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PEACE BY PIECE:
New Options for International Arms Control and Disarmament

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Abstract

From the end of World War II until the early 1960s, it was generally assumed that arms control and disarmament should be pursued through international measures. A period then began in which arms control was largely the preserve of the superpowers. This paper argues that a resurgence of international arms control is feasible, timely, and necessary. Present arrangements are inadequate to address current and potential challenges.

If progress in international arms control is to be made, two major problems must be faced: the difficulty of finding agreement on comprehensive, international measures; and the need for consensus. A piecemeal approach, a comprehensive plan of arms control and disarmament disaggregated into discrete, self-contained "modules", would overcome these problems.

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Introduction

> *The basis of a sound foreign policy, in this new age, for all the nations here gathered, is that: anything that happens , no matter where or how, which menaces the peace of the world, or the economic stability, concerns each and all of us.*
>
> Bernard Baruch, presenting a US plan for the international control of atomic energy, before the UN Atomic Energy Commission, 14 June 1946[1]

In the years immediately after World War II, as people searched for ways to prevent another such disaster and grappled anxiously with the new problems posed by nuclear weapons, it seemed natural to pursue international measures of arms control and disarmament. In June 1946, an international approach to nuclear arms control was in fact proposed by Bernard Baruch, on behalf of the United States government, at the first meeting of the United Nations Atomic Energy Commission. The commission had been established in January 1946 by a resolution adopted unanimously by the United Nations General Assembly, this being the first substantive decision ever made by that body. In the resolution, the new commission was mandated to make specific proposals:

> (a) For extending between all nations the exchange of basic scientific information for peaceful ends;
> (b) For control of atomic energy to the extent necessary to ensure its use only for peaceful purposes;
> (c) For the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction; and
> (d) For effective safeguards by way of inspection and other means to protect complying States against the hazards of violations and evasions.[2]

Four decades have intervened, nuclear weapons have not been outlawed, and the concept of an international system to control or eliminate them seems like a distant memory. Yet, a limited framework of nuclear arms control has been put into place, and part of that framework is international. Similarly, partial measures exist for the control or elimination of chemical weapons, biological weapons, and long-range missiles. Some of these measures are international. This paper explores options for strengthening and adapting the existing arms control and disarmament framework through many small steps--a "piecemeal" approach to peacebuilding. The ultimate objective is to create a comprehensive, universal, international arms control structure. There is a growing awareness that such a structure is necessary, particularly in view of the fluidity generated in world affairs by the thawing of the Cold War. At the time of this writing, we await the outcome of one manifestation of that fluidity--the Kuwait Crisis. The outcome is

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1 For the full text of Baruch's speech, see US Department of State, *International Control of Atomic Energy: Growth of a Policy*, US Government Printing Office, 1946.

2 See United Nations, *Weekly Bulletin*, 26 August 1946.

unpredictable, but one point is clear: the prior existence of a comprehensive, international arms control framework might have prevented the crisis and would certainly have diminished its significance.

Much of the discussion in this paper centers around the control of nuclear weapons, for four major reasons. First, the existing arms control framework is most highly developed for this class of weapons. Second, nuclear weapons are unique in their destructive power. Third, a comprehensive nuclear arms control structure would encompass most of the features needed to control other types of arms. Finally, the author has developed the concepts outlined here while working on a seven-year project to study and promote the internationalization of nuclear arms control.[3] Despite the nuclear focus, however, the concepts articulated here are generalizable to all armament types.

At this point, a definition of "international" arms control is in order. The term is meant here to refer to a process in which, ideally, the agreements are universal and nondiscriminatory, are negotiated and reviewed at international forums, and are supported by international institutions. The 1963 Partial Test Ban Treaty (PTBT) provides a good approximation to such an agreement, and the January 1991 conference which seeks to amend the PTBT--to make it a comprehensive nuclear test ban--may signal a revival of the international ethic which still prevailed in the early 1960s. Since that time, arms control has been largely a bilateral business. It is argued here that a return to internationalism is needed and is, although far from inevitable, a likely outcome of current trends. This paper describes measures that can facilitate that return.

Experience with nuclear arms control shows that the actual explosive devices are by no means the only entities which must be controlled. Delivery vehicles and the elaborate infrastructure which supports the warheads and the delivery vehicles must also be controlled. Associated technologies, such as those for anti-satellite warfare or ballistic missile defense, can affect the correlation of nuclear forces and must therefore be controlled too. Finally, one cannot afford to leave unregulated those civilian industries which could be redirected to the creation and sustenance of nuclear arsenals. The existing arms control framework applies restraints in some of these areas but is weak or nonexistent in others. Nevertheless, the outlines of a truly comprehensive, international nuclear arms control structure can be discerned from the many proposals which have been generated by governments and by non-governmental experts.[4] The structure would involve an unprecedented level of international regulation, both of military and civil

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[3] The Institute for Resource and Security Studies has, since 1984, sponsored the Proliferation Reform Project, whose purpose is to study and promote the use of multilateral measures to restrain nuclear weapons proliferation in all its dimensions. A publication that illustrates this effort is Gordon Thompson, *A Global Approach to Controlling Nuclear Weapons*, Institute for Resource and Security Studies, Cambridge, Mass., October 1989.

[4] In illustration, see Frank von Hippel and Roald Z. Sagdeev (editors), *Reversing the Arms Race: How to Achieve and Verify Deep Reductions in the Nuclear Arsenals*, Gordon and Breach Science Publishers, Montreux, Switzerland, 1990.

activities, but would not be as large or as intrusive as the national-level bureaucratic structures which, for example, collect taxes or regulate automobiles.

