation of international law, whenever, and by whomever committed. For instance, in 1991 a UN fact-finding mission was dispatched to investigate Azerbaijani claims that Armenia had used chemical weapons in the Nagorny-Karabagh conflict.

UN fact-finding missions require of course the prior consent of the state involved, and only have as much freedom to observe as accorded to it by that state.⁵⁴⁰ Such lack of intrusiveness makes it difficult to come up with compelling evidence. Yet, the 1984 Iraqi use of chemical weapons against Iran presents a case of a successful investigation. Authorized by the Security Council, the UN Secretary-General immediately put together a team of experts to investigate Iran's charges. Using procedures for collecting and processing samples and other data in advance, the inspection team obtained access to key areas in the war zone and to the gassed victims, and within a matter of days after the investigation (barely six weeks after the complaint had been filed by Iran) unanimously confirmed Iran's allegations. However, the success of this mission was probably highly dependent on specific circumstances; direct access to the relevant sites and a clear violation, which was easy to verify.⁵⁴¹ It must also be noted that no action has been undertaken in response to the violation.

The use of UN fact-finding missions offers at least some means of verification which can be extended to cover other treaties, which lack verification regimes, as has been recommended by the UN study mentioned above.⁵⁴² As for the described UN role in the Geneva Protocol, this has partly been covered by the Chemical Weapons Convention, in which provisions have been included to address allegations of use of chemical weapons.

5.3. UN verification in peacekeeping

Since the UN peacekeeping operation dealing with the cease-fire following the Iran-Iraq war, the term verification has been used in the mandates assigned to peacekeeping missions, such as those in Central America and Cambodia, while in one case it even appears in the official title: the UN Angola Verification Mission

540 The principle of national sovereignty has also been firmly established in General Assembly resolution A/46/59, Declaration on Fact-finding by the United Nations in the field of the maintenance of International Peace and Security. The definition of aggression, which was reached by the United Nations General Assembly at the end of 1974 (29 UN GAOR, 6th Comm., UN Doc. A/9890) reflects the fears and doubts of our time, but it is a tributary of the stream, which is gradually moving States toward a more secure and peaceful international society. The Resolution was adopted without putting it to a vote. The 138 Member States were by no means agreed upon its meaning. If it had been put to a vote, China and a few others would have abstained. A few States noted some objections, and some special interpretations were noted for the record. See B.B. Ferencz, *The United Nations Consensus Definition Of Aggression: Sieve Or Substance, From the Washington Conference on Law and the World*, October 1995.

541 See J.A. Shear, *Compliance diplomacy in a multilateral setting*, in: M. Krepon and M. Umberger (eds.), *Verification and Compliance*, VERTIC, 1988, p. 267.

542 Study on the role of the United Nations in verification, Report of the Secretary-General, New York 1991.

(UNAVEM). These examples illustrate the increasingly recognized importance of verification in peacekeeping operations.

In fact, from 1948 on, the UN has been involved in a range of tasks including supervision, confirmation, certification and other such terms with respect to armistice agreements, cease-fires and elections. These tasks all included a degree of verification in one way or another and the UN has thus developed a fair amount of expertise over the years. An experience, which to some extent may be applied to the area of, arms control.

As UN peacekeeping operations are of course established with the consent of the parties to the conflict, verifying compliance is very much based on the cooperation of those involved. "Freedom of movement, access to information, the ability to inspect and ask questions is essential. One of the hallmarks of UN peacekeeping has been the personal rapport that builds between the peacekeeper and the protagonist. No matter what the problem, human interaction is often a catalyst in finding a solution. There are instances where technology has been very effective in the peacekeeping verification process but there are even more instances where the human factor has proven to be irreplaceable."⁵⁴³

Another relevant aspect of verification in the UN peacekeeping context is that violations may be reported to the Security Council, which may subsequently impose punitive actions. Since the end of the Cold War this seems to have become more than just a hollow threat.

A task, which has become increasingly important for the UN is that of *supervising or monitoring elections*. The concept is not new to the UN: in the fifties and sixties UN teams performed similar tasks in various Trust and Non-Self-Governing Territories as they moved towards self-determination. With its mission in Nicaragua in 1989, the UN, for the first time, observed an election in a member state at the request of its government. There the mandate included several functions, such as verifying that the political parties were equitably represented in the Supreme Election Council, that they enjoyed complete freedom of organization and mobilization, that they had access to state television and radio and that electoral rolls were properly drawn up. The object in such a case is national reconciliation, for which elections offer an instrument to test rival claims to the right to rule. The verdict of the polls is the most accepted test of legitimacy.⁵⁴⁴ In this context, Prime Minister Benazir Bhutto has stressed: "Elections must not only be fair, they must also be seen to be fair. The presence of observers, therefore, is deterrent to fraud. The observers' report can help legitimize an election in an emerging democracy. It is harder to steal an election when the whole world is watching."⁵⁴⁵

A request for UN assistance in elections may lead to confusion over the precise character of the UN role. If it concerns a peacekeeping operation or a regional security matter, it may involve the competence of the Security Council. If it merely concerns technical assistance, the General Assembly may take up the matter. This

543 D.A. Fraser, *Verification in the United Nations context: a process in transition*, in: S. Mataija and J.M. Beier (eds.), *Multilateral verification and the Post-Gulf Environment: Learning from the UNSCOM experience*, Toronto 1992.

544 E. Luard, *Conflict and peace in the Modern International System; a study on the principles of international order*, London 1988, p. 136 f.

545 UPDATE, *Parliamentarians for Global Action*, April 1990.

was the case in Haiti, where the UN Observer Group of Elections in Haiti (ONUVEH) not only observed the electoral process but also was involved in “public security” to keep the elections free of violence. It was the first mission launched in response to a call for help in ending the political and institutional instability that plagued the nation.

Most cases of monitoring elections, however, take place within the framework of a peacekeeping operation involving a regional security plan. The UN activities in Namibia, El Salvador, Cambodia, Western Sahara, Angola, Mozambique and Rwanda are obvious examples. Many third world states argue that if there is no regional security problem involved, there is no need for a UN presence in monitoring elections, as that would in their opinion imply a potential for foreign interference in internal affairs.⁵⁴⁶

The recently established United Nations Situation Centre (SITCEN)⁵⁴⁷ provides information to the decision makers in the Department of Peace-keeping Operations and elsewhere. The need for the Situation Centre emerged as a result of the expansion of peacekeeping activities, and the evolution of its scope and goals. The objectives of present-day peacekeeping operations are not limited to monitoring lines of disengagement. They range from monitoring a situation to reviving civil society and re-building the infrastructure of a shattered state. The fact that peacekeeping missions have so many aspects – political, military, security, and humanitarian, economic, educational – means that the financial burden and the organizational responsibilities are shared among different departments, agencies, and external organizations such as NGOs.

Although clearly not in the direct business of verification, SITCEN provides essential services to those who are directly involved in verification measures by assisting them in the reporting of their results to decision makers.

The role of United Nations in verification aspects of peace and security have been often challenged due to the lack of:

Clear mandates concerning arms limitations and other obligations so that verification objectives can be better defined;

Adequate resources to support the verification objectives;

Systematic and better collection and analysis of information from ground reconnaissance, aerial surveillance and information processing systems;

Independent sources of information and analysis;

Ability to exploit more fully advances in technology, especially in the areas of communications and surveillance.

5.4. Verifying Sanctions

Another aspect of (possible) UN activities in verification, which has not received much attention, concerns monitoring and enforcing compliance with mandatory UN

546 See *The World in Turmoil: Testing the UN's capacity*, in: J. Kaufmann, D. Leurdijk and N. Schrijver (eds.), Academic Council on the United Nations System, New York 1991, pp. 38-39.

547 The Situation Centre was created in April 1993 and was intended to form part of the UN Headquarters Information Management System, supporting the decision-making processes, and connecting all civilian and military flows of information at the strategic level.

sanctions. The Security Council has applied sanctions only eight times in history,⁵⁴⁸ but five of them since 1990. Since sanctions have become an increasingly policy option, growing attention has been paid to improving their implementation. This may have relevance in the field of arms control, especially in the case of arms embargo's which may be seen as compulsory global export and import controls on arms trade.

A number of arms control and disarmament agreements expressly provides that the Security Council may deal with cases of non-compliance.⁵⁴⁹ Measures to be taken by the Security Council include the determination of the existence of a threat to the peace, breach of the peace, or act of aggression (Art. 39 UN Charter); sanctions not involving the use of force (Art. 41 UN Charter); and military sanctions (Art. 42).

The Security Council so far has established a number of committees to oversee implementation of sanctions,⁵⁵⁰ in respect of South Africa,⁵⁵¹ Iraq, the former Yugoslavia,⁵⁵² the Libyan Arab Jamahiriya, Somalia, Haiti, the National Union for the Total Independence of Angola (UNITA) and Rwanda,⁵⁵³ respectively, with the scope differing from case to case. Some are limited to embargoes, while others are more comprehensive⁵⁵⁴. The committee on the former Yugoslavia, established in 1991, was given a mandate that included the power to recommend measures in response to violations⁵⁵⁵ and to approve exceptions to the embargo.⁵⁵⁶

548 To date, the Security Council has established eight committees to oversee implementation of sanctions, in respect of South Africa, Iraq, the former Yugoslavia, the Libyan Arab Jamahiriya, Somalia, Haiti, the National Union for the Total Independence of Angola (UNITA) and Rwanda, respectively, with the scope differing from case to case. Some are limited to arms embargoes (South Africa, Somalia, UNITA in Angola, and Rwanda), while others are more comprehensive (Iraq and the former Yugoslavia). The committee on the former Yugoslavia, established in 1991, was given a mandate that included the power to recommend measures in response to violations 69/ and to approve exceptions to the embargo. The committees established since then (Libyan Arab Jamahiriya, Somalia, Haiti, UNITA in Angola, and Rwanda) have similar mandates. Verification in all its aspects, including the role of the United Nations in the field of Verification, General Assembly, UN A/50/377, 22 September 1995, point 179.

549 Art. XII C of the IAEA Statute; Art. VI BWC; Art. XII (4) CWC; Art. V (4) CTBT.

550 J. Dahlitz, *Security Council Powers and Possibilities*, in: J. Dahlitz (ed.), *Avoidance and Settlement of Arms Control Disputes*, op. cit., pp. 57-83.

551 The first measures against South Africa were not binding on the states and were set out in resolutions 181 (1962) and 182 (1963). Sanctions that were compulsory for the Member States were: 418 (1977), 473 (1980), 558 (1984), 591 (1986), 919 (1994).

552 T. Christakis, *Les Mesures économiques, politiques et diplomatiques contre la Serbie et le Montenegro (1992-1996)*, in: R. Mehdi, *Les Nations Unies et les sanctions: quelle efficacité?* Pédone 2000, pp. 117 and 121. Resolutions 757 (1992), 787 (1992), 820 (1993).

553 A. Vines, *Monitoring UN sanctions in Africa: the role of panels of experts*, VERTIC, Verification Yearbook, 2003.

554 D. Cortright and G. Lopez, *The Sanctions Decade: Assessing UN Strategies in the 1990s*, Boulder, CO 2000; and D. Cortright and G. Lopez, *Sanctions and the Search for Security*, Boulder, CO 2002.

555 Security Council Resolution 724 (1991).

556 Security Council Resolutions 787 (1992) and 820 (1993).

The sanctions committees are usually asked to perform a series of tasks and to report on their work to the Security Council with their observations and recommendations. There are several types of tasks that the committees may be asked to perform:⁵⁵⁷

1. Development of guidelines for the implementation of measures imposed by the Council or to study ways and means by which such measures could be made more effective;⁵⁵⁸
2. Collection and examination of information submitted by States on actions they have taken for implementation with a view to making recommendations to the Council. They are also asked to examine the Secretary-General's progress reports on implementation and to make appropriate recommendations to the Council;
3. Dealing with violations through consideration of information brought to their attention by States concerning violations; making periodic reports of such violations to the Council (identifying where possible persons or entities, including vessels, reported to be engaged in the violations) and recommending appropriate measures in response;⁵⁵⁹
4. Approval of exceptions on application by States to the measures imposed by the Security Council, for example, on grounds of significant humanitarian need.⁵⁶⁰

In monitoring and enforcing sanctions the UN has, as usual, been *dependent* on the co-operation of individual nation-states. Even if the Security Council receives a report that sanctions have been violated, the investigation is left to the country involved. Since national governments have little incentive to report violations which, if stopped, could hurt political or economical interests, the routine reply is that the matter has been fully investigated and that there is no foundation to the allegation of a violation of the sanctions.⁵⁶¹

In Iraq and Yugoslavia, however, a more active approach has been taken by putting in place a blockade to enforce compliance. This has been implemented by the WEU and NATO under UN authorization. In the case of Iraq, Security Council resolutions 661 and 715 established an *import/export monitoring regime*, of which some of the items involved must be notified to, and permitted by either the Sanctions Committee or UNSCOM (see below) prior to import or export.⁵⁶² The blockade of Iraq's coast has been accompanied by *on-board inspections* of passing ships and *custom inspections* at Iraq's harbours.

557 UN/ A/50/377, op. cit. point 180.

558 South Africa – Security Council resolution 421 (1977); Libyan Arab Jamahiriya resolution 883 (1993); Angola – resolution 864 (1993).

559 Haiti – Security Council resolution 841 (1993); Angola – resolution 864 (1993).

560 Libyan Arab Jamahiriya – Security Council resolution 748 (1992); Iraq-Resolution 687 (1991); Haiti-Resolution 841 (1993).

561 Political Symbol or Policy Tool? Making sanctions work, report of the 24th United Nations Issues Conference, Stanley Foundation, 1993, p. 20.

562 See D. Englund, *Lessons for Disarmament from the UNSCOM Experience*, in: S. Mayaija and J.M. Beier (eds.), *Multilateral Verification and the Post-Gulf Environment: Learning from the UNSCOM Experience*, Centre for International and Strategic Studies, York 1992.

It has been suggested that the UN role in assuring compliance might be reinforced by posting UN monitors at critical points along the borders of target countries, possibly following the model of the Sanction Assistance Missions (SAM) program of the CSCE, which has been used to enforce sanctions against Yugoslavia.⁵⁶³ Although there are obvious limits to the effectiveness of such measures, they can contribute to a certain extent in furthering compliance.

Verification of the sanctions is costly and to date no satisfactory means of burden sharing has been devised. Problems have arisen in the assessment of the potential impact of sanctions on both the target country and third countries, in the monitoring of their application, in the delivery of humanitarian assistance to vulnerable groups and in both the measurement of collateral damage and the evaluation of claims submitted under Article 50 of the Charter.⁵⁶⁴ The Secretary-General, in his position paper entitled “Supplement to an Agenda for Peace”, has made a recommendation for the establishment of a mechanism for sanctions implementation.⁵⁶⁵

5.5. Enforcing verification and compliance; the case of Iraq

Having examined the regular verification functions of UN organs, the Iraq case offers a picture of the more extreme measures that can be adopted. At the end of the Gulf War the Security Council, invoking “a threat to international peace and security” under Chapter VII of the Charter, adopted a binding cease fire resolution (Res. 687), part of which required Iraq to accept the verification, destruction and monitoring of its weapons of mass destruction. Included were Iraq's nuclear, chemical, and biological weapons and its ballistic missiles with ranges of over 150 kilometres.

To carry out the regime, the IAEA was enlisted to deal mainly with Iraq's nuclear weapon program. A separate *UN Special Commission* (UNSCOM) was set up in New York to take care of other aspects of the program, and to coordinate and supplement IAEA activities.

In total, UNSCOM has inspected over 200 undeclared sites in the light of their potential for the storage of chemical and biological weapons. In the chemical field, Iraq has acknowledged the production or import of over 212,000 filled and unfilled chemical munitions, nearly 4,150 tons of agent and nearly 18,000 tons of precursor chemicals.⁵⁶⁶ In the biological field, in the face of mounting evidence that it was engaged in an advanced military biological programme, Iraq was due to hand over to UNSCOM a full account of its programme in early August 1995.

563 In this program, trained European custom officials have been dispatched to neighbouring countries and key transportation points to monitor compliance and act as a consulting resource for the local enforcement efforts. For a discussion on enforcing UN sanctions, see Political Symbol or Policy Tool? Making sanctions work, report of the 24th United Nations Issues Conference, Stanley Foundation, 1993.

564 UN/ A/50/377, op. cit., point 186.

565 A/50/60-S/1995/1, paras. 74-76.

566 At the end of the Gulf conflict, Iraq had declared, as stocks remaining, over 500 tons of bulk agent, 28,000 munitions and some 4,000 tons of precursors. Those items which were judged safe to move were transported to a central location for destruction, while the remainder was destroyed on site by UNSCOM. In the field of ballistic missiles, UNSCOM inspection teams have supervised the destruction of 151 missiles, plus launchers and related equipment. UN/ A/50/377, op. cit., point 190.

UNSCOM has operated as an executive organ of the Security Council. An innovation in this already unique regime, is that a number of countries, particularly the U.S., also Britain, France and Russia, have passed to the Special Commission *intelligence* which has helped it in its site selection and in the actual conduct of inspections at particular sites. The IAEA has now agreed with certain reservations to use a somewhat analogous process to manage “special inspections” at non-declared sites in other countries that are member states of the NPT.⁵⁶⁷

Together, these two unprecedented organisations have proved their ability to plan, organise and rapidly deploy a verification operation in the most difficult political circumstances, that of enforced, contested disarmament, and in the most difficult physical terrain and conditions. Not only were they able to conduct a thorough, systematic, on-site inspections and other in-country monitoring and verification activities, they also successfully dismantled or supervised dismantling of extensive nuclear weapons and ballistic missile programmes, and other elements of WMD programmes in the chemical and biological fields. Both organisations were able to use information, including from national technical means and open sources, wisely and to great effect, as well as protecting confidentiality where necessary.⁵⁶⁸

5.5.1 *The UNSCOM verification regime in practice*

UNSCOM started its activities soon after resolution 687 had been adopted on 3 April 1991. The 21 members of the Special Commission were chosen on the basis of their expertise and appointed in a personal capacity. There has been a preponderance of members from industrialized countries, mainly because of the expertise available. The organisation changed dramatically according to the needs of the day. Experts came and went on an ad-hoc basis for a few days or for a few months, working on special and multiple tasks and subjects. This extremely flexible approach was made possible by the fact that there was no established budget, no permanent positions and no salaries, most members being offered as contributions from their respective governments.

The verification of Iraqi compliance entailed three phases, which do not have distinct dividing lines:

1. Inspections to verify Iraqi declarations of proscribed equipment and material, and to ensure that this material is not held at undeclared sites.
2. Destruction of the banned material or actions to render such material harmless
3. Monitoring and verifying future compliance of Iraq in accordance with pertinent Security Council resolutions.

