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VERIFICATION IN ALL ITS ASPECTS: PRINCIPLES, PROVISIONS
AND TECHNIQUES

Draft conclusions of Working Group IV

Paper submitted by the Chairman of the Working Group

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I. FRAME OF REFERENCE

1. In resolution 41/86 Q of 4 December 1987, adopted by consensus at its forty-first session, the General Assembly requested the Disarmament Commission to consider at its 1987 session, the subject of "verification in all its aspects, including principles, provisions and techniques to promote the inclusion of adequate verification in arms limitation and disarmament agreements and the role of the United Nations and its Member States in the field of verification". The Disarmament Commission was further requested to report on its deliberations, conclusions and recommendations concerning this subject to the General Assembly at its forty-second session. The present report concerning verification in all aspects has been drafted by the Disarmament Commission, pursuant to resolution 41/86 Q.

2. In preparing its report, the Disarmament Commission has taken into account, inter alia, the following United Nations documents which afforded a suitable basis for its deliberations:

(a) The Final Document of the Tenth Special Session of the General Assembly (resolution S-10/2);

(b) The reaffirmation of the latter by the Concluding Document of the Twelfth Special Session (A/S-12/32);

(c) "Disarmament and verification: background paper prepared by the Secretariat" (A/AC.187/109, 17 April 1978);

(d) The relevant resolutions of the General Assembly;

(e) The proposals made to the General Assembly by individual countries in response to General Assembly resolutions 41/152 Q and 41/86 Q; and

(f) The documents of the Disarmament Commission containing the views of delegations as expressed during its session.

II. GENERAL POLITICAL CONTEXT

3. This report has been prepared at a time when it is universally felt that the subject of verification of compliance with obligations undertaken pursuant to arms limitation and disarmament agreements is particularly pertinent. It is recognized that adequate and effective measures of verification are the primary mechanism whereby compliance with such undertakings is ascertained and demonstrated. Moreover, there is universal recognition of the central importance that verification provisions play in the negotiation, conclusion and implementation of arms control agreements. It is acknowledged that faith in good intentions alone is not a healthy basis for concluding agreements dealing with vital national security matters; verification supplants the need for faith in the good intentions of other parties by providing an objective means of determining ongoing compliance.

/...
4. There is common concern about the current situation respecting international relations, the recurrent threat or use of force, the ongoing international buildup of armaments, the concurrent rise of instabilities, political tensions and of mistrust, and a heightened perception of the dangers of war, both conventional and nuclear. There is a continuing realization and reaffirmation of the importance that arms limitation and disarmament agreements have in reducing the tensions and capabilities that could lead to war and in promoting strategic stability and co-operative relationships in all fields of international relations. Arms limitation and disarmament agreements, however, can only achieve these ends if each party remains confident that obligations are being fully respected by every other party. Effective arms limitation and disarmament measures must be fair and balanced, acceptable to all parties. Their substance must be clear and compliance with them evident.

5. Verification is an important consideration at all levels of arms limitation and disarmament negotiations and agreements including multilateral (both global and regional) and bilateral. By assuring confidence in compliance at all levels and with all types of arms limitation and disarmament agreements, more stable relations and greater security are built.

III. VERIFICATION AND DISARMAMENT

6. Verification serves functions that are essential to the long-term success of the entire arms limitation and disarmament process. This fact has already been clearly acknowledged by the international community, most notably in the Final Document of the Tenth Special Session of the General Assembly.1/ There is thus an international consensus that adequate and appropriate verification provisions form an essential element in all arms limitation and disarmament agreements and contribute significantly to the enhancement of peace and security.

7. The subject of compliance and verification are inextricably linked. Compliance is descriptive of the behaviour of a party in relation to its arms limitation obligations, whereas verification is the process of determining whether the behaviour of a party is consistent with those obligations. Although the verification process may be over when it is demonstrated that a party's behaviour is inconsistent with its obligations, the related and equally important political process of managing non-compliance is just beginning.

8. General Assembly resolution 41/59 J, entitled "Compliance with arms limitation and disarmament agreements", which was adopted on 3 December 1986 without a vote, stressed that any violation of agreements on arms limitation and disarmament not only adversely affects the security of other parties relying on the constraints and commitments stipulated in those agreements but also that any weakening of confidence in such agreements diminishes their contribution to global and regional stability and to further disarmament and arms limitation efforts. Compliance is, therefore, as the resolution states, a matter of interest and concern to the international community. As compliance is determined by verification measures, it follows that the principle that arms limitation and disarmament agreements should be effectively verified serves the interests of the international community at large.