Each inspection team averaged 20-25 members with a length of stay in Iraq varying from one to five weeks. Since resolution 687 had not been precise on the *intrusiveness of inspections*, detailed provisions were established in an agreement with Iraq which came into force on 14 May 1991. These include the right to unrestricted access to any site in Iraq, the right to request and retain data, information and documents and photographic evidence, the right to conduct interviews, install equipment, and to collect and export samples.

567 See section on the Non Proliferation Treaty (NPT).

568 T. Findlay, *A Standing United Nations WMD Verification Mechanism?* Regional Meeting, sponsored by the Japanese Government, with the United Nations High Level Panel on Threats, Challenges and Change, Kyoto, Japan, 6 July 2004.

In *identifying* Iraq's weapon potential and the sites to inspect, declarations of the host country had to form the basis of action, even though distrust obviously prevailed from the outset.⁵⁶⁹ Declarations clearly had to be backed up by other methods. Initially, the inspections relied heavily on intelligence provided by individual countries, mostly imagery and analysis based on *imagery*. These sources proved to be indispensable for detecting Iraqi activities at non-declared sites, and also in persuading the Council to take action when Iraqi officials would obstruct UNSCOM inspections.⁵⁷⁰ As UNSCOM gained experience on the ground, it accumulated its own information and became more independent. It also greatly benefited from *high-altitude surveillance aircraft* put at its disposal by the US government.⁵⁷¹ Despite Iraqi protests, flights started on a regular basis in September of 1991, backed by the explicit wording of Council Resolution 707. The advantage of these operations was that, in contrast to imagery provided by governments, the aerial photographs resulting from the flights could be kept and analyzed by the Commission or used for reference and comparison.

Cataloguing, sealing and destroying items were relatively simple activities, although Iraq managed to cause problems by deliberately re-interpreting what had been agreed upon previously to be reused or destroyed, thereby playing upon the discontinuity of UN personnel. Another problem was the unavoidable length of time between identification and destruction, which in the case of leaking chemical weapons could have dangerous consequences.⁵⁷²

The final phase of the verification effort concerns *long term monitoring and verification* of Iraq's undertakings not to acquire, develop or use any of the prohibited items.⁵⁷³ The Special Commission and the IAEA elaborated plans for long term verification on the basis of resolution 715. These include extensive declarations by Iraq on activities undertaken in the relevant areas, limits on the peaceful use of nuclear energy, and the right to perform intrusive on-site inspections, anywhere, any time, and without notice. On 19 February 1992, Iraq committed itself only to providing the declarations, but failed to keep even that promise. It wasn't until July 1993 that it committed itself to accept the long term monitoring provisions. This acceptance was a result of negotiations with UNSCOM Chairman Ekeus after the Iraqi's had obstructed placement of camera's and sealing of items at missile sites.

As a result of UNSCOM operations, substantial parts of a clandestine nuclear-weapons programme were unmasked, Iraq's huge chemical weapon arsenal was accounted for, and a programme for biological weapons was discovered and investigated.

569 One UNSCOM participant gave the organization the motto "Distrust and verify once, and distrust and verify again". D. Englund, op. cit., 1992, p. 96.

570 For example, US satellite imagery was shown at a closed session of the UN Security Council to prove that the Iraqi's were hiding equipment related to their nuclear weapon programme. P. Lewis, US Shows Photos to argue Iraq hides nuclear material, in: New York Times (27 June 1991).

571 See, for example, M. Krepon, *Iraq inspections offer lessons to US*, in: Defence News (7 October 1991).

572 D. Englund, op. cit., 1992, p. 97.

573 The Director of the CIA has testified that Iraq would need only two years to get the nuclear program back into business. See D. Albright and M. Hibbs, *Iraq's quest for the nuclear grail: what can we learn?*, in: Arms Control Today (July/August 1992), p. 5.

However, many confrontations, delays and compromise solutions illustrate the constraints that even such a well-supported, intrusive operation must confront. The most difficult part proved to be the nuclear- and ballistic missile related items, both concerning extremely costly high tech equipment, which the Iraqi's have been eager to preserve.⁵⁷⁴ For example, in March 1992, after several warnings of the Security Council accompanied by threats of using military force from the US and the UK, Iraq finally communicated its readiness to destroy designated equipment, and declared certain items, which had been concealed. These kinds of confrontation are very time consuming and run the risk of eventually 'tiring out' the Council's political willingness to continue to press for full implementation of the resolutions. There have been many cases in which Iraq refused to provide information, or access to certain facilities. In some instances inspectors have been physically threatened. In serious crises only military threats from the Security Council or actual punitive military actions could make the Iraqi's comply. This often caused considerable delay, from which Iraq could benefit, and has often induced UNSCOM to favor negotiated compromises rather than to steer towards another confrontation.⁵⁷⁵ In his 1996 report to the UN Secretary General, Hans Blix declared that "All quantities of special nuclear material [highly enriched uranium or plutonium] found in Iraq have been removed and the industrial infrastructure, which Iraq had set up to produce and weaponize special nuclear material has been destroyed."

Consequently, UN resolution SCR 1284 in December 1999, sought to entice Iraqi compliance through the promise of lifting trade sanctions on civilian goods once cooperation with arms inspections was achieved. The United Nations Monitoring, Verification, and Inspection Commission (UNMOVIC) was created to put back UNSCOM.⁵⁷⁶

While UNSCOM did have difficulties in its relationship with foreign intelligence agencies, UNMOVIC learned the correct lessons and avoided such difficulties. Both UNSCOM and UNMOVIC successfully withstood the political pressures from the inspected state and from other countries that could have derailed or diverted their work. In short, both agencies demonstrated that the United Nations could organise an effective, efficient and suitably independent verification mechanism outside the structure of a specific treaty regime.⁵⁷⁷

574 T. Findlay and B. Mines, *UNMOVIC in Iraq: opportunity lost*, Verification Yearbook 2003, The Verification Research, Training and Information Centre (VERTIC), London 2003, pp. 45-62; D. Albright and M. Hibbs, *The Bulletin of Atomic Scientists*, September 1991, pp. 14-23.

575 In 1995 Iraq declare its offensive biological weapons program, in 1997 UN inspectors discover evidence of production completed on prohibited missiles in 1992. In 1997 Iraq declare an additional 187 pieces of specialty equipment used to produce deadly chemical agents. In 2003 Iraq disclosing an additional 6,500 bombs with 1,000 tons of the blistering agent mustard gas. UNMOVIC's Report, 6 March 2003 and Historic Review of UNMOVIC's Report on Unresolved Disarmament Issues, Fact Sheet, Office of the Spokesman, Washington, DC, 10 March 2003.

576 UNMOVIC was to replace the former UN Special Commission (UNSCOM) and continue with the latter's mandate to disarm Iraq of its weapons of mass destruction (chemical, biological weapons and missiles with a range of more than 150 km), and to operate a system of ongoing monitoring and verification to check Iraq's compliance with its obligations not to reacquire the same weapons prohibited to it by the Security Council.

577 T. Findlay, op. cit.

5.5.2 Issues of contention and lessons

The operation in Iraq must be seen against the background of special circumstances.⁵⁷⁸ It coincided with drastic changes in international politics (most notably the break-up of the Soviet Union) and came about after a US-led coalition under the authorization of the UN Security Council had defeated Iraq, in response to a clear-cut breach of the UN Charter – the Iraqi invasion of Kuwait. The regime was imposed on Iraq as part of the conditions for a cease-fire. Distrust prevailed from the outset, and it was apparent that the Iraqi authorities were determined to cheat and to obstruct UNSCOM's activities as much as possible. These attempts, however, met an unprecedented resolve of the UN Security Council and the military power of the US-led coalition.

In spite of the special circumstances, the experience of UNSCOM may have some conceptual and operational lessons⁵⁷⁹ regarding verification in general, and specifically for UN activities in this field.⁵⁸⁰

The importance of political and military backing of verification efforts. UNSCOM had a strong mandate and unwavering support from the Security Council under strong leadership of the United States. In the face of a determined cheater like the Iraqi government, it was important that the Council continue to take appropriate measures to enforce compliance.

But even in this case, it has been difficult to maintain a staunch position, and compromises had to be made (sometimes involving other parts of the UN regime, not directly dealing with the disarmament efforts). The Iraqi obstruction also has shown an interplay between political and technical processes. If the Council is to enforce its mandatory resolutions, it has to provide the political and if necessary military backing to enable the inspectors to do their work and in order to persuade political authorities to act, it is necessary to provide compelling evidence of non-cooperation and non-compliance.

Use of imagery and aerial reconnaissance was decisive. For future operations, use of commercial satellites could avoid an excessive reliance on information from one

578 For a review of UNSCOM see S. Black, *Verification under duress: the case of UNSCOM*, in: T. Findlay (ed.), *Verification Yearbook 2000*, The Verification Research, Training and Information Centre (VERTIC), London 2000, pp. 115–129. R. Butler, *Saddam Defiant: The Threat of Weapons of Mass Destruction, and the Crisis of Global Security*, London 2000. F.R. Cleminson, *What happened to Saddam's weapons of mass destruction?*, in: *Arms Control Today* 33/7 (September 2003), available at www.armscontrol.org.

579 *The Lessons and Legacy of UNSCOM: An Interview With Ambassador Richard Butler*, in: *Arms Control Today* 29/4 (June 1999), available at www.armscontrol.org/ACT/jun99/rbjun99.htm; S. Ritter, *The Case for Iraq's Qualitative Disarmament*, in: *Arms Control Today* 30/5 (June 2000), pp. 8–14, available at www.armscontrol.org/ACT/june00/iraqjun.htm; *Anticipating Inspections: UNMOVIC Readies Itself for Iraq: An Interview with Hans Blix*, in: *Arms Control Today* 30/6 (July/August 2000), pp. 3–8, available at www.armscontrol.org/ACT/julaug00/blixjulaug.htm.

580 For the 47th GA session in 1992, Canada put a lot of effort in getting a resolution adopted asking for a follow-up study on the UN role in verification, which among other things would have to focus on the experience of UNSCOM. The Canadians failed, because most states considered it too soon for another study, and Security Council members did not want the General Assembly to touch too much on the delicate UNSCOM issue.

country (in this case the US) and create an indigenous capability for data gathering and analysis.⁵⁸¹

In face of a determined cheater, verification can only work to a limited extent. Even in the unique circumstances UNSCOM enjoyed (strong political backing, intelligence services at its disposal, sophisticated technical means, intrusive on-site inspections), it has proven extremely difficult to identify key parts of the weapon programmes.⁵⁸² Some aspects of Iraq's nuclear programme are still not completely understood.⁵⁸³

Economic incentives were not sufficient to induce cooperation. The 'carrot', which was supposed to encourage Iraq to comply was the promise to lift economic sanctions. Apparently, the sanctions did not hurt Iraq enough to have that effect.⁵⁸⁴ The U.N. imposed economic sanctions immediately after Saddam invaded Kuwait. Many observers believed that, given enough time, economic sanctions would bring Saddam to the bargaining table. Economic sanctions hurt Iraq, but not enough to be sufficient to force Saddam out of Kuwait. This analysis has proven correct. As economic sanctions have continued in force since 1990, and Saddam has not yet complied with the U.N. Security Council's resolutions, it is not likely that Saddam would have left Kuwait solely due to the economic sanctions.⁵⁸⁵

The organizational culture. Since UNSCOM is a temporary ad hoc organization with a specific mandate to be completed within a certain time, there was a sense of urgency and common purpose among its highly motivated personnel. The organization was not hampered by history, organizational culture or ethos. It had no future, therefore little need for bureaucratic politics. While these were clear advantages, there were also some drawbacks in the scarcity of human expertise, and difficulties in planning and coordinating inspections.

The cooperation between UNSCOM and the IAEA ran into some difficulties, but this was a relatively small price to pay for the advantage of combining IAEA experience with nuclear weapon expertise and intelligence information provided by UNSCOM. The IAEA conducted the inspections in the nuclear area, while UNSCOM was given a role of coordination and assistance, and made solely responsible for designation of additional inspection sites on the basis of supplied intelligence. The Security Council gave UNSCOM the overall responsibility, so that it could keep full control of decision-making. In this manner the involvement of the IAEA's General Conference

581 See A.V. Banner and A.G. McMullan, *Commercial Satellite Imagery for UNSCOM*, in: S. Mataija and J. M. Beier (eds.), op. cit., pp. 153-171.

582 See, for example, D.D. Dorn, *Nuclear Weapons Proliferation: a case study*, in: S. Mataija and J.M. Beier (eds.), op. cit., pp. 103-109.

583 See inter alia the Statement of the Director General of the IAEA to the 37th session of its General Conference, 27 Sept 1993, p. 16, para 2.

584 S. Danielson, *Sanctions Hurt Iraqi People But They Do Not Weaken Saddam*, 23 February 2001. available at: www.brunchma.com/~acsumama/com/com022301.html.

585 One advocate for continued military pressure short of armed conflict was Colin Powell, Chairman of Joint Chiefs of Staff, who advanced military containment with increased pressure on Iraq, but could not find any allies in the Bush administration. A major reason was that Powell admitted that it would take a longer time to force Iraq from Kuwait. Bush and others believed that their Coalition was fragile and could not be held together for prolonged period of time. Bush believed that it was important to move quickly to insure the success of the military option.

and Board of Directors was avoided.⁵⁸⁶ In February 1992 an incident occurred when the IAEA performed an inspection on the basis of UNSCOM information that Iraq had built an underground reactor at a particular site. This information proved to be based on highly speculative material. After this inspection, the IAEA assumed a stronger role in assessing information⁵⁸⁷ for itself. On March 7, 2003, IAEA Director General Mohamad ElBaradei reported to the UN Security Council that “After three months of intrusive inspection, we have to date found no evidence or plausible indications of the revival of a nuclear weapon program in Iraq.”⁵⁸⁸

The Iraqi case could probably be best compared with the Armistice and Versailles treaty of 1918-1919, which imposed a regime for disarmament and arms control measures⁵⁸⁹ on Germany. In this case, the destruction of weapons was mainly carried out by the inspected state itself, and the regime was backed up by a credible military threat. The differences are more significant, though. The aim in Iraq was not complete disarmament, but only destroying the weapons of mass destruction potential. By leaving the conventional forces in place, Iraq's security in the region was maintained. To a considerable extent Iraq's sovereignty has been maintained, and its political leadership remained unchanged. Hopefully, the lessons learned from Germany's case and the benefit of modern technological means and Security Council authority. The best way to ensure this in the long term is probably a political settlement in the Middle Eastern region.

The UNSCOM experience provides many lessons relevant to today's inspection process. Among the most important are the following:⁵⁹⁰

Maintain the unity of the Security Council. Although Iraq never fully complied with the earlier resolutions of the Security Council, neither did it fully ignore them. As long as the Security Council remained united, Iraq reacted in a way that at least kept UNSCOM operational. When unity collapsed, Iraq ignored the Security Council.

586 See R. Ekeus, *The Iraqi experience and the future of nuclear non-proliferation*, in: Washington Quarterly (Autumn 1992), p. 71. In Security Council Resolutions the IAEA would not be addressed, but only its Director-General, so as to involve only IAEA's executive part and not its policy making organs.

587 D. Albright and M. Hibbs, op. cit., p. 4.

588 M. ElBaradei, Statement to the UN Security Council, March 7, 2003.

589 See J. Molander, *The United Nations and the elimination of Iraq's weapons of mass destruction: the implementation of a cease-fire condition*, in: F. Tanner (ed.), *From Versailles to Baghdad; post war armament control of defeated states*, UNIDIR, 1992, pp. 154-155.

590 The conclusions are summary of J. Krasno, and J. Sutterlin, *The United Nations and Iraq: Defanging the Viper*, Westport, CT 2003. Understanding the Lessons of Nuclear Inspections an Monitoring in Iraq. A Ten-Year Review, Sponsored by the Institute for Science and International Security 14-15 June 2001; Garry Dillon, former Leader, IAEA Action Team, Ephraim Asculai, Senior Research Fellow, ISIS, Michael Eisenstadt, Senior Fellow, Disarming Iraq Problems and Prospects, The Washington Institute for Near East Policy, 5 December 2002. To examine the problems and prospects of disarming Iraq of its weapons of mass destruction (WMD), the United States Institute of Peace held a briefing for senior congressional staff on 20 November 2002. Panelists James Sutterlin, Yale University lecturer and co-author (with Jean Krasno) of *Defanging the Viper: The United Nations and Iraq* (an Institute-funded book on the UNSCOM experience); David Kay, Potomac Institute senior fellow and former UN chief nuclear weapons inspector; and Jonathan Tucker, Institute senior fellow and former member of UNSCOM, provided their perspectives and engaged in a wider discussion of the issues.

Maintain the credibility and relative independence of the inspection process. UNMOVIC's leadership must be credible and retain the confidence of the Security Council, especially the five permanent members. The first executive chairman of UNSCOM was able to do this, the second was not.⁵⁹¹

On-site inspections are critical. UNSCOM demonstrated that there is no substitute for on-site inspections keyed by timely and accurate intelligence in generating the critical information necessary to determine compliance. Information provided by defectors and informants was often invaluable in uncovering hidden weapons programs.

Maintain a credible military threat for non-compliance. Inspections backed by a credible threat to use force to ensure compliance are essential, according to Kay. But, as Sutterlin argued, "Resort to a limited use of force is likely to be counterproductive. In fact, American and British bombings attempting to force Saddam Hussein to cooperate with inspectors had the opposite effect. They gave him an excuse to stop all cooperation without fear of a full-scale attack and at the same time weakened support in the Security Council for UNSCOM."

The capability and experience garnered by UNMOVIC still of course exists pending a decision by the Security Council about the organisation's future. Leaving aside the question of whether UNMOVIC will ever be permitted to complete its mission in a sovereign Iraq, it would seem that the international community would be unwise to simply let UNMOVIC be abolished or to waste away. Having invested an enormous amount of effort and funding in the organisation, a way should be found to preserve and nurture its capacities, both human and material, and its institutional memory.⁵⁹²

The international community should overcome its fragile consensus⁵⁹³ and use the occasion to encourage and provide support to regional countries interested in establishing Weapons of Mass Destruction Free Zones (WMDfZ), such as the zone that has been proposed in the Middle East. The regional approach, which has gained favour in recent years, suggests that whenever possible, regional organizations can join with international organizations, such as the IAEA, to ensure the application of the obligations of the international non-proliferation regimes. This could lead to more effective in integrating the countries of the region in bearing responsibility for overseeing the fulfillment of the regional states' international obligations.

591 Hans Blix, the executive chairman of UNMOVIC, must spend a great deal of time and energy personally briefing the Security Council. At the same time, UNSCOM's effectiveness derived to a large extent from remaining relatively independent of the UN Secretariat, allowing it to maintain the necessary freedom for highly intrusive action the respect of the Iraqi leadership, and to obtain and process the sensitive intelligence that the success of the operation depended upon. See the discussion *idem*.

592 T. Findlay, *op. cit.*

593 *Fragile Consensus of the Security Council*. While the UN Security Council voted unanimously in favor of inspections, there are nevertheless significant divisions among its members, not least the permanent representatives, on the threat posed by Iraq; the inspections process could expose these divisions and thereby undermine its unity.

5.6. Prospects and proposals: United Nation Verification Agency for Peacemaking, peace-keeping and peace-building

It has been suggested that the UN Security Council act more often on proliferation issues, or as a last resort to make states comply to treaty obligations.⁵⁹⁴ Yet, it seems doubtful that the Council will be able to gain consensus on such action.⁵⁹⁵ The Iraqi case is rather unique; most situations are less clear cut. The failure of North Korea to comply with the NPT has been a test-case in this regard. The Security Council has reacted very cautiously, as it wanted to avoid provoking a veto from China, which has preferred to take a non-confrontational approach toward North-Korea. In July 1993 the US concluded an agreement with North Korea, in which the latter would accept IAEA inspections. Under the terms of a subsequent Security Council resolution, the IAEA Director-General is required to report back to the Council on compliance. This resolution could pave the way for Security Council action in the case of non-compliance, but that is mainly dependent on China's position. In fact, most Council members might want to avoid punitive action, when a cooperative approach possibly including an agreement with South-Korea can in the long term provide better chances. However, if UN mandatory inspections (not necessarily in the framework of sanctions or military action) would be undertaken in the future, the experience of UNSCOM offers a wealth of expertise and infrastructure.

Another issue related to the future role of the United Nations in verification, is the lack of coordination of diverse international efforts on non-proliferation. Several proposals have been made ranging from establishing a UN 'umbrella' verification organization to a UN function as 'clearing house' for information. The latter option seems to be the most realistic one, and several UN activities in data exchanges already point in that direction. In addition, some distribution of roles may emerge between the UN and regional organizations, most notably the CSCE and NATO.

In addition, arms control and verification must be placed in the wider framework of UN activities as described in table 9 with respect to preventive diplomacy, peacemaking, peacekeeping⁵⁹⁶ and post-conflict peace-building.⁵⁹⁷ More attention should be paid to the disarmament dimension of peace and security and the operations aspect of peace-building including, inter alia, the verification of overall mission objectives, including supervising, monitoring and verifying the withdrawal of foreign forces and their non-return; monitoring the cessation of outside military assistance to parties; locating and confiscating weapons and military supplies; supervising the regrouping and relocation of military forces to designated cantonment areas and verifying the process of demobilization, arms limitation and arms reduction. The United Nations may, upon request, provide such monitoring and could assist the parties involved in their monitoring activities in other instances. The United Nations should better prepare itself for its increasing, and increasingly complex, verification tasks in peace operations by exploring how it might better

594 See, for example, R. Ekeus, op. cit., p. 73.

595 See, for example, T.R. Pickering, in: *Arms Control Today* (June 1992), p. 9.

596 Peacemaking is diplomatic action to bring hostile parties to a negotiated agreement through peaceful means.

597 See the report by the UN Secretary General B. Boutros-Ghali, *New dimensions of arms regulation and disarmament in the post-cold war era*, op. cit., and his report *An Agenda for Peace*, New York 1992.

standardize its verification procedures, including the development of a range of verification “protocols” outlining the verification methods applicable to particular objectives.⁵⁹⁸

Verification and monitoring in peace operation remains a neglected backwater of study in the peace operations field. Trevor Findlay, in the recent publication of VERTIC on Peace operations and the military dimensions of verification⁵⁹⁹ explain the differences between the verification of arms control and disarmament agreements on the one hand and of peace agreements on the other.

The verification of peace agreements is usually less well defined and less well organised than is the case with arms control agreements. Particularly in the case of arms control agreements dealing with weapons of mass destruction, where even minor breaches can have enormous strategic and political implications, verification systems are minutely negotiated and highly organised. In peace agreements there is almost an expectation of imperfection, since it is recognised that during the winding down of armed conflict there is often a period of prolonged uncertainty before the situation settles down. Minor infractions are often overlooked on the grounds that they may not necessarily presage the emergence of more significant challenges to an agreement and that to overreact to them might jeopardise the continuing peace process. In the implementation of peace agreements there is often an expectation that monitoring and verification activities will not be prolonged and that therefore they can be makeshift and hence easily terminated. In arms control it is at least implicitly recognised that monitoring may be required in perpetuity. More robust systems therefore tend to be instituted.⁶⁰⁰

Table 8: Selected UN activities in peace related verification missions⁶⁰¹

UN peace operation	Mandate source for verification (including military tasks)	Measures
UN-Iran-Iraq Military Observer Group (UNIMOG) 1989-91	Security Council resolution Verify and supervise ceasefire and troop withdrawal	No special measure
UN Angola Verification Mission I (UNAVEM I) 1989-91	Security Council resolution Verify redeployment and withdrawal of Cuban troops	Military observers (Milobs) teams for ad hoc inspections; joint Commission for liaisons and coordination.
UN Angola Verification Mission II (UNAVEM II) 1991-93	Security Council resolution Verify compliance with peace accords Verify that the parties are adequately monitoring ceasefire	Milobs: observation posts, patrols; Joint Political Military Commission and subsidiary committees.

598 UN/ A/50/377, op. cit. point 279.

599 T. Findlay, *Peace operations and the military dimensions of verification*, Verification Yearbook 2001, The Verification Research, Training and Information Centre (VERTIC), pp. 160-172.

600 Idem, p. 161.

601 United Nations, *The Blue Helmets*, third edition, New York 1996; United Nations, *The United Nations and Mozambique, 1992-1995*, UN Department of Public Information, New York 1995; United Nations, *The United Nations and Somalia, 1992-1996*, UN Department of Public Information, New York 1996; United Nations, *The United Nations and the Iraq-Kuwait Conflict, 1990-1996*, UN Department of Public Information, New York 1996; United Nations, *Disarmament and Conflict Resolution Project, Managing Arms in Peace Processes Series*, Geneva 1995 (all volumes).

UN peace operation	Mandate source for verification (including military tasks)	Measures
UN Observer Group in Central America (ONUSAL) 1989-92.	Security Council resolution 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 and verify weapons inventories.
UN Mission for the Referendum in Western Sahara (MINURSO) 1991-present	Security Council resolution Monitor ceasefire, verify reduction of troops and confinement of certain troops to specified locations.	Milobs with short-notice inspections.
UN Angola Verification Mission III (UNAVEM III) 1995-97	Security Council resolution Lusaka protocol and Accords de Paz Monitor and verify cease-fire, assembly of troops and demobilisation, disarmament, formation of new armed forces	Milobs and Joint Commission framework
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; notifications and inspectors; Joint Military Commission with IFOR as chair.

In the new international context, exacerbated ethnic, religious, linguistic or other group interests represent sources of tension leading, when they take the form, inter alia, of aggressive nationalism or aggressive separatism, to open armed confrontation in an intra-State context. Peacekeeping was pioneered by the United Nations (UN) in May 1948, with the establishment of the UN Truce Supervision Organization during the first Arab-Israeli war.⁶⁰² The maintenance or restoration of peace, is one of the central tenets, in fact even the *raison d'être*,⁶⁰³ for the existence of the UN, and this is reflected in the Preamble to the UN Charter, which states unequivocally, that the “peoples of the United Nations determined to save succeeding generations from the scourge of war”.

As table 9 demonstrates, United Nations as a neutral third party could be valuable for restoring confidence between the parties involved. United Nation could play the role of fact-finding missions and related activities to, inter alia, ascertain the accuracy of declarations respecting the nature, deployments or activities of military forces. Such measures, however, can make meaningful contributions to peacemaking only to the degree that they are credible; that is, they must be seen to address the concerns of the parties and they must be effectively implemented and these measures have to be undertaken from the very beginning of the crisis.

United Nation verification activities can be an essential ingredient in this process if it is able to provide credible evidence about compliance with obligations that are assumed during the peacemaking process or timely evidence of non-compliance so that breaches can be satisfactorily addressed.

602 Basic Facts about the United Nations. UN Dept of Public Information 1998.

603 Report of the Panel on United Nations Peace Operations. Available at www.un.org/Dept/dpko Accessed 15 Nov 2000. The panel described the UN's principal mission as helping communities engulfed in strife and maintaining or restoring peace.

These suggests to the reform of U.N. peacekeeping in an effort to strengthen the verification regimes and build new ones to support the peacekeeping effort. These should include among others a Satellite Monitoring Agency to augment the capabilities of the verification agency to monitor undeclared weapons facilities and assist in conflict prevention, peacekeeping and confidence-building measures and economic sanctions.⁶⁰⁴

Efforts to limit arms proliferation can only be effective on a twin track with political solutions and security guarantees. It is also in this context that the spreading use of verification in such fields as peacekeeping and elections must be seen.

Legal procedures to facilitate the collection and destruction of small arms and light weapons have gained considerable importance for peace agreements and mandates of peacekeeping missions. Specific and adequate measures for the disarmament, demobilisation and reintegration of ex-combatants are essential for the success of efforts to secure reconciliation and stable peace building.⁶⁰⁵

6. Export Controls

The notion of export controls was born at the beginning of the cold war with the aim of controlling all exports of sensitive items and technologies that could not only be diverted to military use but could also contribute to a potential enemy's capability.⁶⁰⁶

Export controls are an aspect of arms control that is characterized, not so much by one particular verification regime, but by a propensity to layer various negotiating frameworks and verification systems. The network of monitoring systems reflects the perception of national interest in maintaining sovereignty over all aspects of trade activities, particularly those of sensitive military items, and an increasing proclivity to strengthen regimes through mutually-reinforcing layers.⁶⁰⁷

The effort to limit the transfer of militarily sensitive technology has been dominated by political circumstances and objectives, as well as national economic goals, and only recently have certain states begun to recognize a common interest in limiting the spread of this technology. Perceptions of national interests have long discouraged individual states from delegating their authority over export controls to any multilateral or supranational organizations, and have led to disputes over interpretation of those multilateral agreements that have been implemented. However, the end of Cold War confrontation and the demonstration by the Gulf War of the dangers of proliferating weapon technology have opened the way for the

604 UN/ A/50/377, op. cit., point 280.

605 As stated in Security Council Resolution 1265 (1999), the excessive accumulation and destabilising effect of small arms and light weapons pose a considerable impediment to the provision of humanitarian assistance and have a potential to exacerbate and prolong conflicts, endanger the lives of civilians and undermine security and the confidence required for a return to peace and stability. Hence clear and detailed arrangements for the destruction of surplus arms and ammunitions are to be worked out, often under high time pressure.

606 See R. Cupitt, *Reluctant Champions: U.S. Presidential Policy and Strategic Export Controls, Truman, Eisenhower, Bush and Clinton*, New York 2000. G. Bertsch and M. Beck, *Nonproliferation Export Controls: A Global Evaluation*, Athens 2000. D.A. Hicks, *Final Report of the Defence Science Board Task Force on Globalization and Security*, Washington, DC December 1999.

607 See US Export Control Act 1949.

addition of common perspectives and efforts that should match the globalization of trade forces with globalized means of control and verification.

Today one can identify three different frameworks for the implementation, including verification, of export controls – national, multilateral, and regional. It is important to note, however, that the framework that actually *ensures* the implementation of export controls may not be identical with the framework within which the principles behind the controls are agreed. The following discussion illustrates, that *common precepts are often established within an organization of states, and implemented but the states themselves*.⁶⁰⁸

6.1. National Controls

Within the “national framework” of implementation and verification individual states are responsible for all aspects of applying restrictions on trade. A nationally implemented export control system may also be conceived at the national level, as was the American MacMahon Act of 1946, which restricted the transfer of nuclear technology to any other nation. However, one also finds *multilateral agreements* on the principles of limiting technology transfers within which each individual state remains singly responsible for the implementation and maintenance of these controls.

Today's various systems of national responsibility for export controls date from the beginning of the Cold War when they were directed primarily at preventing the export of items that would add to the military and economic capabilities of the Soviet Union, its satellite states, and the PRC.

6.2. Multilateral Controls

The **Multilateral Control system (CoCom)** was set up in 1949 to coordinate export controls among NATO allies on an item list designed by the US Administration and agreed unanimously by CoCom members.⁶⁰⁹ CoCom remains an *unofficial, non-treaty, coordinating organization* for NATO allies'⁶¹⁰ *nationally* based trade restrictions. Verification remained the responsibility of national customs and commercial licensing officials, often of several different agencies within a single government. By the late 1960s, however, dissatisfaction among American allies as well as American industries led to a reconsideration of the strict item lists. More limited aims of preserving Western superiority in defense-related technologies replaced the practice of full-scale “economic warfare”.

National responsibility for enforcing the agreed export controls led to debate over varying degrees of lenience in interpreting and monitoring controls, notably in the 1980s as the weight of restrictions became a drag on participants' economies.⁶¹¹ In 1984, a program of Third Country Cooperation was initiated with the aim of broadening CoCom membership and effectiveness, but “Few CoCom members have actively pursued such agreements; the agreements negotiated do not systematically

608 See C. Ahlström, *Status of Multilateral Export Control Regimes, An Examination of Legal and Non-legal Agreements in International Co-operation*, September 2000.

609 Three separate lists actually exist: The International Munitions List, the International Atomic Energy List, and the Industrial List, which covers all other dual-use products and technologies.

610 Not including Iceland.

611 In 1987, the DOC found that nearly 90% of license applications were for transactions between allies and the direct costs of the system to the US economy were estimated at \$7 to 10 billion. See, *Balancing the National Interest*, p. 21.

cover all goods controlled by CoCom; and the cooperating countries exhibit uneven will in implementation and enforcement”.⁶¹² A 1987 Department of Commerce study showed that US industry suffered proportionally more from the system than its partners due to a more rigorous and complex system of controls, licensing and enforcement.⁶¹³ Whereas CoCom controls generally cover only export and import of restricted items, the US exercises unilateral controls on the *re-export* of any US items to third countries, on American-owned transnational companies and on foreign products that have any components or technologies of American origin.⁶¹⁴

The revolutionary events of the late 1980's and early 1990's and the dissolution of the Warsaw Pact against which CoCom restrictions were directed, led to a re-evaluation of the political justification and target of export controls. By May 1991, the CoCom list was reduced by over half of its items – the majority from the categories of telecommunications equipment, computers, and machine tools – A policy of “favorable consideration” was announced for licenses to most Eastern European destinations, and a “license-free zone” was created within CoCom. Where technology transfers to the Eastern bloc were once limited in order to weaken their military potential, critics of export controls now assert the *benefits* of increased technology transfers to central Europe in an effort to foster market reforms and democracy.⁶¹⁵

Consequently, demand has also grown for effective verification of the peaceful use of this technology. Contract-based arrangements have permitted *end-use guarantees* and *on-site monitoring* by officials of the supplying country.⁶¹⁶ Such efforts to reduce absolute prohibitions on the transfer of technology in favour of strengthening control “raise difficult questions of safeguards, verification and limits to intrusions in national sovereignty that can be expected in a technologically interdependent world”.⁶¹⁷

Accordingly, on the 16th of November 1993, in The Hague, at a High Level Meeting (HLM), representatives of the 17 COCOM member states agreed to terminate COCOM, and establish a new multilateral arrangement, temporarily known as the “New Forum”, which led to Wassenaar Arrangement. Created in 1994 and governs international transfers of conventional weapons and related dual-use goods and technologies, it received final approval by 33 co-founding countries⁶¹⁸ in July 1996

612 National Academies of Science and Engineering and the Institute of Medicine, *Finding Common Ground: US Export Controls in a Changed Global Environment*, National Academies Press, 1991, p. 176.

613 National Academies of Science and Engineering, *Balancing the National Interest*, Washington 1987, p. 21.

614 National Academy of Science and Engineering and the Institute of Medicine, *opt. cit.*, 1991, p. 167.

615 W.J. Long, *Proliferating Problems: An Assessment of US Efforts to Manage Strategic Technology in the 1990s*, p. 3.

616 For example, Control Data Corporation's export of six CYBER 960 mainframe computers was permitted to a civilian nuclear power program in the former USSR on the condition that US officials could perform on-site inspections to guarantee the peaceful use of the technology.

617 W.J. Long, *op. cit.*, p. 4.

618 Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Luxembourg, Netherlands, New

and began operations in September 1996. Its purpose is to contribute to international security and stability by promoting greater responsibility and transparency in transfers of arms and sensitive dual-use goods and technologies. Unlike its predecessor, the Cold War-era Coordinating Committee for Multilateral Export Controls (COCOM), which was created to restrict exports to the former Eastern bloc, Wassenaar is not targeted at any region or group of states,⁶¹⁹ but rather at “states of concern” to members. Wassenaar members⁶²⁰ also lack veto authority over other members' proposed exports, a power that COCOM members exercised.

At their last plenary meeting in December 2001, Wassenaar members agreed for the first time to amend the arrangement's July 1996 founding document, the Initial Elements. The members added a paragraph to the Initial Elements calling on members to continue to prevent terrorist groups and individuals from acquiring conventional arms and dual-use goods and technologies. Members also agreed at the plenary to voluntarily report on exports of bridge-launching vehicles and gun-carriers designed specifically for towing artillery. Meeting in Vienna December 11-12, the 33-member Wassenaar Arrangement approved a document setting out nonbinding guidelines for exporting small arms and light weapons but failed to agree on other initiatives largely due to Russian opposition.⁶²¹

The **Australia Group (AG)** is another informal export control group. The OECD countries came together in the Australia Group in 1984 to cooperate in tightening export controls on substances that can be used to fabricate chemical arms. Australia Group was established in 1985 as a response to the use of chemical weapons in the Iran-Iraq War, and the MTCR was established in 1987 in response to missile developments in the 1970s and 1980s. Established in 1985, the Australia Group is a voluntary, informal, export-control arrangement through which 33 countries, as well as the European Commission, coordinate their national export controls to limit the supply of chemicals and biological agents-as well as related equipment, technologies, and knowledge-to countries and non-state entities suspected of pursuing chemical or biological weapons (CBW) capabilities.⁶²² All countries are members of the 1997 Chemical Weapons Convention (CWC) and the 1972 Biological Weapons Convention (BWC) and have stated that they view the Australia Group as a practical

Zealand, Norway, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom and United States.