/...
9. With or without legal provisions for verification purposes, nations will strive to collect information on the military activities of other nations which are perceived as relevant to their own national security. Adequately verified arms limitation and disarmament agreements could provide the means whereby certain of these basic information needs can be met under conditions where interference is minimized, sovereignty is respected and distrust is largely dispelled.

IV. DEFINITION OF VERIFICATION

10. The background paper prepared by the Secretariat for the tenth special session of the General Assembly (A/AC.107/109 of 17 April 1978) defined verification as "the process of ascertaining that a commitment laid down in a particular agreement in the field of disarmament or arms limitation is being met ... Verification, therefore, is a process of gathering and analysing information, permitting a conclusion" (p. 15).

11. In the English language, the verb "verify" has been defined as "to establish the truth or correctness of by examination or demonstration". This concise definition embraces two basic functional concepts inherent in the verification process. The first is "examination" which implies both inspection and interpretation. This suggests that verification is more than a technical exercise, involving both the interpretation of the evidence as well as the interpretation of the meaning of the treaty itself. The second concept is the voluntary aspect of "demonstration", whereby compliance can be demonstrated in order to allay suspicions and thereby build confidence.

V. FUNCTIONS OF VERIFICATION

12. Verification can be said to perform several functions, but there would seem to be three of particular importance: deterrence of non-compliance, confidence-building and treaty assessment. In the first place, by holding out a credible prospect of detection of non-compliance with an agreement, verification serves to protect the security of all the parties to an agreement. When adequate and effective verification increases the risk of detection that a prospective violator would face, the temptation to seek advantage by violating an agreement is reduced and deterrence is enhanced.

13. Second, verification also seeks to demonstrate compliance. Continued evidence or demonstration of compliance with an agreement will help build confidence in the intentions of other parties. This increased trust will have positive benefits for the conduct of relations between the States in question as well as for international relations generally.

14. Verification has a third role, that of clarifying uncertainty. When an ambiguous activity is detected, an effective verification system will counteract false alarms by producing clear evidence of compliance. If uncertainty continues with respect to an activity's legitimacy, it may be an indication of an inadequacy in a treaty provision. By providing a broad range of objective, operationally...
relevant data, verification provisions can provide an invaluable information base for the review and assessment of a treaty's operation in practice and point the way to possible changes in the treaty and/or its manner of application.

15. What is involved in verification is the need, on a common-sense basis, to institutionalize in the context of relations among States the same kinds of accepted rules, procedures and expectations which govern the conduct of relations among individuals in all civilized societies. Such rules and procedures do not presume bad faith or malevolent intent on the part of others; but they allow for such a possibility and provide a framework in which unjustified accusations can be authoritatively rebutted or sanctions against misconduct can be authoritatively imposed.

16. Most States do not enter into arms limitation and disarmament agreements in order to violate them at the first suitable opportunity. However, such a possibility cannot be overlooked. Moreover, the intentions of Governments can change over time.

17. In this connection, it should be emphasized that the verification process does not in itself address the issue of sanctions against misbehaviour. No judicial function is involved. This touches on perhaps the ultimate, and most difficult and sensitive problem in the whole arms control and disarmament process - the political management of the consequences of demonstrated non-compliance. The role of the verification process in this context is limited to providing, in the most comprehensive and objective way, possible relevant data about behaviour. It thus can be invaluable in limiting the scope for unjustified allegations and in providing a basis for reasoned and factually-based decisions by the international community in instances where non-compliance appears to have been demonstrated.

VI. PRINCIPLES OF VERIFICATION

A. Adequacy

18. Paragraph 31 of the Final Document of the Tenth Special Session of the General Assembly 1/ 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."

19. Adequate verification does not mean a 100 per cent certainty of detecting and proving every possible violation. No verification system can be totally foolproof, nor does it need to be. Even though verification can never be perfect, to be adequate it must be able to detect, beyond a reasonable doubt, a violation of an agreement which would permit a State to acquire a military capability threatening the national security of any other party. Adequate verification must also be timely. The verification system must be capable of detecting a violation early enough so that innocent parties would be able to respond appropriately to negate any advantage that a violator might gain.

/...
(a) **Threat to national security**

20. There is a relationship between the military significance of an agreement and the need for verification. In general, the greater the significance, the greater are the demands on the verification provisions. Also, the shorter the time span between the hypothetical breach of an agreement and the security-related effects of that breach, the greater is the need for effective verification. Violations of an agreement pose dangers to other parties that are dependent, in large part, on the kind of armaments, forces or activities and the time factors involved. When this risk is large, then the requirements for verification will be correspondingly stricter.