619 See A G-7 Embargo on Iran?, in: Mednews (19 April 1993); E. Sciolino, U.S. Asks Europe to Ban Arms-Linked Sales to Iran, in: New York Times (10 June 1993); K. Katzman, Iran: U.S. Policy and Options, in: Congressional Research Service Report 97/231 F (11 February 1997), p. 8. See S. Coll, Technology From West Floods Iran, in: Washinton Post, (10 November 1992); L. Helm, Japan Reluctant to Back Embargo on Iran; Tokyo Distances Itself From Policy on Exports to Tehran, in: Los Angeles Times (13 November 1992).

620 Wassenaar members agreed that all information exchanges, notifications, and Wassenaar discussions be kept confidential.

621 W. Boese, *Wassenaar Members Adopt Small Arms Initiative*, in: Arms Control Today (January/February 2003).

622 The 33 states participating in the Australia Group are Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The European Commission also participates. Several other countries, including Russia, Ukraine, India, and China, have national export controls for some, but not all, of the items on the group's lists.

way to uphold the core purpose of these accords: preventing the spread of chemical and biological weapons, and informal agreement among a group of states with a common aim of limiting the transfer of chemical weapons materials and technology. This informal grouping performs two functions.

First, together they agree on lists of products and materials to which export controls will apply.

The *Core List* is comprised of production equipment and precursors to chemical arms, to which, according to a May 1991 agreement, export controls should be applied when transferred to a country outside the Australia Group.

The *Warning List* describes fifty dual-use products, which should be monitored within national industries so that a suspect flow of these materials to any state that might try to develop chemical arms will trigger further investigation.

Second, the 21 states *exchange information*⁶²³ regarding trade in chemical substances, with the aim of preventing the illegal construction or transfer of chemical arms and components. A similar organization, known as the Leipzig group existed among Warsaw Pact states prior to its dissolution but its members have since adopted the AG guidelines. However, no formal multilateral organization has been created, and states retain full responsibility for drawing conclusions from the exchanged information and for the implementation of agreed restrictions.

Unfortunately, the implementation of these controls has not been consistent between states, many of which have been slow to put the agreed guidelines into practice. The Chemical Weapons Convention signed in January 1993 significantly tightens restrictions on chemical weapons components and dual-use chemicals by providing detailed lists of suspect substances,⁶²⁴ but it does *not* dismantle individual state mechanisms in favour of a multilateral group, as several developing states had suggested.⁶²⁵

Developing countries have also questioned the Australia Group's relationship to the CWC and BWC. Countries in the Non-Aligned Movement (NAM), for instance, have repeatedly asserted that they already made legally binding commitments not to acquire CBW by signing the biological and chemical weapons conventions⁶²⁶, and that the Australia Group is at odds with the BWC provision for the “fullest possible technical exchange” for the advancement of peaceful scientific endeavours. Participants of the Australia Group, however, maintain that the group complements CWC and the BWC and serves the same goals. A U.S. State Department official

623 Since 1985 the 21 adherents have met at the Australian Embassy in Paris, once every six months to exchange intelligence on chemical weapons proliferation and coordinate common controls.

624 Article I of the CWC requires States Parties to the Convention to refrain from actions which would assist others to acquire chemical weapons. Article VI requires States Parties to ensure that the transfer of toxic chemicals does not take place for purposes prohibited by the Convention, and Parts VI, VII and VIII of the Annex on Implementation and Verification impose specific restrictions on the trade in chemicals listed in the Schedules to the Convention.

625 The developing countries consider that the CWC has its own set of trade controls in Article VI and there is no need to maintaining of an export control regime outside the CWC. The developing countries consider AG as undermining the right to economic and technological development.

626 Arms Control Association, Fact Sheet, The Australia Group at a Glance, September 2003.

explained that “the Australia Group offers another layer of control, but one-in the U.S.'s view-that is consistent with the U.S.'s obligations under the chemical and biological weapons treaties”.⁶²⁷

The **Missile Technology Control Regime (MTCR)**⁶²⁸ represents a more contemporary export control system involving multilaterally agreed principles, but it too rests on the principle of *national* controls. Established by the US Departments of State and Commerce in 1987 to handle export controls on goods and technology that could be used to produce missiles with payloads of more than 500 kilograms and ranges greater than 300 kilometres, MTCR multilateral cooperation involves an agreement to respect the export denials of other participants and to share national intelligence findings on “projects of concern”.

The Multilateral agreement is a critical element, but actual controls remain the responsibility of national authorities in member states. Individual states thus retain full sovereignty over their transactions. All transfers are considered on a case-by case basis and guidelines are implemented through national legislation by state agencies and customs authorities. The decision to allow any export remains the sole and sovereign judgment of the individual government and that government is responsible for ensuring the peaceful end use of the item.⁶²⁹

The advantage of such a system is that it surmounts the need for difficult, if not impossible, negotiation of detailed lists of forbidden transactions, while still committing individual members to the principles of controlling arms trade. Each nation is left to interpret common principles and policy in the manner it deems appropriate. The regime's membership is not limited to that of any specific organization. Still adherence to the MTCR has grown in recent years⁶³⁰ although it does not include all key suppliers, and even some non-members, most importantly China, have agreed to abide by its guidelines.

However, several serious criticisms can be leveled against the MTCR's dependence on national implementation.⁶³¹

627 Quoted in L.R. Ember, *Stemming the Tide*, in: Chemical and Engineering News (15 July 2002), p. 8.

628 MTCR members, followed by the year they joined the regime, are: Argentina (1993), Australia (1990), Austria (1991), Belgium (1990), Brazil (1995), Canada (1987), the Czech Republic (1998), Denmark (1990), Finland (1991), France (1987), Germany (1987), Greece (1992), Hungary (1993), Iceland (1993), Ireland (1992), Italy (1987), Japan (1987), Luxembourg (1990), the Netherlands (1990), New Zealand (1991), Norway (1990), Poland (1998), Portugal (1992), Russia (1995), South Africa (1995), South Korea (2001) Spain (1990), Sweden (1991), Switzerland (1992), Turkey (1997), Ukraine (1998), the United Kingdom (1987), and the United States (1987).

629 See K. Bailey, *Can Missile Proliferation Be Reversed*, in: Orbis. A journal of world affairs (Winter 1991), p. 9.

630 Several European states, Warsaw Pact members and Australia have all joined the MTCR.

631 See Anthony et al, *Multilateral weapon-related export control measures*, SIPRI Yearbook 1997. See also I. Anthony et al, *Multilateral weapon-related export control measures*, SIPRI Yearbook 1995, especially pp. 622-630 and A. Butfoy, *Common Security and Strategic Reform: A Critical Analysis*, London 1997, Chapter 5; D. Mistry, *Ballistic Missile Proliferation and the MTCR: A Ten-Year Review*, in: Contemporary Security Policy (December 1997).

First, national controls differ widely between national legislations, thus offering a comparative commercial advantage to those states that have less stringent controls. An unfortunate consequence is the trend for all partners to adopt the position of the “least common denominator” or least comprehensive implementation of the agreed principles, in order to maintain commercial competition. In 1993 already, differences between the American and Chinese interpretations of the controls threatened the regime's fragile consensus on principles of non-proliferation.

Second, licensing procedures for national controls are laborious and bureaucratic. Detailed procedures add costs to relevant exporting industries – again bestowing a commercial disadvantage on states with strict procedures and lowering incentives to abide by the rules. Meanwhile “customs controls and licensing authorities are all under the control of governments, which can override stated policy in the interest of making money”⁶³² and can easily adapt transaction reports so that technical requirements are filled without any real check on intended uses.

Third, the secrecy that surrounds the “projects of concern”, based on national intelligence sources, establishes an image of the regime that determines the attitude of non-regime countries toward cooperation. This makes it “difficult to engage the cooperation of other countries and industry when neither the rationale for controls nor the targets can be identified”.⁶³³ This factor is particularly significant given the emergence of a robust black market for technology in the Third World and interstate cooperation for ballistic missile development. Especially in the aftermath of the September 11th, the U.S. has been working to strengthen the AG to address better chemical and biological weapon proliferation and terrorism.⁶³⁴

Lastly, the increasing internationalization of arms production has posed considerable challenges to nationally administered arms transfer controls. This in itself is the result of two phenomena:

The first is the multiplying number of suppliers as states once dependent on the Big Five weapons producers are now investing in indigenous arms production and looking for markets to support these efforts.

The second trend is the proliferation of dual-use technology in a growing number of consumer industries. This technology, while potentially useful to weapons development programs is much harder to control without inflicting heavy burden on non-military trade.

Both phenomena imply *a larger number* of actors that should be considered for any effective verification of export control principles to be really effective.

6.3. Global controls

The globalization of trade in dual use technology and spread of arms production has generated support for a *global “layer”* of export control implementation. At a political level, this multilateral cooperation, even during the Cold War years,

632 P. Lewis, *How can controls be effectively and efficiently verified and enforced?*, in: International Control of the Arms Trade, Oxford Research Group, Current Decisions Report, Number 8, April 1992, p. 52.

633 Finding Common Ground, p. 134.

634 See, J. Schlosser, Director, Office of Export Controls and Sanctions Bureau of Nonproliferation, Department of State, Multilateral Nonproliferation Treaties and Regimes, Transshipment Enforcement Conference, Barcelona, Spain, 20 May 2002.

contributed to international nonproliferation norms, reduced the quantity of sensitive equipment, services and technology on the market and helped strengthen nuclear export guidelines.⁶³⁵ Meanwhile, as Herbert Wulf describes it, multilateral cooperation is capable of confronting practical realities of world trade. “Multilateralism in arms transfer control appears to be of particular importance to prevent possibilities for companies to transfer equipment or parts of weapon systems internationally by moving it internally within the company. National legislation no longer seems adequate”.⁶³⁶ The precedent for globally organized controls has already been set in the control on nuclear and biological weapons.⁶³⁷

The earliest existing model for such controls are those organizations that have been established to restrict the uses of nuclear technology to non-military ends. The first of these, the **Zangger Committee**, was formed in 1974 by agreement among certain exporting parties to the Nuclear Non-proliferation Treaty. The Treaty itself is the principle mechanism for the control of nuclear and dual-use items, and although it does not specifically obligate its participants to establish and execute broad export controls, the commitment is implicit within the Treaty responsibilities.⁶³⁸ The Zangger Committee thus formalized NPT party responsibilities by agreeing on a “trigger list” of exports “especially designed or prepared” for nuclear use and thus requiring the acceptance of IAEA safeguards and a promise of “no explosive use”. *Common understandings* of prohibited exports have been established within the Committee to eliminate differing interpretations that might offer commercial advantages to a party.

The **Nuclear Suppliers' Group** (NSG), also called the “London Club” was established in 1978 in order to expand the membership and content of the nuclear technology export control regime in the aftermath of 1974 Indian nuclear test. The Nuclear Suppliers Group was established in 1975 after India – a nonnuclear weapons state – tested a nuclear explosive device in 1974 and was strengthened after the 1991 Gulf War and revelations of Iraq’s efforts to develop weapons of mass destruction. Because this group was not directly affiliated with the NPT, France⁶³⁹ was willing to participate, and the list of controls and restraints was more comprehensive than the Zangger Committee's NPT-based list. In addition to the Zangger list requirements, the NSG requires exporters to *ensure* that exports are not used to make nuclear explosives of any kind, to provide adequate physical *protection* to all exports, and to *exercise restraint in the export of sensitive technologies*.⁶⁴⁰ At a 1992 meeting in

635 W.C. Potter, *New Nuclear Suppliers*, in: *Orbis. A journal of world affairs* (Spring 1992), p. 206 f. See also W.C. Potter, *Nuclear Proliferation: US-Soviet Cooperation*, in: *The Washington Quarterly* (Winter 1985), pp. 141-154.

636 H. Wulf, *How will limitations impact on the defence industry, and how could their concerns be addressed?*, in: *International Control of the Arms Trade, Current Decisions Report*, Number 8, April 1992, pp. 21-22.

637 Through provisions of the 1968 NPT and 1972 Convention on the Prohibition of Bacteriological and Toxin Weapons.

638 Articles I and II pledge all parties not to “directly or indirectly” transfer any nuclear explosive devices and not to “assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire” these prohibited nuclear capabilities.

639 France had not yet joined the NPT, but under the presidency of President Giscard d'Estaing was willing to participate in other non-proliferation efforts.

640 Including reprocessing, enrichment and heavy water production technologies.

Warsaw, by which time the NSG comprised 27 supplier states, these countries agreed on common export controls for a list of 65 dual use technologies and undertook not to transfer nuclear facilities, equipment, material, or technology to non-nuclear weapons states without full-scope IAEA safeguards.⁶⁴¹

The NSG Guidelines include a number of important conditions to control the export of nuclear-related items. For export of items on the NSG Trigger List, the NSG Guidelines currently require (1) an agreement between the IAEA and the recipient state requiring the application of safeguards on all fissionable materials in its nuclear activities (also known as “full-scope IAEA safeguards”) – not just on the exported items, (2) physical protection against unauthorized use of transferred materials and facilities, and (3) restraint in the transfer of sensitive facilities, technology, and materials that could contribute to the acquisition of plutonium or highly enriched uranium.

The **United Nations Arms Register** represents a further step in the globalization of export control measures. This register is based on the idea that increased transparency of arms trade will deter illicit transfers by encouraging all states to monitor more closely the activities⁶⁴² on their territory and by “encouraging a more explicit customer-supplier relationship”⁶⁴³ It will also provide an agreed database on which future efforts and organizations could be built. As a means of verification, the Register offers two particular assets.

The Register includes *all* procurement, not just exports. Although declarations are purely voluntary for all UN members, a greater source of information and an organized system of processing it offer greater opportunities to notice illicit transactions or suspicious procurement patterns. This is an important resource for Member States, but also for the various UN organs or other international organizations that could employ the collected data in verification of existing and future arms control and peacekeeping agreements.⁶⁴⁴

The UN Register is a landmark because it recognizes a *global interest* in national or bilateral arms deals and reinforces the legitimacy of such global efforts in a field long preserved by national sovereignty.

Nevertheless, few problems still characterize the multilaterally implemented export controls that exist so far.

First, the UN is based on the “sovereign equality of all its Members”, but because trade restrictions are oriented towards the restriction of arms technology to certain Members, they imply discrimination between Members. Although export controls are compatible with the UN recognition of the right to individual and collective self-defense, their implementation must be balanced with the rights and norms of the

641 The new multilateral controls were then published as INFCIRC/254 Part 2. See Arrangements adopted at the Meeting of Adherents to the Nuclear Supplier Guidelines, Warsaw, 31 March – 3 April 1992, published in PPNN Newsbrief Number 18, Summer 1992, p. 13.

642 Initially, states are only requested to submit information on arms transfers, but they will be invited to also to provide reports on arms production and their overall military inventories, leaving the possibility of expanding the regime in the future.

643 O. Greene, *How important is the UN Register, and what improvements are needed*, in: International Control of the Arms Trade, Oxford Research Group Current Decisions Report Number 8, April 1992, p. 6.

644 For a discussion of current UN roles in verification, see previous section.

international community. This issue is particularly important in the context of UN development efforts; technology controls are seen by some as a threat to Third World development efforts and many of these countries fail to see the advantages in non-proliferation efforts that can hold back more vital national development.

Second, countries who use arms transfers as an aspect of foreign policy continue to be hostile to the idea of international controls, which restrict their leeway to determine their national interest in each case.⁶⁴⁵

Third, and probably most importantly, the advantages of objective international control of technology transfer restrictions must be weighed against the intrusive character of any regime that wishes to open a state's trading practices to international examination and debate.

6.4. Regional Controls

Regional frameworks are a third format for the organization of export controls and implementation of monitoring systems. In combination with the national and multilateral controls described above, regional controls offer a third layer to export control regimes. While no regional organization currently exists for the sole purpose of implementing export controls, some states in different regions are considering joint action in this field.

The European Community has gone furthest to date in negotiating a regional export controls initiative. Euratom, has regulated European trade in nuclear materials as opposed to national authorities, since its creation in 1958, although in 1984 several sensitive items were exempted from this regulation in favour of intra-community notification and approval procedures. However, the same regional cooperation until recently was not possible for the control of conventional arms exports, which were considered vital to effective and sovereign foreign policies.

The post-Cold War, post-Maastricht European Union has changed this stance. Examination of Iraqi technology sources after the Gulf War revealed that every member of the Community, although some more than others had, violated stated principles of arms and technology transfer restraint.⁶⁴⁶ This generated increased support for a common policy that would make Community-based controls more effective. The Single Market, by eliminating many of the border controls that are an important aspect of national export controls, provided an additional incentive to cooperate in the implementation of "common standards" and the "alignment" of national policies.

The Maastricht agreement includes non-proliferation efforts and the transfer of military technology within the domain of the agreed common security policy, despite the original Treaty of Rome exemption of security-related trade from community controls. A common list of embargoed items, criteria for export, and common licensing procedures have been agreed to within a High Level Working Party as well as a list of dual-use items and guidelines.

645 F. Pearson, *How can the foreign policy goals of exporter nations, now satisfied by exports, be achieved effectively with weapons transfer control*, in: International Control of the Arms Trade, Oxford Research Group, Current Decisions Report, Number 8, April 1992.

646 See H. Muller, *The Export Controls Debate in the "New" European Community*, in: Arms Control Today (March 1993), pp. 10-14.

However, many critiques have been addressed to the EC's efforts to coordinate export controls. The possibility of regional implementation of controls may overcome some of the weaknesses of uneven or biased national implementation, but the EC goals of aligning policies may be still quite different from actually harmonizing national policies. Within the EU, agreement on export controls has come from within European Political Cooperation (EPC mechanism). A NGO study indicated, "There is a need for a body whose role is to ensure that the harmonized system of arms and dual-use goods export control system, once agreed upon, is functioning effectively ... The Member States will have to adopt a common approach not only in the *making* of the policy, but in its *execution*".⁶⁴⁷

While perhaps the furthest developed as yet, EU regional export controls are not unique. A Peruvian proposal aims to prohibit the future purchase, transfer and manufacture of advanced conventional weapons in Latin America. The Mendoza Agreement signed by Argentina, Brazil, Chile, and Uruguay commits its participants not to develop, produce, acquire, or transfer biological and chemical weapons in the region. The Declaration of Cartagena renounced the possession, production, development, use, testing and transfer of all weapons of mass destruction in Bolivia, Colombia, Ecuador, Peru, and Venezuela and called for stronger controls on all transfers.⁶⁴⁸

6.5. Conclusion: the synergy of layered regimes

The export control issue is currently in a broad state of flux as policy makers attempt to reconcile the changes in the international security system⁶⁴⁹ and the perilous spread of lethal conventional, nuclear, biological, and chemical weapons technology with the urgency of development issues in various regions and the demands of the defense industries in a time of rapid down-sizing.

Disagreements often stem from the fact that licensing decisions are based on national interpretations of regime rules. These are in turn steered by the interests of participating states rather than a common norm or a common perception of the risks posed by particular transfers.⁶⁵⁰

During this period of re-evaluation, two principles seem particularly important.

Although the multiplicity of overlapping export control regimes described above may at first glance seem extremely complex and undeniably represents undesired duplication of bureaucracy, one cannot forget that each of these regimes has managed to institute valuable consensus on sensitive and crucial issues. "Melting" these regimes in an effort to streamline bureaucracy would risk the loss of those

647 *Arms and Dual-use Exports from the EC: A Common Policy for Regulation and Control*, Saferworld, December 1992, p. 102.

648 Disarmament newsletter of the World Disarmament Campaign 10/1 (February 1992).

649 After 11 September certain decisions that were difficult to take in the framework of the regimes may have become possible. Particular attention is being paid to the following questions: the development of procedures for sharing information related to licensing and enforcement; the development of a more harmonized approach to risk assessment and the identification of programmes of concern; the development of common approaches to end-user controls in countries where programmes of concern are located; and how to apply controls to new types of commercial practices in a changing market. I. Anthony, *Multilateral export controls*, SIPRI Yearbook 2002.

650 I. Anthony, op. cit., 2002.

accomplishments. Rather, these efforts can be seen to work in synergy with actors at the national, global and regional level sharing the burden of their enforcement.

Second, industry represents one “layer” of this system, which cannot remain under represented. States are asking certain industries within their boundaries to refrain from specific types of trade in the interest of international security. As it is the industry that will thus bear the burden of effective implementation of arms control regimes, one cannot ignore their role in the negotiation and implementation of export controls. This role for non-state actors in regards to trade across national borders is what sets export controls so far apart from other types of arms control efforts.

The effectiveness of export controls during the Cold War was based on several factors. Most importantly, the United States possessed a significant edge over most other supplier countries in the production of key, enabling technologies. The United States and its allies clearly agreed on the target of export controls, namely the Soviet bloc. And we joined in a highly coordinated effort to implement such controls.

None of these factors exist today in any large measure. While the United States most certainly enjoys a technological edge in some areas of production, foreign competitors often provide the same or similar products in the global market. And while many of us come together to discuss the issue of export controls quite frequently – and indeed, coordinate our efforts more formally in the various multilateral export control regimes – it is clear that the international export control system in place today lacks the cohesion and common purpose of the old Coordinating Committee for Multilateral Export Controls.⁶⁵¹

Multilateral export control regimes are consensus-based, voluntary arrangements of supplier countries that produce technologies useful in developing weapons of mass destruction or conventional weapons. The regimes aim to restrict trade in these technologies to keep them from proliferating states or terrorists. However, the regime lack effective verification regime, they cannot enforce members’ compliance with regime commitments. For example, Russia exported nuclear fuel to India in a clear violation of its commitments, threatening the viability of one regime. Despite the expectation to report export denials; the United States did not notify the Australia Group between 1996 and 2002 that the U.S. government denied 27 licenses to export Australia Group-controlled items to such countries as China, India, and Syria.⁶⁵² The summary of the Report of the United States General Accounting Office (GAO) to Congressional Committees on Non-proliferation strategy needed to strengthen Multilateral Export Control Regimes⁶⁵³ is relevant.

The U.S. government faces a number of interrelated obstacles in trying to:

First, the difficult process of making consensus-based decisions limits options for reforming the regimes. Under the current process, a single member can block regime decision-making.

651 Remarks of J.J. Jochum, Assistant Secretary of Commerce for Export Administration Bureau of Industry and Security, Globalization of Export Controls and Sanctions London, England, 11 November 2002.

652 Report of the United States General Accounting Office (GAO) to Congressional Committees on Non-proliferation strategy needed to strengthen Multilateral Export Control Regimes October 2002. Appendix III describes the export denial reporting procedures for each regime, available at www.gao.gov/cgi-bin/getrpt?GAO-03-43.

653 Idem.

Second, the voluntary and nonbinding character of the regimes means that they have no explicit tools to enforce members' compliance with their non-proliferation commitments. For example, the Nuclear Suppliers Group had no direct means to impede Russia's export of nuclear fuel to India, an act that the U.S. government said violated Russia's commitment to that regime.

Third, the rapid pace of technological change in a globalized economy makes it difficult to keep control lists current because these lists need to be updated more frequently.

Fourth, "secondary proliferation", the growing capability of non-member countries to develop technologies used for weapons of mass destruction and trade them with other countries of concern, undermines the regimes' ability to prevent proliferation. For example, North Korea has exported significant ballistic missile-related equipment, components, materials, and technical expertise to countries of concern, including Iran also, Pakistan.

Finally, there are no specified or agreed-upon criteria for assessing the regimes' effectiveness, despite the stated goal of strengthening their effectiveness.

Chapter 3 The Trends and Future of Verification

The preceding chapters have described the development of verification agreements. They have analysed and compared the various elements. This last chapter will attempt to go beyond the facts of existing agreements and trace observable trends in the principles and practice of verification and identify issues that mark the continuing debate over this subject.

In trying to understand the fundamental reorientation and restructuring of the verification regime and its role in international relations (in view of today threat to international, regional and nation security). It is necessary to evaluate the core principles of the “Sixteen Principles for Verification,” that have dominated the negotiation of most of the verification regimes and those, which are suggested as a basis for governing the establishment and performance of verification systems. Section II demonstrated that the “Sixteen Principles for Verification,”⁶⁵⁴ have been used in most of the verification regimes as guiding principles. This first part of this chapter would first draw four important conclusions that highlight the required modification in the guiding principles: adequacy, non-discrimination, transparency and confidentiality⁶⁵⁵ in order to fulfill the challenges of verification in 21st century.

Adequate and effective verification could require the employment of different and varied information gathering techniques, such as national technical means, international technical means, and internationally accepted inspection procedures, including on-site inspections.

As the discussion in the Conference on Disarmament (CD) in Geneva, Switzerland concerning the issue of a fissile material cut-off treaty (FMCT) leading to the adoption of INFCIRC/540, the Model Protocol, demonstrate that positive verification activities are insufficient for providing the necessary assurance that an inspected state is not producing fissile material for use in nuclear explosives. Negative verification, which is more difficult than positive verification, requires much more sophisticated equipment and the use of additional information to direct the inspectorate to the proper place, site, or facility.⁶⁵⁶

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

Even though, equality of rights among states is a principle, in practice, most of developing countries have no technical and financial capacity to participate in the process of negotiation and effective implementation of international verification agreements. For instance, in 2003 a number of allegations were made that states had

654 Which were formulated in 1987-88 by the United Nations Disarmament Commission (UNDC) and adopted by the UN General Assembly in 1988.

655 They draw from and take into account, in part, the “Sixteen Principles for Verification”.

656 J. Sokolsky, *The Revolution in Military Affairs and the Future of Arms Control and Verification*, prepared for the International Security Research and Outreach Programme International Security Bureau, February 2001. pp. 76-78.

acquired or possess chemical or biological weapons.⁶⁵⁷ Many of the published allegations are from United States.

Therefore, one of the challenges of future verification regime is to assure mutuality and reciprocity in order to avoid the state that is not granted equal rights (technically or financially) distrust the verification mechanism, and to impose unilateral restrictions on the verification teams' freedom of action. Enabling the states to fully participate in the inspection activities not only brings trust to the system, but also opens up all states to all mechanisms and techniques of verification. In turn, this mutuality creates a better understanding of the verification activities.

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

The manner in which some intelligence information was characterized and used by the UK and the USA regarding Iraq has raised doubt as to whether ad hoc coalitions can be sufficiently certain of the accuracy of their information. The public estimates of Iraq's capabilities that were produced by the coalition partners differed from those reported by UNMOVIC. According to a February 2003 fact sheet produced by the US Department of State, 1.5 tones of VX were still unaccounted for. The fact sheet also stated that the UN estimated that Iraq was able to produce 26 000 liters of anthrax spores and 38 000 liters of botulinum toxin.⁶⁵⁸ British assessments of Iraqi capabilities and Iraqi concealment efforts were presented in two dossiers: the first published in September 2002,⁶⁵⁹ and the second published in February 2003.⁶⁶⁰ Both dossiers appear to contain inaccuracies. For example, the September dossier stated that "some of these [chemical and biological] weapons were deployable within 45 minutes of an order to deploy them".⁶⁶¹

Confidentiality is critically important for effective multilateral verification. For a state to agree to disclose sensitive information relating to its national security, or for a business to divulge commercial proprietary information, strong assurances must be offered that such information will be properly protected by the responsible international verification agency.

The effort put into verifying each state should be the amount required for this state, taking into account not only its size, and the number of nuclear sites, installations,

657 Owing to the frequent, and sometimes exclusive, use of the term "weapon of mass destruction" in some allegations, however, it is unclear in a number of cases what type of weapon (nuclear, chemical or biological) is referred to.

658 UNMOVIC Working Document and US Department of State, Iraq's hidden weapons: failing to disclose and disarm, Fact Sheet, 27 February 2003, available at www.state.gov/documents/organization/18130.pdf.

659 British Government, Iraq's Weapons of Mass Destruction, the Assessment of the British Government, London 24 September 2002, available at URL www.officialdocuments.co.uk/document/reps/iraq/iraqdossier.pdf.

660 Iraq: its infrastructure of concealment, deception and intimidation, in: No. 10 Downing Street (January 2003), available at www.number-10.gov.uk/files/pdf/Iraq.pdf. This dossier was the subject of some controversy after it was revealed that sections had been taken from a doctoral thesis without attribution.

661 British Government, op. cit., 2002, p. 5.

and facilities on its territory, but also the assessment – based in part on the information available from NTM and other sources, on past cooperation and transparency history, and on the verification experience with this state – on the effort needed for verification.

Multilateral arms control and disarmament regimes offer a framework for states to agree politically sensitive matters that might not otherwise be resolved. The implementation of routine verification measures also offers a degree of transparency and confidence that ad hoc coalitions cannot provide. Most countries do not have the resources or capability to follow international developments related to the possible misuse of chemical and biological substances.⁶⁶² However, transparency is more important in cases where the goal is negative verification. When a state engages in concealment activities, as Iraq had under the Action Team's inspection effort, the fruits of verification are tainted. The relationship between the Iraqi authorities and the Action Team was non-cooperative and full of mutual distrust. Iraq only acknowledged aspects of its program when independent physical evidence came to light. Iraq limited the Agency's verification activities. The lesson is that a "technically coherent" picture of a state's activities is not necessarily a complete picture. The IAEA has recognized this distinction in many statements it has made, but remains ambiguous in other statements and is trying to maintain that some negative verification goals are fully achievable and capable of reaching conclusive results.⁶⁶³

1. The Trends

One group of trends in the evolution of the concept and implementation of verification concerns the *participants* in these negotiations and resulting regimes. The variety of agreements signed at bilateral, global, and regional levels illustrate the growing number and variety of participants in verification arrangements. Whereas early arms control verification provisions were negotiated in bilateral frameworks between the superpowers, or, despite the formal adhesion of a greater number of states, could only be implemented by a small number of states in possession of advanced technologies⁶⁶⁴, today's arms control negotiations incorporate a broader range of actors. This expanded cast results from (two) separate phenomena.

First, following the model of the NPT verification regime, both "haves" and "have nots" are commonly included in multilateral negotiations and the methods of verification defined are designed not to exclude any participant from their implementation. For example, the Chemical Weapons Convention has been signed by many states that are not known to possess any such arms, and representatives

662 See J. Hart, F. Kuhlau and J. Simon, *Chemical and biological weapon developments and arms control*, SIPRI Yearbook 2003: Armaments, Disarmament and International Security, Oxford 2003, p. 231; N.A. Sims, *Biological disarmament diplomacy in the doldrums: reflections after the BWC Fifth Review Conference*, in: Disarmament Diplomacy 70 (April–May 2003), available at www.acronym.org.uk/dd/dd70/70op2.htm; and M. Chevrier, *Waiting for Godot or saving the show? The BWC Review Conference reaches modest agreement*, in: Disarmament Diplomacy 68 (December 2002/January 2003), available at www.acronym.org.uk/dd/dd68/68bwc.htm.

663 Merriam-Webster's Collegiate Dictionary, available at www.m-w.com/home.htm.

664 Although the Antarctica Treaty, the Enmod Treaty and the Outer Space Treaty were all signed in global frameworks, only a small number of adherents possessed the means to verify other states.

from all signing states participate in the verification organization (the OPCW). Likewise a comprehensive test ban treaty, not just among the declared nuclear powers in the Security Council and proposals for verification focus on an international seismic monitoring network, this globalisation of arms control and verification agreements is supported by the ever-increasing membership to the NPT regime, highlighted in 1993 when South Africa became the first unofficial nuclear weapon state to dismantle a nuclear weapons program and adhere to the treaty. The decision by Libya to verifiably demonstrate to the international community that it no longer possesses chemical, biological and other weapons suggests that, in at least some cases, it is less tenable in the current international security environment for a country to maintain a policy of ambiguity as to whether it possesses NBC weapon programmes.⁶⁶⁵ The decision also suggests that more and more nations demonstrate the willingness to accept and participate in verification measures than been isolated from international communities.

The introduction of verification schemes within regional agreements represents a second factor in the multiplication of participants. By negotiating verification mechanisms with a small number of neighbours, regional frameworks often recruit participants who have rejected larger frameworks. For example, Argentina and Brazil have not signed the NPT but cooperate in a bilateral verification regime that accepts full-scope IAEA safeguards.

The importance of a diversity of negotiating frameworks is thus an important factor in extending the principle of verification. These “overlapping” systems reinforce one another, and, as in the case of the Euratom safeguards, which under agreed terms substitute for IAEA activities, can reduce the costs of global efforts while maintaining a satisfactory level of effectiveness. Perhaps more importantly, the overlap of such regimes is often an essential factor in establishing the credibility of verification efforts. Global systems that are acceptable for open, democratically-ruled states outside regions of acute tension may not offer an adequate level of credibility among less trusting actors. In such cases, stricter measures of verification and sanction, which would not be acceptable within larger, and more diverse frameworks, may be implemented. For example, a complete ban on nuclear materials, unacceptable within a set of actors that includes the industrialized countries, may be implemented on a regional level to provide adequate levels of security among a smaller set of actors in a region of high tension.

A regional verification regime has the following responsibilities:

Monitor refreezing/dismantling

Verify Compliance with treaties and coordination with international organisations (so far mainly with IAEA)

Verify Denuclearisation Agreement

Verify Dismantlement and Reduction Terms

665 In December, Libyan President Colonel Muammar Qadhafi made a public commitment to disclose and dismantle his country's WMD, including its CW stockpile, following several months of secret negotiations with the UK and the USA. This commitment includes accepting international inspections in Libya to verify the destruction and the dismantling of such weapons and programmes. Libya publicly urged that the Middle East and Africa be made free of WMD. In January 2004 Libya acceded to the CWC.

Verification of mutual reductions or redeployment of conventional forces

Regional verification regime is a trend in “free zone” proliferation of nuclear weapons free zones in Latin America (the Treaty of Tlateloco), the South Pacific (Rarotonga), Africa (Pelindaba) and Southeast Asia (Bangkok).⁶⁶⁶ Similarly, the Organization on Security and Cooperation in Europe (OSCE) is based on a regional approach of verification.

In both the Middle East and South Asia, the negotiation of agreed limits on nuclear weapons is dependent on the negotiation and implementation of peace agreements and of a broader regional security structure.⁶⁶⁷ Assuming that the DPRK agrees to verifiably dismantle its nuclear weapons and freeze its long range missile programs, there are proposals⁶⁶⁸ to establish a regionally managed verification regime, staffed and sustained by all interested parties (Russia, China, ROK, DPRK, Japan, IAEA, and the US). This regime’s charter could be verification of all present and future nuclear agreements for both North and South Korea: Safeguards, weapon program dismantlement and measures included in the ROK/DPRK Denuclearisation Agreement of 1992. The “grand bargain” may require verification of missile and conventional force terms, as well. In order to contribute to a lasting and broadening reduction of inter-Korean tensions, a role in monitoring agreements on biological or chemical weapons could be considered for the future.⁶⁶⁹

On the other hand, purely regional systems may not be universally credible, so the duplication of commitments and verification mechanisms within a broader membership is important.

A second group of trends pertains to the objects of verification. As precedents of verification are established and the principles and methods refined, one can see a willingness to address more difficult tasks and to address a widening variety of objects and activities.

Early agreements provided for verification of easily identifiable activities and objects. For example, the original SALT accords were constrained by the abilities of NTM, the sole agreed method of verification. Thus, the treaty addressed only the number of ballistic missile launchers and defence systems that each country could possess. Strategic arms reduction treaty (START II), contrastingly addresses the specific number of warheads that each state may mount on missiles or stockpile. The Chemical Weapons Convention is another example of the trend toward more difficult verification tasks, tackling the identification of microscopic weapons whose dual-use

666 M. Hamel-Green, *Nuclear-Weapon-Free Zones: Peeling the Nuclear Orange. From the Bottom Up*, in: Disarmament Diplomacy 9 (October 1996).

667 See S. Freier, *A Nuclear-Weapon-Free Zone in the Middle East and Effective Verification*, in: Disarmament: A Periodic Review by the United Nations 16/3, pp. 66-91; G.M. Steinberg, *Arms Control and Regional Security in the Middle East*, in: Survival 36/1 (Spring 1994). For a general discussion of the link between conventional weapons limitation and nuclear arms control, see H. Muller, *Reforming the CD Agenda*, in: Disarmament Diplomacy 5 (May 1996).

668 As Joel Skolski, in his paper *The Revolution in Military Affairs and the Future of Arms Control and Verification*, February 2001, propose a universal verification mechanism that would be based on regional safeguards systems formed for this purpose. The basic arrangement for these systems will include mutual verification and regional judgment procedures.

669 J. Olsen, *Sandia National Laboratories Regional Verification of a Denuclearized Korean Peninsula: A Strategy for Success after the Current Impasse Is Overcome*, SAND2003-1390P, CMC paper, September 2003.

character necessitates a careful assessment of the context in which they are developed before compliance can be assured.