21. As levels of armaments, forces, military activities or military budgets are reduced, the importance of verification increases and the verification measures and procedures which are deemed adequate will correspondingly become more strict. As lower levels of armaments, forces and military budgets are reached, the risk posed by a minor, and hence less easily detected, violation to the security of other parties becomes graver.

22. Exchanges of adequately verified information concerning existing levels of armaments, forces, military activities or military budgets, before any reductions in levels, or other limitations occur, will greatly assist the negotiation and the implementation of any agreement on reductions of armaments, forces, military activities or military budgets. Such information, when it is verified as accurate, increases predictability and builds confidence that security will not be placed at risk by the non-compliance of other parties with an arms limitation and disarmament agreement.

23. Adequate verification of actual reductions of armaments, forces, military activities or military budgets, in a timely and thorough manner as the reductions proceed, is essential. Reliable verification and control at all stages of the implementation of agreements is essential.

24. After reductions in levels of armaments, forces, military activities or military budgets have been completed by reaching agreed thresholds, the levels of relevant armaments, forces, military activities or military budgets must be regularly and adequately verified by examination or demonstration to ensure that levels remain at or below the agreed thresholds and that forces are not restructured or redeployed in a manner inconsistent with the agreement.

(b) **Asymmetrical need for verification data**

25. Verification requires credible information on compliance behaviour. In the absence of a treaty with provision for verification data, States may have differing degrees of access to information about the behaviour of other States. Some States and societies are relatively open in the disclosure of information relating to their military and national security behaviour. Other States are less so. As a result, there may be an asymmetry in the availability of information to verify compliance. This means that, for some States, the verification provisions of an arms limitation agreement will be seen as much more important than might be true for other States. Conversely, States which benefit from the open disclosures of
others, may not, therefore, have as compelling a need for rigorous verification provisions. When assessing the adequacy of a verification system this asymmetrical need for verification data must be taken into consideration.

(c) Effectiveness

26. The adequacy of any verification system will also depend upon the effectiveness of the technologies and procedures employed for verification purposes. The scientific and technical limitations of these techniques must, therefore, be carefully examined when negotiating and designing the verification provisions of any agreement.

27. Remote sensors such as those termed "national technical means" (NTM), which are used to monitor events and objects from long distances, are highly useful verification techniques. However, NTM such as satellites, have very real and important limitations including:

(i) Constraints on resolution capabilities;

(ii) Other obvious sensor limitations, such as their inability to see inside buildings, underground or deep underwater;

(iii) Environmental and climatic considerations, such as the amount of available light and the extent of cloud cover;

(iv) Orbital and coverage constraints;

(v) Platform payload constraints;

(vi) Limitations on fuel and lifetime of the platform;

(vii) Data-processing constraints caused by collection of massive amounts of NTM data;

(viii) Cost and availability of relevant technical expertise;

(ix) The possibility of interference with the sensors or the use of deception methods such as camouflage;

(x) The fact that NTM are not necessarily equally available to all parties of agreements.

28. Consequently, adequate and effective verification will require employment of other techniques, such as on-site inspections, in addition to NTM.

29. The technical effectiveness of a verification system also involves ensuring that any organization created to implement the system has the technical competence and capability to do so. This implies not only the availability of appropriate resources in terms of skilled personnel, training, appropriate machinery and devices, etc., but also the acquisition and development of expertise in the area of
analysis and data interpretation. Such a capability cannot be developed
overnight. Consequently, there is much advantage to be gained by testing
prospective verification mechanisms such as exemplified by the 1984 technical test
of an international, seismic data exchange conducted by the Conference on
Disarmament's Group of Scientific Experts to Consider International Co-operative
Measures to Detect and Identify Seismic Events. The continuance of such exercises
and research is essential. Similarly, the sharing of the applicable experience of
existing verification organizations such as the International Atomic Energy
Agency (IAEA) is an important means of enhancing verification capabilities.

(d) Manpower and cost

30. The practical requirements of manpower and cost must also be considered when
designing adequate verification measures. The significance of the human factor in
the development of verification provisions is often not fully appreciated. Schemes
for verification must be assessed in critical cost-benefit terms. Systems which
duplicate existing national capabilities may not be essential. The use of random
sampling techniques can also serve to reduce costs.

B. Non-interference with verification methods, procedures
and techniques

31. An arms limitation and disarmament agreement should include an explicit
provision 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 generally recognized principles of international law and with the
other provisions of the agreement.

32. An arms limitation and disarmament agreement should include an explicit
provision whereby each party undertakes not to use deliberate concealment measures
which impede verification of compliance with the agreement. This undertaking
should not require changes in current construction, assembly, conversion or
overhaul practices except as required to comply with other provisions of the
agreement. "Deliberate concealment measures" should include encryption of
telemetric information during testing and denial of telemetric information.

C. Treaty specificity or appropriateness

33. Paragraph 31 of the Final Document of the Tenth Special Session of the General
Assembly states:

"The form and modalities of the verification to be provided for in any
specific agreement depend upon and should be determined by the purposes, scope
and nature of the agreement."

34. The nature and extent of verification arrangements should be governed by the
requirements for determining compliance with the provisions of the agreement in
question; these arrangements must fully correspond to the purposes, scope and
nature of the arms limitations established. This principle of proportionality is an important criterion for determining what constitutes adequate verification.

35. Determinations about the adequacy, effectiveness and acceptability of specific methods intended to verify compliance with the provisions of an arms limitation and disarmament agreement must be made within the context of that agreement. In this sense the verification system must be treaty-specific. This does not preclude, however, the utility of research into and consideration of verification principles, provisions and techniques outside the context of negotiations on specific agreements.

D. Universality

36. Paragraph 31 of the Final Document of the Tenth Special Session of the General Assembly 1/ states that arms limitation and disarmament agreements "should provide for the participation of parties directly or through the United Nations system in the verification process".

37. The capabilities of States to undertake verification activities varies greatly. Similarly, the extent to which parties to an agreement may desire to participate in verification activities may vary. All parties, however, should have the right to participate in the verification process directly or through the United Nations.

38. To include direct participation of all States in every aspect of verification activity could result in unworkably complex and cumbersome procedures. In addition, duplicating the capabilities already possessed by some States may be unnecessary and costly.

39. The use of specialized international organizations such as the IAEA can contribute to meeting the requirements of the principle of universality. All parties are able to participate in the verification process through the specialized agency's structure.

40. The conduct of international verification activities can be undertaken, upon request, with the assistance of other States or through appropriate international procedures within the framework of the United Nations.

41. In certain instances, it may be reasonable to delegate major responsibilities for verification to a group of countries which possess significant national means, on a collective basis and on the understanding that there would be access to verification information by all parties.

42. Global agreements with their respective verification provisions could be enhanced by complementary regional or bilateral verification provisions.

43. The principle of universality in no way implies or requires any form of participation in a verification process by States or international organizations not party to a treaty, though such a possibility is not excluded, given the willingness of the parties to the treaty to permit it.
E. Combining verification methods, procedures and techniques

44. Paragraph 31 of the Final Document of the Tenth Special Session of the General Assembly 1/ states:

"Where appropriate, a combination of several methods of verification as well as other compliance procedures should be employed."

45. Verification is a process involving a variety of methods, procedures and techniques which operate together. Each of the elements can complement or reinforce the others such that the total effect of elements acting together is greater than the sum of their effects taken independently. Such synergism enhances the effectiveness of the verification system.

46. In some instances, the most appropriate package of verification provisions might involve an incremental process by which suspicious events or complaints are dealt with in a series of appropriately escalating steps. To achieve this escalation, it is likely that different combinations of verification methods, procedures and techniques will be necessary.

F. Non-discrimination

47. Paragraph 92 of the Final Document of the Tenth Special Session of the General Assembly 1/ states:

"Every effort should be made to develop appropriate verification methods and procedures which are non-discriminatory ..."

48. Verification provisions should be based on principles of equality and undiminished security of all parties under international law.

49. While verification provisions will apply equally to all parties to an agreement, when it comes to implementation, differences in geography, population and size of military forces may cause a heavier monitoring or compliance burden to fall upon certain countries. As a result, some States may appear to be treated in a discriminatory manner because they must either be subject to quantitatively more verification activities or must meet greater monitoring requirements. In addition, the scope of the arms limitation in question may entail different treatment of countries. For example, the creation of a demilitarized zone may mean that certain countries are the focus of more intense verification activities than are other countries. Another example is the Treaty on the Non-Proliferation of Nuclear Weapons under which the most stringent verification activities (i.e., on-site inspections to discourage the diversion of peaceful nuclear material to military purposes) are applied primarily to non-nuclear-weapon States.

G. Minimum interference

50. Paragraph 92 of the Final Document of the Tenth Special Session of the General Assembly 1/ states:

"..."
"Every effort should be made to develop appropriate methods and procedures ... which do not unduly interfere with the internal affairs of other States ..."

51. A degree of interference in internal affairs and sovereignty may sometimes be necessary if the requirement for adequate verification is to be met. The fact that a particular verification activity involves such interference is not ipso facto a legitimate ground for rejecting the activity as unacceptable.