The UN Monitoring, Verification and Inspection Commission (UNMOVIC) and the International Atomic Energy Agency (IAEA) in Iraq is one of the most intensive and intrusive international verification undertaking ever.⁶⁷⁰ The United Nations Special Commission (UNSCOM), created by Resolution 687 of 3 April 1991, was mandated to verify the disarmament of Iraq's chemical and biological weapons and missiles with a range of more than 150 km and to operate a system of Ongoing Monitoring and Verification (OMV) to verify Iraq's compliance with its obligations not to reacquire WMD. The IAEA was mandated to verify Iraq's disarmament of its nuclear weapons program. On 17 December 1999 Security Council Resolution 1284 disbanded UNSCOM and replaced it with UNMOVIC. UNMOVIC inherited the mandate and responsibilities of UNSCOM as well as being tasked to establish a system of Reinforced Ongoing Monitoring and Verification (R-OMV). The IAEA resumed its mandate with regard to nuclear weapons. The whole decision about whether the UN Security Council should authorize war against Iraq or, alternatively, whether the United States, the United Kingdom and their allies should go it alone, was made contingent on the answer to a verification question: was Iraq already sufficiently in verifiable non-compliance or should UN inspectors be given additional time to make the case? Questions about the veracity, interpretation, and use or misuse of national intelligence information by both the British and the US governments in making the case for war reinforced for many observers the need for a multilateral verification process to be allowed to discern the truth.⁶⁷¹

At the same time, verification schemes are not limited to arms control agreements. The concept of a formal monitoring system was not born in the context of arms control and the technological and political developments that have surrounded the issue of arms control verification can be identified in many other verification projects as well. Environmental agreements, peacekeeping missions, and election monitoring are just a few of the issues to which the principles of verification and the relevant technologies are now applied.

Despite this remarkable “spread” of verification, verification regimes remain exclusively object-specific. With each new treaty, new coordinating mechanisms, databases, and, regulations are designed. Discussion on “melting” the various regimes or creating an over-arching verification organization has attracted very little interest. In fact, the distinction between the many different monitoring systems serves as a safety valve to ensure that disputes within one regime need not hinder the success of another.

As table 10⁶⁷² demonstrate that the rules for monitoring and verification of environmental standards, as laid out by the Canadian Council of Ministers of the Environment, to rules laid out by the U.N. Peacekeeping Operations for

670 T. Findlay, *Multilateral verification in flux*, Verification Yearbook 2003. “Those of us who support multilateral verification can only despair at the fact that this endeavour – hastily deployed and equally hastily ended and superseded by war – was not given the opportunity to prove itself fully.” p. 1.

671 Idem.

672 From J. Ouellet, *Monitoring of Agreements*, 2004, available at www.beyondintractability.org/m/monitoring_agreements.jsp.

Disarmament, Demobilization, and Reintegration integrates are based on the basic principles of verification regimes of arms control and disarmament.

Table 9: Comparison of Monitoring Standards: Environmental, arms control and disarmament and general rules of monitoring.

Environmental Monitoring Standards ⁶⁷³	Disarmament & Demobilization Monitoring Standards	Generalized Monitoring Rules
Transparent and open communication of information	Develop monitoring plans prior to implementation	Transparency
Respect mandates and jurisdictions	Disputant parties have right to oversee monitoring	Open involvement of all parties
Shared responsibility for implementation	Military observers used for D&D; Civilian police monitors for public security	Third-party access to, provision of, verification of data regarding compliance
Timely sharing of data between parties	Verify compliance by Data cross-checking Reporting non-compliance Supplementary action by sanctioned military forces in search, seizure, and destruction	Open access to and cross-checking of data by all involved parties.
Third-party access to data	Cross-check data with disputant parties and independent sources	Use open and standardized measures for compliance
Protection of proprietary information	Procedures should be transparent	Take active role against spoilers
Use of scientific standards	Flexible methods: shift between self-enforcement and search & seizure	Allow fluid shift between observation, verification, and enforcement roles
Standardized data and data management	Persistent non-compliance should be referred to joint monitoring commission containing representatives from disputant parties	
Public accountability; transparency	Include disincentives for non-compliance	
Reciprocal notice in case of termination	Forcibly disarm spoilers	

A third area of trends in the evolution of verification regimes is found in the methods used. Technological advances facilitate verification efforts in two ways.

First as specific technologies become increasingly reliable, states are more willing to place their trust in monitoring systems. For example, the mastery of many seismic monitoring techniques is an important contributor to the renewed willingness of some states to negotiate a Comprehensive Test Ban.⁶⁷⁴ A major breakthrough in processing the seismic data came in the early 1970s with the declining cost and increasing power of small computers. In 1974 tape recording system was replaced by an on-line computer, which was programmed to automatically detect seismic signals, steer the array to locate the source of the signals, and store the data on digital tape. This leading to the possibility of achieving the Comprehensive Nuclear-Test-Ban Treaty (CTBT), which prohibits all nuclear test explosions, was opened for signature in New York on 24 September 1996, when it was signed by 71 States, including the five nuclear-weapon States.

673 Peacekeeping Tasks. John Hopkins University: P.H. Nitze School of Advanced International Studies. Johns Hopkins University: P.H. Nitze School of Advanced International Studies, Conflict Management Program, available at cmtoolkit.sais-jhu.edu.

674 The first multilateral negotiations on a CTBT took place in Geneva in 1958. These negotiations failed because the experts could not agree on the monitoring system to verify compliance with a ban on underground testing.

Second, technology is increasingly available to all parties. Given the widening membership of verification regimes, equal access to the methods of verification is an important factor for legitimacy. 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.⁶⁷⁵ The commercialisation of high-resolution satellite imagery is just one example of how the spread of verification technologies creates greater opportunity for arms control and verified agreements. Soon in the near future *any actor will have access* to materials that were hitherto the exclusive domain of highly industrialized states or national defence departments.⁶⁷⁶

Another methodological trend is the recognition of the importance of multiple sources of information. The ability to compare data sets acquired from on-site inspections, national technical means, country reporting and other methods reinforces the conclusions drawn in the process of verification. Not only are anomalies more likely to be detected by multiple probes, but ambiguities are less likely to be falsely judged if a suspicious source can be cross-checked with the data obtained by another method. This *layered approach* escapes dependence on either human intelligence or technology, neither will ever be infallible.

Increasingly there is 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.⁶⁷⁷ 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.

Consequently, the value of multiple sources acting in synergy demonstrates the advantage of sharing intelligence through any acceptable means. Voluntary information exchanges, such as the UN Conventional Arms Register, can provide an additional layer of data to compare with more technical monitoring techniques.

675 See www.unidir.ch/pdf/articles/pdf-art1931.pdf.

676 Space Liason International is now marketing 2 meter resolution images from the Russian archives and active satellites and Lockheed Aerospace and Missiles has announced plans to offer sub-meter resolution images on the commercial market as well as the CIA.

677 Data from NTM was shared beginning with the very first Iraqi inspection; as they became available clues on the Iraqi arms programs gained from HUMINT were shared; data collection techniques and analytical capabilities were put at the service of the inspection efforts; and even a collection asset a U-2 aircraft with sensors--has been leased to the United Nations. While the US intelligence community has taken the lead in assisting the United Nations, significant contributions have also been made by other coalition partners. None of these resources and techniques are panaceas, but without them it would not have been possible to mask a program as well hidden as that of Iraq. David Key, *Iraq and Beyond: Future Non-proliferation Inspection Challenges*, available at www.npec-web.org/essay/kay.htm.

Nor can the utility of national intelligence to multilateral verification efforts be ignored. Although the use of national intelligence sources has long been a taboo in the IAEA, the Agency now asserts the merit of incorporating outside intelligence sources in verification analysis.⁶⁷⁸ The use of national intelligence does not act as a sole source, but can confirm the positive correlation of collected information⁶⁷⁹, and indicate anomalous activities to be further investigated within the limits of an international verification regime.

This brings up the question of institutional set up. Some centralised data bank must be established so that information can be exchanged as close as possible to real time at least between governments willing to cooperate (a possible role for NACC or a transformed CoCOM). Yearly declarations as for the UN register is simply not quick enough particularly for trade in dual-use goods – in this sense the more transparency national governments can establish the better.

In recent years, the international community has become increasingly cognizant of the need to support and strengthen the United Nations. With a verification and compliance capability, the United Nations can play an important role in the implementation of an objective and effective verification regime for arms control. In the same way that peace-keeping has become a vital part of the United Nations' contribution to peace and security, UN verification can be a tool to help maintain international peace and security in the coming decade and through the coming century.⁶⁸⁰

2. Issues for the Future

This paper has attempted to provide an overview of verification principles and their development through various experiences, but if verification is to really achieve its aims, at least three issues remain to be addressed.

(a) The interdependence of verification technologies and political developments must be highlighted. No single technology can provide confidence in an agreement. Nor can one round of negotiations introduce lasting harmony and trust in an international relationship. The scientific and political foundations of a verification regime are worthless if separated.

Even though, technology plays a vital role in verification by permitting the rapid and systematic collection, collation, manipulation, analysis, storage, retrieval and dissemination of information. The political dimension, the questions of availability, utility and cost, will determine the advantages and the disadvantages of the technology.

In the future, technology would provide more detailed information but still they would require skilled human experts and analysts in order to be used as verification instrument and find the balance between inspection and confidence building. For

678 See Discussions in: IAEA on 93 +2 programme on strengthening the effectiveness of Safeguards and improving the efficiency of IAEA Safeguards, Vienna 1993. See also IAEA Press Release, PR 91/43 from 21 October 1991.

679 See I.H Daalder, *The future of Arms Control*, in: Survival Spring (1992).

680 D. Walter, *Verification Agency Inside or Outside the UN?*, available at www.rmc.ca/academic/gradrech/dorn21_e.html; see also D. Paul et al., (eds.), *Disarmament's Missing Dimension: A UN Agency to administer multilateral treaties*, Toronto 1990, pp. 129-132.

instance, today's advanced remote monitoring satellite from outer space has the advantages that their use does not need permission of the State that is being monitored.⁶⁸¹ This advanced monitoring technology can also generate unnecessary false alarms about non-compliance unless systems are in place to screen and analyse data carefully.

The other important issue is the equal access to verification technology. For the great majority of countries the access and the acceptance of advanced technologies are linked to the cost. High technology are expensive to purchase and maintain. Moreover, most nation, don't have the specialized personnel needed to install, operate and maintain particular types of technology and to analyse the resulting data. In the future, this may be overcome by restricting the system to commercially available technology or by making all the technology to be used and available to all parties.

A perfect verification system is impossible, even with quite intrusive means of inspection as in the case of Iraq. For example, even in the case of positive verification, it is unlikely that one can verify to the exact number compliance with any agreements that set a numerical limit in arms control regimes. Fortunately, this is not the requirement for verification of arms-limitation agreements, any more than it is for monitoring an intense arms race. What really matters is whether or not the inspection system offers a high degree of confidence that it could provide a warning before a dangerous situation develops.⁶⁸²

The existence of scientific methods and institutional precedents of verification does not guarantee the success of negotiations today unless the political will to enter into those negotiations is solid. Strategic revolution in superpower relations has offered a window of political will for the conclusion of many regimes, but many conflict-ridden regions have not experienced similar changes. It remains to be seen whether political will for verified arms control or other forms of conflict management can be successfully "imported" based on the observation of others' experiences.

For instance, the future success of the test ban treaty regime will depend on the strong political support of state-parties and their willingness to provide their political commitments technical, and financial support.⁶⁸³ And the many experts, scientists,⁶⁸⁴

681 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.

682 J.B. Wiesner, *op. cit.*, 1997, p. 1.

683 Clearly, the future of the CTBT verification system depends on the continued financial and technical support of the United States. Not only is the United States the single largest financial contributor for the establishment of the official verification system, but also the United States is a major source of technical support and expertise. In addition, the future of the CTBT verification system depends on the renewal of political support from the United States for the treaty itself. The United States is one of the nuclear-weapon states – if not the key state – that must ratify the CTBT in order to help secure the entry into force of the treaty.

684 Civilian researchers worldwide have continued to add additional seismic stations in key locations that enhance the overall nuclear test explosion monitoring capabilities and increase the overall verifiability of the CTBT.

diplomats, educators, and ordinary people around the world who support a permanent halt to nuclear weapons test explosions.

Characterizing the whole verification system of the START Treaty, one may conclude with confidence that it evolved into a reliable means by which to achieve the declared goals. Nevertheless, one should not forget the fact that without a solid political will and commitments from both side this system is diffusing, and that there is a danger that it will totally collapse before START officially ends in 2009. It is true – the U.S. and Russia have signed the so-called Moscow Treaty, and there is a good chance that the new agreement will get approval in both countries. However, the Moscow Treaty does not require any verification procedure for its implementation.⁶⁸⁵

The main reason for the existing situation is that the U.S. intends to take their dual-capable strategic delivery systems out of the arms control regime. Today, these platforms include submarines carrying long-range cruise missiles and strategic bombers. This list may also include land- and submarine-based ICBMs in the future. In the author's opinion, the principle danger to the multilateral reduction of nuclear arms is the reorientation of nuclear delivery means to conventional platforms.⁶⁸⁶ It is increasingly apparent that in order to build an efficient verification system, conventional delivery platforms must be covered as well.

(b) The changing nature of state sovereignty must also be taken into account in future implementation of verification principles.

Verification introduces an element of organized transparency within interstate relations. Access to and influence on military arsenals, national territory, and trade practices, all crucial factors in traditional definitions and of state sovereignty, are bargaining chips in international negotiations. Information once tightly guarded, and perhaps still classified even from the citizens of a state, can no longer be the exclusive domain of the sovereign state when commercial satellite operators are capable of collecting and marketing it. This is a reality, which must be faced before accepting or rejecting any agreement.

It follows that if a state does not hold exclusive domain to certain information, other actors may require consideration in future negotiations. The best examples of this can be found in the negotiation of the Chemical Weapons Conventions and the negotiation of export controls. In both cases, a state's ability to keep commitments hinges on the cooperation of industrial actors within its territory.

The existing verification regimes and export control mechanisms would need to deal with the threat posed by non-state actors “Mass Destruction Weapons (MDW) terrorism”. Here there are two important areas where the actual and future of verification regimes challenges:

The spread of nuclear and biological weapons and their convergence with terrorism poses the gravest danger to international peace and security. The actual verification

685 A. Diakov, T. Kadyshev, E. Miasnikov and P. Podvig, *What to Do with the Treaty on Strategic Offensive Reductions?*, in: *Nezavisimoye Voennoye Obozreniye* (20 September 2002). The text in Russian can be found at www.armscontrol.ru/start/publications/nvo092002.htm.

686 E. Miasnikov, *Precision Guided Weapons and Strategic Balance*, Center for Arms Control, Energy and Environmental Studies at MIPT, November 2000. The summary in English and links to the full report can be found at www.armscontrol.ru/start/publications/vto1100.htm.

regimes have to deal with the actual challenges of the 21st century the danger posed by failed, failing or weak states⁶⁸⁷; and the need to address global problems through multilateral approaches.

The other challenges is that so far, neither of the Export Control group nor the existing verification regime of bilateral and multilateral regimes are currently positioned to address a newly-identified concern: such as vulnerability the of multinational nuclear companies to possible penetration by employees loyal to non-state actors.⁶⁸⁸

The second important future actors in verification regimes require to consider is the relation between governments and non-governmental advocacy actors with respect to policy formulation and implementation on international security policies, in particular, within the context of the arms export control regime. The past years has demonstrated, that this development saw the close involvement of non-governmental actors in regional organizations. However, in the process of policy formation in international security in bilateral, multilateral as well as in the United Nations, Governments are still virtually the sole players. Of course, NGOs helped found the United Nations and are mentioned in the Charter. And NGOs have a long and proud history of fighting against tyranny, and providing humanitarian assistance to the victims of conflict and natural disaster.

And Kofi Annan says:

“NGOs have helped give life to the idea of an international community, an idea that is often questioned and mocked. The international community is, admittedly, a work in progress. And the State is not disappearing or ceding authority. But we have entered an era of ever-greater partnership, and there are few limits to what civil society can achieve.”⁶⁸⁹

(c) Most important of all, for verification to succeed, the issue of compliance must be addressed.

Although most verification regimes to date have included some sort of procedure to follow in cases of discovered non-compliance such as reference to the UN Security Council, the dismantlement of the Iraqi nuclear and chemical programs is the first example of multilateral enforcement of non-compliance to a regime agreement. The debate over the North Korean situation, however, drives home the fact that this punitive mechanism is far from accepted as a universal principle. Failure to respond to violations remains the greatest threat to the success of verification regimes, as enforcement is primarily a legal term. When an aggressor is collectively identified, there should be an escalating ladder of means until the situation is reversed – it is

687 Important security threats emanate from ungoverned space, the territory of failed and failing states, and areas within otherwise minimally functioning states where governance is absent. ISDP has been reviewing lessons learned from American-led post-conflict interventions and investigating how these might be applied in Iraq and Afghanistan. The Korean peninsula has also been a significant area of focus. The Center has been examining the military and economic implications of the end of the North Korean regime and of Korean unification.

688 Vann H. Van Diepen, Director, Office of Chemical, Biological, and Missile Nonproliferation Testimony Before the Senate Governmental Affairs Committee Subcommittee on International Security, Proliferation and Federal Services, Washington, DC July 29, 2002.

689 Secretary- General Kofi Annan at the non-governmental organization (NGO), *Forum on Global Issues*, UN Press Release SG/SM/6973, April 29, 1999.

only at the end of the ladder that enforcement would entail “all necessary means” i.e. military ones such as under Resolution 678 of the Security Council.

It is important to note at the outset that the non-proliferation regime, as it is framed by the NPT, serves to address the problem of vertical proliferation (by those states already possessing nuclear weapons) as well as that of horizontal proliferation (by those states which do not possess nuclear weapons but which actively seek to acquire them).

The sad fact is that since the NPT’s inception, the nuclear weapons states have shown scant inclination to fulfil their part of the bargain. As recently as the year 2000, the nuclear weapons states agreed to 13 practical steps to achieve nuclear disarmament. Their near-perfect record for failure in this pursuit is due primarily to the lack of political resolve in these countries to pursue complete disarmament. Without a serious effort by the nuclear weapons states to achieve nuclear disarmament, the discriminatory nature of the NPT will continue to allow nuclear weapons states to promote double standards that provide them special privileges while denying these same privileges to the non-nuclear weapons states a recipe for increased ill-will and distrust.

Today, the non-proliferation regime is in serious danger of unraveling altogether as witnessed by the fact that India, Israel and Pakistan have joined the list of states in possession of nuclear weapons; North Korea has withdrawn from the NPT and claims to have developed nuclear weapons; nuclear powers are seeking to upgrade and improve their nuclear arsenals; and a nuclear black market – capable of providing states and extremist groups with nuclear technology and weapons-grade material – has emerged. In order to meet the challenges of the 21st Century, the NPT – and the non-proliferation regime in general – is in urgent need of reconstruction.⁶⁹⁰

In order for a non-proliferation regime to be successful in the long term, the same standards must be applied to all states. This means that nuclear weapons states must engage with determination in fulfilling their long-overdue obligations to achieve nuclear disarmament. In today’s world, the only way to halt nuclear proliferation is to eliminate existing double standards and implement a more equitable universal regime that includes a strict timetable for nuclear disarmament, the criminalization of both horizontal and vertical proliferation, effective international enforcement mechanisms and adequate funding to achieve these goals.