52. An arms limitation or disarmament agreement is essentially a contractual exchange: in return for limiting military options (one kind of interference in internal affairs) greater information about the relevant military activities of potential adversaries will be provided for verification purposes (another kind of interference in internal affairs). The loss of some degree of sovereignty is more than compensated for by an increased degree of security.

53. Concern about the principle of non-interference arises primarily as a result of the intrusiveness involved in various verification activities. Intrusiveness can be seen to involve two aspects: physical intrusion and cognitive intrusion. The former refers to access by foreign inspectors into the territory of the party being monitored. Cognitive intrusion involves the acquisition by foreigners of sensitive military or economic information. While these two forms of intrusion are obviously highly interrelated, there are, nevertheless, some important differences.

54. Although physical intrusion seems invariably to arouse greater national sensitivity than some forms of cognitive intrusion (e.g. by remote-sensing devices), it should not necessarily be a special source of concern. Physical intrusion, generally, can be strictly controlled by the party being monitored since physical access can usually be limited to specific sites and to the performance of certain tasks. In some cases, humans may only be indirectly involved, for example, when automatic, unattended "black boxes" are employed.

55. Cognitive intrusion can arise as a result of physical intrusion, such as when human inspectors are allowed access to the territory of a party. It can also arise when no physical intrusion is involved such as when remote-sensing devices are used. Both types of cognitive intrusion are legitimate under conditions of mutual acceptability and within the framework of an agreement. In such circumstances, no unacceptable violation of national sovereignty is involved.

56. While the increased use of modern remote-sensing techniques suggests that physical intrusion may, in the future, be less frequently used as an aspect of verification for some types of agreements, other areas of arms limitation will continue to require significant physical intrusion in order to achieve adequate verification. Furthermore, modern verification technology may not reduce the cognitive intrusion involved in verification activities.
H. Non-jeopardizing of economic and social development

57. Paragraph 92 of the Final Document of the Tenth Special Session of the General Assembly 1/ states that "every effort should be made to develop appropriate methods and procedures ... which do not unduly jeopardize" the economic and social development of other States.

58. Provisions to protect against the possible disclosure of sensitive commercial or economic information obtained during verification activities can be developed and should be included in the design and operation of any verification system.

59. Verification involves the acquisition of information relevant to military and related activities for the purpose of determining compliance with arms limitation and disarmament obligations. The information so acquired is to be used exclusively for that purpose, within the context of the specific agreement of concern. The information should not be employed to the detriment of the economic or social development of any State except to the extent this may result from legitimate verification and compliance-related activities. Provisions to protect against the use of such information for non-verification-related purposes can be developed and should be included in the design and operation of any verification system.

I. Negotiating verification provisions

60. Experience has demonstrated the close interrelationships between the elaboration of an agreement as such and the elaboration of verification procedures for that agreement. While no verification system can be finalized before the scope, nature and purpose of the arms limitation and disarmament measures of the agreement are known, it is similarly impossible to ascertain this scope, nature and purpose without being aware of the capabilities of the parties to verify the agreement and what verification provisions they are willing to accept.

61. Paragraph 91 of the Final Document of the Tenth Special Session of the General Assembly 1/ states:

"In order to facilitate the conclusion and effective implementation of disarmament agreements and to create confidence, States should accept appropriate provisions for verification in such agreements."

62. Countries can impede progress in the arms limitation and disarmament process by failing to agree to legitimate demands for reasonable verification measures. The verification issue is not unique in this respect; all treaty issues (e.g. scope, nature, purpose) can be similarly used as pretexts for avoiding sincere negotiations.

63. Verification must be an integral part of an arms limitation and disarmament agreement. The specifics of the verification system, including the implementing provisions, should be spelled out and constitute part of the agreement.
J. Verification research

64. Paragraph 92 of the Final Document of the Tenth Special Session of the General Assembly 1/ states:

"In the context of international arms limitation and disarmament agreements, the problem of verification should be further examined and adequate methods and procedures in this field should be considered."

65. Research into verification principles, provisions and techniques can be profitably conducted independently of specific negotiation contexts. Attempts to study the implications of general principles relating to verification as well as general verification methods and procedures can be highly productive both in generating new ideas and solutions to specific problems and in overcoming obstacles in specific negotiations.

66. The verification requirements in certain agreements may be so complex that, without substantial pre-consideration of verification questions, negotiations may founder and agreements may become impossible to conclude. Therefore, it is crucial that there be attempts to address verification concerns beginning in the earliest stages of agreement consideration. Moreover, technologies and procedures for verification purposes must be continually discussed, researched and updated if verification capabilities are to keep pace with the demand placed on them through relentless technological development and increasingly complex arms limitation agreements.