However, the inherent double standard of the NPT, allowing the original nuclear weapons states to maintain their nuclear arsenals without a time framework for their elimination, while forbidding other treaty parties from possessing nuclear weapons, was a central weakness that has grown increasingly important over time. Dissatisfaction with the double standard has been exacerbated by the fact that the NPT failed to achieve its goal of preventing the nuclear arms race of the 70's and 80's, and also has had little success in facilitating significant progress towards elimination of nuclear arsenals in the post-Cold War period.

Finally, one should mention that entirely new challenges will emerge on the way to creating a multilateral verification system for nuclear disarmament. In particular, what could be the mechanism for information exchange between the parties? To what extent can the shared information be transparent to the world community? How

690 D. Krieger and C. Ong, *Disarmament: The Missing Link to an Equitable Non-Proliferation Regime*, available at www.wagingpeace.org/articles/2004/03/26_road-proliferation.htm.

can national technical means be efficiently implemented while taking into account that the parties have entirely different capabilities? What is the best strategy for implementing inspections? Should the parties inspect each other, or is there a need to create an international organization that will be responsible for inspections?

The importance of these questions can be illustrated during the UN inspections in Iraq. On one hand, the U.S. claim that they can prove that Iraq violated UN resolutions and therefore threaten to use force against Iraq, and on the other hand the U.S. is hesitant about providing the international community with the alleged proof.

Faced with this reality, must we conclude that it is futile to try to combat the spread of WMD through a collective, rule-based system of international security – and that we have to acquiesce to living in a world plagued with the constant threat of a nuclear holocaust or other disasters? I do not believe so. But reliance on a system of collective security to curb the proliferation of WMD will require bold thinking, a willingness to work together, and sustained effort. The following steps, among others, are in my view urgently required:⁶⁹¹

In order to be effective,⁶⁹² mechanisms addressing non-compliance should perhaps consist of three stages. A first stage involves a priori *decision to take some form of action* when a violation is discovered. Most regimes have addressed this stage in theory, if not in practice. The existence of a consultative forum is one version. In establishing such a mechanism for addressing anomalies, a regime has already indicated that violations will not be passively tolerated.

The second stage in the handling of non-compliance should spell out the consequences that follow the violation of the international norm at varying degrees. By objectively outlining suitable penalties in advance of sensitive situations and implementing at least symbolic sanctions even for very minor violations, a regime can bare its teeth to would-be violators.

In the absence of such established plans of recourse, the existence of the verification regime is threatened at the first moment it actually discovers the anomalies it has brought to the parties attention. In practice, one has avoided the disintegration of the regime, by using consultative mechanisms to present complaints of violations and then forgive them. These mechanisms have thus become fora to “consult, cooperate and *complain*”, but not to *sanction*. By implementing even minor penalties for un-cooperative or anomalous activities and thus removing the stigma against finding cases of non-compliance, the verification regime could become more credible and more effective.

The last stage of a non-compliance policy must ask the question “and then what?”⁶⁹³ Although a successful verification regime would serve as a deterrent to violations and could catch such aggressive action in time to prevent a situation where this question need ever be answered in practice, the credibility and contribution to

691 M. ElBaradei, *Must We Conclude That It Is Futile To Try To Combat The Spread Of WMD Through A Collective, Rule-Based System Of International Security?*, *Combating the Spread of Weapons of Mass Destruction: Some Reflections*, in: *Le Monde* (5 May), English translation provided on the IAEA website, www.iaea.org.

692 Many sources of non compliance can be managed by routine international processes. It is in the case of wilful non compliance that coercive sanctions have to be examined. See inter alia A. and A.H. Chayes, *On compliance*, International Organization, Spring 1993.

693 See F. Iklé, *After detection what?*, in: *Foreign Affairs* 39/2 (1961), pp. 208-20.

security made by any verification regime is in the end, contingent on the limits to which a state is willing to prosecute a determined violator,⁶⁹⁴. Ultimately, one must decide whether action against internationally agreed principles is equivalent to an act of war against the parties or not. Only by asking this question early enough and committing oneself to answer, can a state realistically pursue its national interest through a multilateral or international verification regime.

694 See C. Gray, *Does Verification really matter?*, in: Strategic Review (Spring 1990), p. 39.

Annex

Table 10: Proliferation Controls of Weapons of Mass Destruction⁶⁹⁵

	Nuclear Weapons	Biological and Chemical Components	Missiles	Strategic Goods
Multilateral Export Control Arrangement	Nuclear Suppliers Group (NSG)	Australia Group (AG)	Missile Technology Control Regime (MTCR)	Coordinating Committee for Multilateral Export Controls (COCOM)
Members of Arrangement	Australia, Austria, Bulgaria, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, Switzerland, U.K., U.S.(27)	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Luxembourg, Netherlands, Portugal, Spain, Sweden, Switzerland, U.K., U.S.(22)	Argentina, Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Sweden, New Zealand, Spain, U.K., U.S.(21)	COCOM countries: Australia, Belgium, Canada, Denmark, France, Germany, Greece, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Spain, Turkey, U.K., U.S. (17)
	Others states applying some NSG standards: All NPT parties require IAEA safeguards on exports; Argentina, South Africa apply some additional NSG rules.		Others applying standards: PRC, Israel, Russia	Others fully cooperating: Austria, Finland, Ireland, Sweden, Switzerland, Hong Kong, New Zealand CCF countries
Multilateral Sanctions	NSG to "consult" regarding possible sanctions in event of nuclear test by non-nuclear weapon states	Based upon national law	No multilateral sanctions mechanism	Ad hoc consultations, based on national law

Table 11: Membership States of multilateral military related export control regimes
Information current as of 1 August 2002

State	Zangger Committee	Nuclear Suppliers Group	Australia Group	Missile Technology Control Regime	Wassenaar Arrangement
Argentina	X	X	X	X	X
Australia	X	X	X	X	X
Austria	X	X	X	X	X
Belarus		X			
Belgium	X	X	X	X	X
Brazil		X		X	
Bulgaria	X	X	X		X
Canada	X	X	X	X	X
Cyprus		X	X		
China	X				
Czech Republic	X	X	X	X	X
Denmark	X	X	X	X	X
Estonia					
Finland	X	X	X	X	X

⁶⁹⁵ Source: Adapted from G.K. Bertsch and R.T. Cupitt, *Non Proliferation and Export Control*, in: Washington Quarterly (Autumn 1993).

State	Zangger Committee	Nuclear Suppliers Group	Australia Group	Missile Technology Control Regime	Wassenaar Arrangement
France	X	X	X	X	X
Germany	X	X	X	X	X
Greece	X	X	X	X	X
Hungary	X	X	X	X	X
Iceland			X	X	
Ireland	X	X	X	X	X
Italy	X	X	X	X	X
Japan	X	X	X	X	X
Kazakhstan		X			
Korea, South	X	X	X	X	X
Latvia		X			
Lithuania					
Luxembourg	X	X	X	X	X
Moldova					
Netherlands	X	X	X	X	X
New Zealand		X	X	X	X
Norway	X	X	X	X	X
Poland	X	X	X	X	X
Portugal	X	X	X	X	X
Romania	X	X	X		X
Russia	X	X		X	X
Slovakia	X	X	X		X
Slovenia	X	X			
South Africa	X	X		X	
Spain	X	X	X	X	X
Sweden	X	X	X	X	X
Switzerland	X	X	X	X	X
Turkey	X	X	X	X	X
Ukraine	X	X		X	X
UK	X	X	X	X	X
USA	X	X	X	X	X
Total	35	40	33	33	33

Table 12: Multilateral Treaties

Treaty	Verification clause	Specific provisions relating to verification clause	Compliance procedure clause	Withdrawal clause
Declaration of St. Petersburg (1868)				
Hague Conventions (1899) and (1907)				
Covenant of the League of Nations (1919)		The Members of the League undertake to interchange full and frank information as to the scale of their armaments, their military, naval and air programmes and the condition of such of their industries as are adaptable to warlike purposes. Additionally, a permanent Commission shall be constituted to advise the Council on the execution of, among other things, the above provisions.	A permanent Commission.	
St. Germain Convention (1919)				
Convention relating to the Non-Fortification and Neutralisation of the Asland Islands (1921)				
Washington Naval Conference (1922)				
Convention on the Limitation of Armaments of Central American States (1923)		Six months after the coming into force the Contracting Governments shall submit to the others a complete report on the measures adopted.		
Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (1925)				
Brussels Treaty of	Protocol III, parts II;	That the Federal Republic agrees to supervision by	Agency of Western European Union	

Treaty	Verification clause	Specific provisions relating to verification clause	Compliance procedure clause	Withdrawal clause
Collaboration and Collective Self-Defence Among Western European States WEU (1948) Protocol (1948)	annex I Protocol IV, parts I and II	the competent authority of the Brussels Treaty Organization to ensure that these undertakings are observed. Creation of an Agency for the control of armaments, inspection of budgets and statistics, test checks	for the Control of Armaments.	
Geneva Conventions (Relative to the protection of civilian persons in the time of War) (1949) Protocol I (1977)		To establish a Protecting Powers regime: guarantee representatives or delegates access to all places where protected persons are, particularly to places where protected persons are, particularly to places of internment, imprisonment, detention and work; to interview the protected persons, to enquire into any facts alleged, institute an enquiry...	The Protocols establish an International Fact-Finding Commission.	
Statute of the International Atomic Energy Agency (1956)		To establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities, and other information, to establish control over the use of special fissionable materials received by the Agency, to examine the design of specialized equipment and facilities, including nuclear reactors, to assist in ensuring accountability for source and special fissionable materials, to send inspectors....	Board of Governors – UN Security Council	
Antarctic Treaty (1959)	Article VII	To promote objectives and ensure observance: observers, inspection, freedom of access, overflight, advance notice of all expeditions, all stations and any military personnel or equipment...	Article XI (having the possibility to refer to the ICJ)	Article XII, 2 (c)
Partial Test Ban Treaty (1963) (Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water)		Since it was envisaged that verification under this Treaty would be carried out by national means only, no provisions for verification were included in the text.		Article IV
Latin American Denuclearization Treaty (1967) Article 7, 12 and 13		To ensure compliance: creation of a panel, creation of control system, IAEA safeguards, information sharing, reports, inspection, free access.	Article 24 "Agency for the Prohibition of Nuclear Weapons in L.A." (possibility to refer to the ICJ)	Article 30
Outer Space Treaty (1967)	Article X and XII	To promote international co-operation: on a basis of equality to be afforded an opportunity to observe the		

Treaty	Verification clause	Specific provisions relating to verification clause	Compliance procedure clause	Withdrawal clause
		flight of space objects launched. Open installations on the basis of reciprocity, consultation...		
Treaty on the Non-Proliferation of Nuclear Weapons (1968)	Article III	Conclusion of safeguard agreements with the International Atomic Energy Agency for exclusive purpose of verification of peaceful uses to nuclear weapons...	Board of IAEA, UN Security Council	Article X
Seabed Treaty (1971)	Article III	To promote the objectives and insure compliance: observation, consultations, further procedures as may be undertaken...	Article III: (3), (4) and (5) to Security Council	
Biological Weapons Convention (1972)	Article V	To consult and to co-operate in solving any problems...	Article VI Security Council	Article XIII (2)
Convention on the Prohibition of Military or any other Hostile use of Environmental Modification Techniques (ENMOD) (1977)		To consult and to cooperate in solving any problems, to create a Consultative Committee of Experts in order to transmit a summary of its findings of fact.	Article V, Consultative Committee of Experts, Security Council	
CFE Treaty (1990)	Article XIII, XIV and XV	To ensure compliance: right to conduct and the obligation to accept inspections, to use national or multinational technical means of verification...	Article XVI, Joint Consultative Group	
CWC (1993)	Article IV, V and VI, Verification annex	To set out a comprehensive regime for international monitoring through declarations and on site inspections of activities not prohibited, as in the chemical industry of parties...	Article XIV	Article XVI

Table 13: Bilateral Treaties

Treaty	Verification Clause	Specificque provisions relating to Verification clause	Compliance procedure Clause	Withdrawal clause
ABM Treaty (1972)	Article XII; XIII	<p>1. For the purpose of providing assurance of compliance with the provisions of this Treaty, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.</p> <p>2. Each party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article.</p> <p>3. Each party undertakes not to use deliberate concealment measures which impede verification by national technical means of compliance with the provisions of this Treaty. This obligation shall not require changes in current construction, assembly, conversion, or overhaul practices.</p> <p>idem ABM.</p>	Article XIII Standing Consultative Commission	Article XV
SALT I Treaty (1972)	Article V; VI		Article VI Standing Consultative Commission.	Article VIII: (3)
Threshold Test Ban Treaty (1974)	Article II; Protocol	To provide assurance of compliance: use national technical means, noninterference, consultation, information sharing, inquires. Protocol: information exchange on basis of reciprocity, prior notice of new testing... op. cit. ABM.		Article V (2)
SALT II Treaty (1979)	Article XV		Article XVII Standing Consultative Commission.	Article XIX (3)
INF Treaty (1987)	Article XI and XII	To ensure compliance: on-site inspections, inspections both within the territory of the other Party and within the territories of basing countries, inspections at all missile operating bases and missile support facilities, inspection to verify the elimination. To ensure compliance: use national technical means of verification...	Article XIII Special Verification Commission	Article XV (2)
START Treaty (1991)	Article IX, XI and XII	To ensure compliance: to conduct inspection on data update, new facility, suspect-site, reentry vehicle, postexercise dispersal, conversion or elimination,	Article XV Joint Compliance and Inspection Commission	Article XVII (3)

Treaty	Verification Clause	Specific provisions relating to Verification clause	Compliance procedure Clause	Withdrawal clause
		close-out, formerly declared facility, to conduct inspection during technical characteristics exhibitions and distinguishability exhibitions, continuous monitoring activities...		
START II 1993)	Article IV and V	National technical means of verification, inspections, establish Bilateral Implementation Commission,...	Article V Bilateral Implementation Commission	Article VI (4)

Table 14: Principles of Verification; extracts from UN document A/45/375

<p>In 1988, the General Assembly endorsed a set of 16 principles of verification developed by the Disarmament Commission (Assembly resolution 43/81 B). The 16 principles resulted partly from the preceding three paragraphs of the Final Document, which were used as a basis for the work of the Commission. The principles, which could be useful guidelines in the negotiations of arms limitation and disarmament agreements, are:</p> <p>“(1) Adequate and effective verification is an essential element of all arms limitation and disarmament agreements.</p> <p>(2) Verification is not an aim in itself, but an essential element in the process of achieving arms limitation and disarmament agreements.</p> <p>(3) 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.</p> <p>(4) Adequate and effective verification requires employment of different techniques, such as national technical means, international technical means and international procedures, including on-site inspections.</p> <p>(5) Verification in the arms limitation and disarmament process will benefit from greater openness.</p> <p>(6) 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.</p> <p>(7) 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.</p> <p>(8) 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 should be agreed in order to facilitate this assessment.</p> <p>(9) Verification arrangements should be addressed at the outset and at every stage of negotiations on specific arms limitation and disarmament agreements.</p> <p>(10) All States have equal right to participate in the process of international verification of agreements to which they are parties.</p> <p>(11) 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.</p> <p>(12) 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.</p> <p>(13) 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.</p> <p>(14) 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.</p> <p>(15) 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.</p> <p>(16) To be adequate and effective, a verification regime for an agreement must cover all relevant weapons, facilities, locations, installations and activities.”</p>
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Table 15: Summary of Inspections in 2002 (Source: OPCW. www.opcw.org)

State Party	Number of Inspections, by Type										Total
	ACW	CWDF	CWPF	CWSF	DHCW ⁶⁹⁶	OCW	SCHED1	SCHED2	SCHED3	DOC	
Argentina										1	1
Austria										1	1
Belgium									2	1	3
Brazil									1		1
Bulgaria								1		1	2
Canada							1			1	2
Chile										1	1
China	1						2	4	1	1	9
Costa Rica										1	1
Croatia										1	1
Czech Republic										2	2
Finland										1	1
France						2	1		1	1	5
Germany						1		1	3		5
India		7	2	2					3		14
Iran (Islam. Rep. of)										2	2
Ireland										1	1
Italy						1		1	1		3
Japan			1						3		4
Mexico										1	1
Morocco										1	1
Netherlands							1			1	2
Norway								1		1	2
Panama	1										1
Poland										2	2
Republic of Korea											24
Romania										1	1
Russian Federation		8	20	7	2			1			38
Slovakia							1			1	2
Slovenia										1	1
Spain								2	1		3
Sweden										1	1
Switzerland								1		1	2
Turkey										1	1
Ukraine										1	1
United Kingdom			1			1	1	2	2		7
United States		20	15	12		1	1	7	3	1	60

696 Destruction of hazardous chemical weapons.

State Party	Number of Inspections, by Type										Total
	ACW	CWDF	CWPF	CWSF	DHCW ⁶⁹⁶	OCW	SCHED1	SCHED2	SCHED3	DOC	
Yugoslavia ⁶⁹⁷										1	1
					TOTAL :						210

697 As of 4 February 2003, the Federal Republic of Yugoslavia has changed its name to “Serbia and Montenegro”.

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Protocol to the Treaty between the United States of America and the Soviet Union Socialist Republics on the Limitation of Strategic Offensive Arms, together with agreed statements and common understanding Regarding the Protocol

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ANNEX: Text on the Establishment of a Preparatory Commission for the Comprehensive Nuclear Test-Ban Treaty Organization

APPENDIX: Indicative List of Verification Tasks of the Preparatory Commission

The Comprehensive Nuclear Test-Ban Treaty
 Protocol to the Comprehensive Nuclear Test-Ban Treaty
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Multi-Lateral – Conventional

CFE : Conventional Forces in Europe Treaty

Treaty Article By Article

Scope and Parameters of the Process Commissioned in Paragraph 19 of the Final Document

Certain Basic Elements for Treaty Adaptation – July 1997

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Protocol on Existing Types of Conventional Armaments and Equipment

Protocol on Procedures Governing the Reclassification of Specific Models Or Versions of Combat-Capable Trainer Aircraft Into Unarmed Trainer Aircraft

Protocol on Procedures Governing the Reduction of Conventional Armaments and Equipment Limited by the Treaty on Conventional Armed Forces in Europe

Protocol on Procedures Governing the Categorisation of Combat Helicopters and the Recategorisation of Multi-Purpose Attack Helicopters

Protocol on Notification and Exchange of Information

Protocol on Inspection

Protocol on the Joint Consultative Group

Protocol on the Provisional Application of Certain Provisions of the Treaty on Conventional Armed Forces in Europe

Agreements and Statements:

Memorandum of Understanding

Joint Extraordinary Conference

Agreement Between the Czech Republic and the Slovak Republic

Provisional Application

Final Document of the Extraordinary Conference

Agreement in the Principles and Procedures for the Implementation

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Statement of the Representative of the USSR

Statement by the Government of the USSR

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American Defense Annual. 1985-.Studies all aspects of the U.S. defense establishment. The annual also includes appendices containing a defense chronology, a summary of U.S. defense commitments and an annotated bibliography of defense literature. All years are in EDX.