67. The study and consideration of verification cannot only allay concerns about possible abuses of the verification process but can also facilitate arms control and disarmament. There are many initiatives that can be undertaken to prepare and develop a range of instruments - legal, institutional and technological - that could contribute to the potential for the verification of specific agreements. General research into and consideration of verification principles, provisions and techniques also offers the promise that effective verification systems can be made less intrusive and, therefore, more acceptable to parties concerned about the potential intelligence-gathering capabilities of verification systems.

68. There is considerable scope for joint research among countries and for the sharing of information on verification research. There is also a role for the United Nations in these activities. Such endeavours not only serve to promote progress in arms limitation negotiations but also help build confidence between nations as they co-operate in overcoming shared problems.

K. Ambiguities and review

69. Arms limitation and disarmament agreements should include provisions for resolving ambiguities relating to evidence of compliance.

70. To assess the continuing adequacy and effectiveness of the verification system, an arms limitation and disarmament agreement should provide for procedures
VII. PROVISIONS AND PRECEDENTS

71. A number of bilateral and multilateral arms limitation and disarmament agreements have been concluded which incorporate verification-related provisions. These agreements provide useful insight for future negotiations relating to verification. However, they cannot always be followed without modification because circumstances may change and because verification provisions must be designed and implemented within the context of the specific treaty in question.

72. The background paper prepared by the Secretariat for the tenth special session of the General Assembly (A/AC.187/109 of 17 April 1978) provides a comprehensive listing of the verification provisions from arms limitation and disarmament-related agreements up to April 1978. Since then several further agreements in this area have been concluded, the verification-related provisions of which are identified below:

(a) Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Strategic Offensive Arms (SALT II Treaty), concluded 18 June 1979 (arts. XV, XVI and XVII);

(b) Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Treaty), concluded 5 December 1979 (art. 15);

(c) South Pacific Nuclear-Free-Zone Treaty, concluded 6 August 1985 (arts. 8, 9, 10 and annexes 2, 3 and 4);


VIII. CATALOGUE OF METHODS, PROCEDURES AND TECHNIQUES

A. Overview

73. A structural compilation of verification methods, procedures and techniques would be useful to facilitate later consideration of and negotiations on this issue. The following section provides a descriptive catalogue that seeks to exemplify the range and scope of methods, procedures and techniques applicable to verification of compliance with arms limitation and disarmament agreements. The determination of which methods, procedures and techniques to include in the design of an adequate verification system will depend on the context of the specific agreement in question.
B. On-site inspection

74. This method involves the physical presence of inspectors from another country (or countries), or an international organization, on the national territory of the party being inspected. There are six major subcategories of on-site inspection.

(a) General on-site inspection

75. General on-site inspection involves unrestricted access to the physical objects and related facilities and to the activities that are subject to control under the terms of specific agreements. The relevant agreements to which this method might apply could range in scope from general and complete disarmament to control of specific weapons or research related to those specific weapons. Like other verification methods, the purpose of general on-site inspection is to preclude the possibility of clandestine violations of an agreement. The degree of assurance thought to be attainable using this method varies. Some proponents consider general on-site inspection to be capable of uncovering all possible violations; others hold that it only increases the likelihood of discovery, and thereby improves the deterrent value of the verification system.

76. The Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor (concluded on 11 February 1971) can be seen as an agreement which permits general on-site inspection. The object of the Treaty is to prohibit the emplacement on the sea-floor of nuclear weapons, other weapons of mass destruction and their related launching facilities (art. 1). The Treaty makes parties "free to observe activities of other states on the sea bed" provided that this observation does not interfere with such activities or otherwise infringe upon existing rights under international law (art. 3(1)). Should such observation still leave doubts unresolved, parties are authorized to consult and co-operate with a view to removing those doubts (art. 3(2)).

(b) Selective on-site inspection

77. Selective on-site inspection involves a greater degree of restriction with regard to the inspectors' rights of access than does general on-site inspection. Most frequently, such restriction permits entry by inspectors only for the limited purpose of monitoring compliance with agreements concerning specific weapons systems and related facilities. From this central restriction flow certain others. Access might be allowed only to a particular geographic location, such as the site of a peaceful nuclear explosion (as provided in the Peaceful Nuclear Explosions Treaty) or that of a facility for the destruction of chemical weapons (as put forward in a number of proposals). Second, limitations could be placed on the activities which the inspectors may undertake at the place of inspection, and on the information which they may acquire there. In the case of a chemical weapons treaty, some sensitivity might be shown to analysing the nature of a chemical agent which is in the process of being destroyed, on the pretext that sensitive information might be disclosed. Third, inspectors may also be limited as to the persons they may contact and the questions they may ask. Clearly, there will be a boundary area between selective and general on-site inspection where the distinction between the two becomes blurred.
78. In the Treaty on the Non-Proliferation of Nuclear Weapons (concluded on 1 July 1968) non-nuclear-weapon State parties to the Treaty agree not to receive nuclear weapons nor to develop or manufacture them (art. 2). To verify this commitment, non-nuclear-weapon States undertake to conclude safeguards agreements with the IAEA in which selective on-site inspection by IAEA inspectors is the primary verification method.