Asian Security. Compiled by the Research Institute for Peace and Security. 1986-.This yearbook provides a review of the major economic, political, and foreign policy events of the previous year. United States and Russian activities are discussed as they relate to Asia. Last three years in EDX.

The Military Balance. International Institute for Strategic Studies. Military power and defense expenditures for countries worldwide are covered in this annual, quantitative assessment. Published by the IISS. www.iiss.org

Jane's Annuals, the Jane's Information Group publishes a number of reference books which detail all types of weapon systems and military equipment.

Peace Report – Germany's independent yearbook on peace and security -has been published since 1987 as a joint effort of the IFSH and two other peace research institutes, the Peace Research Institute Frankfurt (HSFK) and the Research Centre of the Evangelical Study Community (FEST) in Heidelberg.

SIPRI Yearbook. Stockholm International Peace Research Institute. Since, 1968-.Provides an analysis of recent trends in military expenditures and an account of attempts at arms control and disarmament. www.sipri.se.

The United Nations Disarmament Yearbook. Centre for Disarmament Affairs. 1976-.Contains a review of the main developments and negotiations in the field of disarmament. www.unis.unvienna.org

Verification Yearbook, VERTIC, 1986, documents and reseach on monitoring and verification activities of international treaties on nuclear nonproliferation, nuclear disarmament, nuclear testing, chemical and biological weapons and conventional weaponry, including the performance of the relevant international verification organizations.

Selected International Revues on Arm Control and Disarmament

Table 16: German Reveus on Arms Control and Disarmament

Europäische Sicherheit
Europäische Wehrkunde
Friedensgutachten (HSFK)
FriedensForum
Militärwissenschaftliche Rundschau
The Peace Report (PRIF)
Wissenschaft & Frieden (W&F)

Table 17: United States Reveus on Arms Control and Disarmament

Air University Review Armed Forces and Society
Arms Control Today
Bulletin of the Atomic Scientists Comparative Strategy
Defense Intelligence Journal

International Journal of Intelligence and CounterIntelligence
International Security Joint Forces Quarterly Military Review
Naval War College Review Non-Proliferation Review
Parameters
Small Wars and Insurgencies
Strategic Review
U.S. Naval Institute Proceedings France Reveus

Table 18: United Kingdom Reveus on Arms Control and Disarmament

Defense Analysis
European Security
Intelligence and National Security Naval Review Journal of the Royal United Services Institution
Survival Security Studies
Theory of international relations

Table 19: International Reveus on Arms Control and Disarmament

Cooperation and Conflict. Nordic Journal of International Politics
Journal of Conflict Resolution
Journal of Defense and Peace Economics
Journal of Peace Research
Études polémologiques
Foreign Affairs
International Affairs International Studies Quarterly
Orbis. A journal of world affairs
Politique étrangère
Politique internationale
Revue internationale et stratégique
The Washington Quarterly

Accademic institutions

Table 20: General overview of almost all Research Institutes & Universities worldwide dealing with the issue of Security, Peace, Arms Control and Disarmament.⁶⁹⁸

ABI – Arnold Bergstraesser Institute for Socio Cultural Research, Freiburg i. Brsg., Germany
Acronym Institute
African Centre for the Constructive Resolution of Disputes (ACCORD)
American Council on Germany
American Enterprise Institute for Public Policy Research (AEI)
American Friends Service Committee
American Institute for Contemporary German Studies
Arbeitsgemeinschaft für Friedens- und Konfliktforschung (German Association for Peace and Conflict Research)
Arbeitsgemeinschaft Kriegsursachenforschung (AKUF), Institut für Politische Wissenschaft der Universität

698 Complied by Berlin Information-Center for Transatlantic Security, available at www.bits.de.

Hamburg

Arbeitsgruppe Friedensforschung und Europäische Sicherheitspolitik (AFES – PRESS)

Arbeitskreis Militärgeschichte e.V.

Arbeitsstelle Friedensforschung Bonn (AFB) – Peace Research Information Unit Bonn (PRIUB)

Arbeitsstelle Transatlantische Aussen- und Sicherheitspolitik

Arms Control Association

Arms Control, Disarmament, and International Security (ACDIS)

Aspen Institute

Austrian Study Center for Peace and Conflict Resolution (ASPR)

Belfer Center for Science and International Affairs (BCSIA)

Bellona Foundation

Bendrath, Ralf; Ph.D. Project on Infowar,

Berghof Research Center for Constructive Conflict Management

Bioethics and Health Law (formerly the Center for Medical Ethics)

British American Security Information Council (BASIC)

Bonn International Center for Conversion (BICC)

Bochum Verification

Brookings Institution

Bundesinstitut für ostwissenschaftliche und internationale Studien (BIOSt)

Carnegie Endowment for International Peace

Cato Institute

Center for Arms Control, Energy and Environmental Studies at MIPT

Center for Bioethics and Human Dignity (CBHD)

Center for Civilian Biodefense Studies, John Hopkins University

Centre for Defence & International Security Studies (CDISS)

Center for Defence Information (CDI)

Center for Defense Studies, King's College

Center for Democracy and Technology (CDT)

Centre For European Policy Studies (CEPS)

Center for International Earth Science Information Network (CIESIN)

Center for International Policy (CIP)

Center for International Security and Cooperation, Stanford University (CISAC)

Center for Research on Disarmament, Peace & Conflict (CDRPC)

Center for Strategic & Budgetary Assessments

Centre for Strategic Studies: New Zealand

Center for Middle Eastern Studies, University of Texas

Centre for Military and Strategic Studies (CMSS)

Center for Nonproliferation Studies (CNS)

Center for Political and International Studies CPIS

Center for Political Studies in Russia (PIR)

Center for Science and International Security at the University of Hamburg (CENSIS)

Center for Security Policy (CSP)

Center for Security Studies and Conflict Research, ETH Zürich

Centre for Defence and Security Studies (CDSS)

Center for Strategic & International Studies (CSIS)

Center for Strategic Leadership – Collins Hall, US Army War College

Centre Interdisciplinaire de Recherches sur la Paix et d'Etudes Stratégiques (CIRPES)

Centre For Security Studies, University of Hull

Centre for the Study of Conflict, University of Ulster

Centro Español de Relaciones Internacionales (CERI)

Centro de Investigación para la Paz (CIP)

Chemical and Biological Arms Control Institute

Chemical and Biological Warfare Project at SIPRI

Coalition to Reduce Nuclear Dangers

Conflict Research Consortium, University of Colorado

Council on Foreign Relations

CP/CBD Web-Counterproliferation and Chemical Biological Defense

Danish Institute of International Affairs (DUPI)

DANTE

Demographic, Environmental and Security Issues Project (DESIP)

Department of International Politics – The University of Wales, Aberystwyth

Department of Peace and Conflict Research, Uppsala University

Department of Peace Studies, Bradford University

Deutsche Aussenpolitik – German Foreign Policy, Universität Trier

Deutsche Stiftung Friedensforschung (DSF)

Deutsche Gesellschaft für Auswärtige Politik (DGAP)

Deutsches Orient-Institut

Deutsch-Französisches Institut

EastWest Institute

Environment and Conflict Project , Bern u. ETH Zürich (ENCOP)

Environment Institute

European University Center for Peace Studies (EPU)

European Centre for Minority Issues

Evangelische Akademie Loccum

European University Institute, Florence, Italy

European University Center for Peace Studies (EPU)

Europainstitut der Universität Basel

Federation of American Scientists

Finnish Institute of International Affairs (FIIA / UPI))

Forschungsgruppe Informationsgesellschaft und Sicherheitspolitik

Forschungsverbund Naturwissenschaft, Abrüstung und internationale Sicherheit, Universität Hamburg (FONAS)

forum on early warning and early response (FEWER)

Forschungsstätte der Evangelischen Studiengemeinschaft e. V.

Forum per i problemi della pace e della guerra

Fridtjof Nansen Institute

Friedrich-Ebert-Stiftung – Aussenpolitikforschung

Friends and Partners

fundación CIDOB

Gandhi Information Center

Global Network Against Weapons and Nuclear Power in Space

Groupe de recherche et d'information sur la la paix et la sécurité (GRIP)

Groupe de recherche sur les interventions de paix dans les conflits intraétatiques (GRIPCI)

Harvard Sussex Program on CBW Armament and Arms Limitation (HSP)

Heidelberger Institut für Internationale Konfliktforschung

Heritage Foundation

Henry L. Stimson Center

Hessische Gesellschaft für Demokratie und Ökologie – HGDÖ

Hessische Stiftung für Friedens- und Konfliktforschung (HSFK)

Hochschule für Wirtschaft und Politik Hamburg

Informationsstelle Militarisierung e.V. Tübingen

Information Warfare Research Center @ Terrorism.com

Initiative on Conflict Resolution and Ethnicity (INCORE)

Institute for Jewish Policy Research (JPR)

Institute for Contemporary International Studies (ICIS), Diplomatic Academy, Ministry of Foreign Affairs, Russian Federation

Institute for Defence Studies and Analyses (IDSA)

Institute for Energy and Environmental Research (IEER)

Institut für Entwicklung und Frieden, Universität Duisburg (INEF)

Institute of International Affairs, University of Latvia

Institute for International Relations (IMO)

Institut für Internationale Politik, Universität der Bundeswehr, München

Institut for Public Accuracy

Institute for Science and International Security (ISIS)

Institute for Security and International Studies, Sofia (ISIS)

Institute for Security Studies (ISS)

Institute for the Advanced Study of Information Warfare (IASIW)

Institute for the USA and Canadian Studies (ISCRAN)

Institute for War and Peace Reporting (IPWR)

Institute for the Study of Conflict, Ideology, and Policy (ISCIP)

Institute of Development Studies

Institute of Europe

Institute of International Relations Prague (IIR)

Institute of International Relations and Political Science, Vilnius University

Institute of World Affairs

Institute of World Economy and International Relations (IMEMO)

Institute on Global Conflict and Cooperation, University of California (IGCC)

Institut für Interkulturelle und Internationale Studien

Institut für Iberoamerika-Kunde

Institut d'Etudes Européennes et Internationales du Luxembourg (IEIS)

Institut für Afrika-Kunde

Institut für Allgemeine Überseeforschung

Institut für Asienkunde

Institut für Auslandsbeziehungen e.V. (IFA)

Institut für Entwicklung und Frieden, Universität Duisburg (INEF)

Institut für Frieden und Sicherheitspolitik an der Universität Hamburg (IFSH)

Institut für Friedenssicherungsrecht und Humanitäres Völkerrecht (IFHV)
 Institut für Internationale Politik, Universität der Bundeswehr, München
 Institut für Ostseeforschung, Warnemünde
 Institut für Politikwissenschaft, TH Darmstadt
 Institut für Politikwissenschaft, Universität Hamburg
 Institut für Politikwissenschaft, Universität Salzburg
 Institut für Regionalforschung, CAU Kiel
 Institut für Theologie und Frieden
 Institut für Weltwirtschaft Kiel
 Institut québécois des hautes études internationales
 Interdisziplinäre Arbeitsgruppe Naturwissenschaft, Technik und Sicherheit (IANUS)
 International Boundaries Research Unit
 International Institute for Applied Systems Analysis (IIASA)
 International Institute for Strategic Studies (IISS)
 International Network of Engineers and Scientists for Global Responsibility (INES)
 International Peace Bureau (IPB)
 International Peace Research Institute, Oslo (PRIO)
 International Relations and Security Network, ETH Zürich (ISN)
 International Security Information Service (ISIS)
 Istituto Affari Internazionali
 Jaffee Center for Strategic Studies (JCSS)
 Japan Foundation Center for Global Partnership
 Japan Institute of International Affairs
 John F. Kennedy School of Government, Harvard University
 Kings College
 Kittler Institut, Humboldt-Universität Berlin
 Landesverteidigungsakademie Österreich
 Landmines Project
 Lawrence Livermore National Laboratory: LLNL
 Lester B. Pearson Canadian International Peacekeeping Training Centre
 Life and Peace Institute
 Los Alamos Study Group
 Mannheimer Zentrum für Europäische Sozialforschung
 McMaster Centre for Peace Studies
 Mine Action Information Center, James Madison University
 Monterey Institute of International Studies (MIIS)
 Moscow Public Science Foundation (MPSF)
 Moshe Dayan Center for Middle Eastern and African Studies
 National Center for PTSD
 National Defence University (US)
 National Security Archive at George Washington University
 NaturwissenschaftlerInnen-Initiative "Verantwortung für Friedens- und Zukunftsfähigkeit" e.V.
 Nautilus Institute for Security and Sustainable Development
 Netherlands Institute of International Relations Clingendael
 Norman Paterson School of International Affairs (NPSIA)

Norwegian Institute of International Affairs (NUPI)
 Nuclear Age Peace Foundation
 Nuclear Control Institute
 Österreichisches Institut für europäische Sicherheitspolitik (OEIES)
 Österreichisches Institut für Internationale Politik (OIIP)
 Open Society Institute Landmines Project
 Otto-Suhr-Institut für Politikwissenschaft, Freie Universität Berlin
 OXFAM
 Paix 2000
 Peace and Conflict, University of Colorado
 Peace & Conflict Studies, Westfälischen Wilhelms-Universität Münster
 Programme for Strategic and International Studies (PSIS)
 Project on Defense Alternatives at the Commonwealth Institute
 Projektgruppe Friedensforschung Konstanz
 PUGWASH
 RAND
 Red de Universidades pro la Paz y la Convivencia
 Regional Centre for Strategic Studies, Colombo
 Research Institute for European and American Studies (RIEAS)
 Royal Institute of International Affairs (RIIA)
 Royal United Services Institute for Defence Studies (RUSI)
 Russian-American Nuclear Security Advisory Council (RANSAC)
 Schleswig-Holsteinisches Institut für Friedenswissenschaften (SCHIFF)
 Schweizerische Aussen- und Sicherheitspolitik (SPN)
 Science for Peace
 Scientists for Global Responsibility
 South African Institute of International Affairs
 Stockholm International Peace Research Institute (SIPRI)
 Strategic and Defence Studies Centre (SDSC)
 Strategic Issues Research Institute of the United States
 Strategic Studies Institute, United States Army War College
 Stiftung Entwicklung und Frieden -SEF – Homepage
 Stiftung Wissenschaft und Politik (SWP)
 Swedish Institute of International Affairs
 Tami Stienmets Center for Peace Research (TSC)
 Tampere Peace Research Institute (TAPRI)
 Terrorism Research Center
 Toda Institute for Global Peace and Policy Research
 Transcend: A Peace and Development Network
 Transnational Foundation for Peace and Future Research (TFF)
 United Nations Institute for Disarmament Research
 United Nations University
 United States Institute of Peace
 Universität der Bundeswehr München, Fakultät für Wirtschafts- und Organisationswissenschaften, Sicherheits- und Militärökonomie

Uppsala universitet, Sweden
U.S. Naval Institute
Uranium Institute
Union of Concerned Scientists
Universität Tübingen, Institut für Politikwissenschaft, Abteilung Internationale Beziehungen/Friedens- und Konfliktforschung
Verification Research, Training & Information Centre (VERTIC)
Verification Research, Training & Information Centre (VERTIC)
Verein für Friedenspädagogik Tübingen
Watson Institute for International Studies, Brown University
Wilton Park Conferences
Worldwatch Institute
Woodrow Wilson School of Public and International Affairs, Princeton University
York Centre for International and Security Studies (YCISS)
Zentrum für Europäische Integrationsforschung (ZEI)
Zentrum für Europäische Umfrageanalysen und Studien / Universität Mannheim (ZEUS)
Zentrum für Nordamerika Forschung (ZENAF)
Zentrum für Ostasien-Pazifik Studien / Universität Trier (ZOPS)

Ehrenwörtliche Erklärung

"Ich erkläre hiermit ehrenwörtlich, dass ich die vorliegende Arbeit ohne unzulässige Hilfe Dritter und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe; die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Bei der Auswahl und Auswertung des Materials sowie bei der Herstellung des Manuskripts habe ich Unterstützungsleistungen von folgenden Personen erhalten:

1. Oliver Lahmut (Unterstützung bei der Rechtschreibkontrolle),
2. Andreas Müller (Formatierung)

Weitere Personen waren an der geistigen Herstellung der vorliegenden Arbeit nicht beteiligt. Insbesondere habe ich nicht die Hilfe eines Promotionsberaters in Anspruch genommen. Dritte haben von mir weder unmittelbar noch mittelbar geldwerte Leistungen für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen. Die Arbeit wurde bisher weder im Inland noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde als Dissertation vorgelegt.“

Jena, den 20.02.2006

Lebenslauf

Geboren 1968 in Akordote, Eritrea, Äthiopisch, verheiratet, zwei Kinder

Ausbildung

1995 M.A. in Licence Spéciale Etudes Politique Européennes (svw. Spezialstudien für europäische Politik, Abschluß mit Auszeichnung)

1992 B.A. in International Studies (Abschluß: Honour's Degree) Université Libre de Bruxelles - Fakultät für Wirtschaft sowie Sozial- und Politikwissenschaften

1987 Diplom in Entwurfstechnologie (Industriedesign) Universität Addis Abeba, Fakultät für Erziehungswesen

Berufserfahrung

Managerin von EuroContact: Unternehmensberatung für europäische und internationale Geschäftsentwicklung

1994-1998 Beraterin bei der Abteilung für Auswärtige Beziehungen beim Technischen Sekretariat der Organisation für das Verbot Chemischer Waffen

1995-1998 Forscherin im Rahmen des Harvard-Sussex-Programms zur Abrüstung chemischer und biologischer Waffen sowie der Rüstungsbeschränkung

1993-1995 Forschungsassistentin beim Centre d'Etude en Relations Internationales et Stratégiques (CERIS - svw. Studienzentrum für Internationale Beziehungen und Strategien)

1994-1997 Vorlesungen zur Entwicklungspolitik an den Universitäten Jena und Gießen

1994 Assistenz im Europäischen Parlament, Entwicklungspolitik (Praktikum)

1990 Journalistische Aktivitäten für das Amharisch- und Französischprogramm der Deutschen Welle