(c) **Challenge on-site inspection**

79. This method is a derivative of the first two methods. A challenge is normally initiated by one of the contracting parties and may or may not permit the right of refusal. Rejection of such a request for on-site inspection runs the danger of heightening suspicions and increasing tensions. The inspection provisions of the Document of the Stockholm Conference, signed in September 1986, can be described as involving a quota of challenge inspections without right of refusal.

(d) **Progressive/zonal on-site inspection**

80. This method seeks to match the level of inspection with the level of arms reduction by entering into verification activities more gradually than immediate introduction of general on-site inspection. One of its central aims is confidence building. Progressive on-site inspection involves the "progressive" implementation of inspection on the basis of type of facility, intensity of inspection or area. When progressive area inspection is involved the term "zonal" is frequently used. As force reductions increase, the scope or intensity of the inspections also increase.

(e) **Random surprise on-site inspection**

81. This is a variation of selective on-site inspection in which the frequency of inspections is reduced by selecting the sites to be inspected on a random basis. The element of surprise is present to provide additional deterrence by introducing uncertainty into a potential violator's calculations.

(f) **Control posts**

82. The control post is essentially a stationary inspection team for monitoring nearby military activities. The most common proposal is to have control posts at such locations as transportation centres, airfields, railway stations, main-road junctions and ports, to monitor military traffic. Such monitoring should provide warning of impending aggression by detecting any unusual flow or concentration of military power or weapons production.

83. One significant advantage of the control post in terms of general applicability is that it obtains information by direct observation, and therefore does not necessarily require high-technology sensors which may be expensive and not available in many contexts. Control posts do, however, require secure communication to an information centre so that the information collected can be properly evaluated.

...
(g) Peace-keeping operations of the United Nations

84. They involve many activities similar to, if not identical with, verification activities in an arms limitation and disarmament context. In particular, the use of United Nations troops to conduct on-site inspections, to operate control posts and to independently observe and report on the implementation of cease-fire and disengagement agreements, are noteworthy. Experience with such peace-keeping operations provides a significant source of expertise for designing verification systems.

C. Remote sensing

85. This method has two general subcategories:

(a) Remote sensing in situ

86. In this method, unmanned stations with appropriate instrumentation can be located at a site within national borders. Sometimes referred to as "black boxes", these unattended sensors could be periodically visited by inspectors to collect data and for maintenance operations. Alternatively, such sensors could transmit their data via secure communications links to analysis centres outside the country in which they are situated, reducing the need for periodic visits by foreign personnel. "Black boxes" can be designed to resist tampering so as to ensure the credibility of the data they collect.

(b) Remote sensing from outside boundaries

87. In the context of bilateral agreements between the United States of America and the USSR this method is termed verification by "national technical means" (NTM). This type of remote sensor does not involve the physical presence of foreign or international inspectors within the territory of the State being inspected. While the United States of America and the USSR possess the greatest collection of NTM, a wide range of other countries have some kind of NTM. Among the devices used for remote sensing from outside borders are the following:

(i) Satellites sensors;

(ii) Aircraft-based sensors;

(iii) Ship-borne sensors;

(iv) Ground-based listening stations, radars, etc.

88. The particular types of sensors used vary greatly. Most, however, involve the use of electromagnetic radiation to monitor events and objects from considerable distances. One notable exception is long-range seismic sensors which measure vibrations transmitted through the Earth as a result of underground nuclear tests.

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D. Short-range sensors

89. These devices are used by inspectors or in "black boxes". They can vary widely in nature from binoculars and cameras carried by inspectors to special flow meters to monitor chemical production or destruction. Variants of short-range sensors include seals and tags. The former are used to ensure that tampering with any instrumentation (e.g. "black boxes") or any containment areas is detected by inspectors. Tags might be employed to uniquely identify weapons systems in order to help ensure that mutually agreed quantities are not exceeded.

E. Complaints/consultation procedures

90. These procedures involve explicit agreement by the parties to air and resolve complaints regarding compliance. They may take a variety of forms including a simple undertaking to consult and co-operate, the establishment of a more formal consultative commission, and the referral of complaints to the consideration of existing international organizations. One important feature of some existing multilateral arms limitation agreements is the idea of separating international data collection or fact-finding, which would occur in response to a complaint, from the political judgement of that data, by having these two functions performed by different international bodies. Another useful idea is to include a series of escalating steps in terms of international consideration of complaints.

F. Collateral analysis

91. This method involves perusal of the world press, scientific reports and other openly available, pertinent material. It must be recognized that an asymmetry exists in the availability of the collateral information between different types of societies.

G. International control organizations

92. Some States have suggested the need for a general International Verification Organization (IVO) with responsibility for monitoring compliance with a number of prospective multilateral agreements. Such proposals have sometimes taken the form of an international body responsible for a particular type of verification technology such as satellites. Other States have proposed an international verification body in the context of monitoring a specific agreement such as a chemical weapons convention. Proposals for international bodies to verify specific agreements often look to the IAEA as a working model of such an arrangement. Such bodies provide a practical solution to verification questions and could perform very useful work in the monitoring of certain agreements. They could also serve as a stepping stone towards the eventual creation of a general IVO, should the international community agree on the desirability of establishing such an institution.

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IX. ROLE OF THE UNITED NATIONS

93. Paragraph 114 of the Final Document of the Tenth Special Session of the General Assembly 1/ states:

"The United Nations, in accordance with the Charter, has a central role and primary responsibility in the sphere of disarmament. Accordingly, it should play a more active role in this field and, in order to discharge its functions effectively, the United Nations should facilitate and encourage all disarmament measures - unilateral, bilateral, regional or multilateral - and be kept duly informed through the General Assembly, or any other appropriate United Nations channel reaching all Members of the Organization, of all disarmament efforts outside its aegis without prejudice to the progress of negotiations."

94. In the future, although the bilateral arms limitation and disarmament process may continue to dominate, the United Nations must be capable of responding to increased demands from the international community regarding arms limitation and disarmament agreements whether bilateral, regional or multilateral. As the Secretary-General in his annual report for 1986 states, "the ability of the Organization to assist in verification and compliance arrangements should be explored". 2/

95. In the context of the subject of verification of compliance with arms limitation and disarmament agreements the Disarmament Commission recommends that the United Nations undertake several actions.

96. On a responsive basis, the United Nations might involve itself in the formulation and execution of verification provisions within agreements. Where a need exists, the United Nations should be prepared to help bring together verification expertise and encourage States to develop procedures through which this expertise can be applied in actual agreements.

97. Given that the distribution of technical verification capabilities is uneven, the United Nations Department of Disarmament Affairs should compile and manage a verification database. Member States would be invited to contribute to this database a wide range of information pertaining to arms control and disarmament. Such a database could include a catalogue of verification provisions, procedures, and methods as well as a catalogue of experts upon which members may call for assistance in designing verification systems or resolving disputes over compliance.

98. The United Nations should provide greater assistance, advice and technical expertise to negotiators in the regional arms control and disarmament process with a view to combining international mechanisms with regional measures for verification. In this regard, useful examples are provided by the verification system of the Treaty of Tlatelolco which utilizes safeguards of the IAEA as well as the control measures provided by the Agency for the Prohibition of Nuclear Weapons in Latin America (OPANAL), and the comparable provisions of the verification system in the South Pacific Nuclear Free Zone Treaty.
99. The United Nations should further strengthen its capacity to investigate allegations of non-compliance. For example, fact-finding initiatives by the Secretary-General can help to bridge the gap between prohibition and verification, between the legislative and enforcement roles of the United Nations.

100. The United Nations should give consideration to means of improving the adequacy of the Security Council as a means of resolving verification and compliance difficulties.

101. The United Nations should examine the possibility that individual nations or groups of nations possessing verification expertise and means could offer such capabilities to the international community for use in the verification of multilateral agreements.

102. United Nations experts groups, specialized agencies of the United Nations such as UNIDIR, as well as the United Nations Department of Disarmament Affairs, should be tasked with conducting studies related to the subject of verification of compliance with arms limitation and disarmament agreements. In particular, these organizations should undertake specific experiments or tests concerning verification methodologies such as on-site inspection or space-based remote sensing. The general goal of such tests would be to improve multilateral verification capabilities. More specific objectives might include the development of standard operating procedures for these verification methods and the identification of technical problems. The 1984 technical test of the Conference on Disarmament's Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Seismic Events is a prime example of the practical contribution that such efforts can make in the arms control and disarmament process.

103. These United Nations bodies might also undertake research and examination of the organizational structures, procedures and techniques which might be devised and further developed for use by IVO-type organizations, utilizing the rich body of documentation generated over the years in the Conference on Disarmament and elsewhere.

Notes

1/ General Assembly resolution S-10/2.