The remainder of this paper begins with a discussion of the expected context within which arms control will operate over coming decades. Then follows an outline of the existing framework of arms control, with particular attention to the Nuclear Non-Proliferation Treaty (NPT). An examination of deficiencies in this framework is then provided, followed by a presentation of arguments in favor of a comprehensive, international arms control strategy. The potential broad characteristics of such a strategy are then explored, followed by an outline of a "modular"--or piecemeal--approach to its execution. A scenario for the application of the modular approach is then offered, followed by some conclusions.

The Emerging Context of Arms Control

As the second millennium draws to a close, individual nations can no longer claim that their security is independent of the security of other nations. The industrial nations are tied together by a web of trading and financial arrangements that require careful management. All nations are susceptible to the effects of long-range air or water pollution, including global effects such as "greenhouse" warming and depletion of the ozone layer. Economic stagnation in developing countries is not only a local problem, but can indirectly affect many other nations by engendering political instability or environmental degradation.[5] The World Commission on Environment and Development has posed the problem starkly:

> The next few decades are crucial for the future of humanity. Pressures on the planet are now unprecedented and are accelerating at rates and scales new to human experience: a doubling of global population in a few decades, with most of the growth in cities; a five- to tenfold increase in economic activity in less than half a century, and the resulting pressures for growth and changes in agricultural, energy, and industrial systems. [6]

Governments have been slow to adapt to these new realities and continue to cling to traditional concepts of national security and sovereignty. Yet, a growing chorus of voices is urging them to update those concepts.[7] When governments do accept this challenge,

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5 The dangers associated with Third World economic stagnation have been succinctly described in Ivan L. Head, "South-North Dangers", *Foreign Affairs*, Summer 1989, pp 71-86.

6 World Commission on Environment and Development, *Our Common Future*, Oxford University Press, Oxford, 1987.

7 In illustration of the growing body of literature calling for an expanded concept of national and international security, see Jessica Tuchman Mathews, "Redefining Security",

they will be obliged to negotiate a restructuring of the international order at least as ambitious as that negotiated in the wake of World War II.[8]

The vast arsenals of the modern world are symbols of the lingering attachment to old concepts of national security. At their heart are thousands of nuclear weapons, providing a threat which is intended to "back up" large conventional military forces. In turn, the conventional forces are meant to allow particular nations or alliances to protect their boundaries and "interests". Few will argue that there is no longer any role for military forces, but it is increasingly accepted that they receive undue priority. Certainly, military means can do little to meet the new international security imperatives. Moreover, the large nuclear forces are themselves a major threat to security. Much effort is devoted to shaping these forces as credible instruments, yet their actual use would lead to destruction of the interests which are to be protected. Gradually, governments of the leading nuclear-weapon states have come to recognize this paradox and are therefore committed, at least rhetorically, to seeking negotiated reductions in nuclear weapons.

Competitive development of nuclear arsenals has occurred primarily as a part of the wider confrontation between the United States and the Soviet Union. Thus, this confrontation has been the main contributor to the risk of nuclear war, overwhelmingly the greatest short-term risk facing humanity. Important sectors of opinion in both countries have become conscious of this risk and wish to reduce it. Moreover, awareness has grown that the US- Soviet confrontation has been economically and socially damaging to both nations and can be aptly termed "the dance of the dinosaurs".[9] Consequently, the two governments have sought (initially with greater flexibility on the Soviet side) to scale back their confrontation.

While the superpowers are trying to lighten the burden of their competition in conventional and nuclear forces, they must reckon with the rise of other powerful nations or regions. For example, the European Community is emerging as a united economic entity, and there is growing support for a unified European approach to security issues. Japan has already become a major player on the world stage (and could be a military superpower if it chose), while a number of other nations (China, for example) are of growing economic and military significance. At the same time, the superpowers are losing their dominance of weapons technology, both conventional and nuclear. According to a US government commission, more than forty countries in Europe, Asia, the Middle East

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Foreign Affairs, Spring 1989, pp 162-177; World Commission on Environment and Development, *Our Common Future*, Oxford University Press, 1987; and Michael Renner, *National Security: The Economic and Environmental Dimensions,* Worldwatch Paper No. 89, Worldwatch Institute, Washington, DC, May 1989.

8 An indication of the scope and complexity of the needed restructuring can be gained from the proposals articulated in Walter Russell Mead, "American Economic Policy in the Antemillennial Era", *World Policy Journal*, Summer 1989, pp 385-468.

9 Marshall D. Shulman, "The Superpowers: Dance of the Dinosaurs", *Foreign Affairs*, America and the World 1987/88, pp 494-515.

and elsewhere will have, early in the next century, the capability to rapidly field small nuclear arsenals.[10]

The Kuwait crisis illustrates the potential for post-Cold War confrontations. Iraq has at its disposal large, battle-proven conventional forces equipped by the Soviet Union and other industrial nations, together with ballistic missiles and chemical weapons. This impressive capability has obliged the United States and its allies to transfer comparably large forces to the region in order to credibly threaten Iraq. Also, the prospect of an Iraqi nuclear weapon capability has been raised by the US government as a justification for attacking Iraq. Most non-government analysts do not accept this justification, but there is broad agreement that Iraq may acquire nuclear capability during the 1990s, to the potential detriment of regional stability. [11]

As demonstrated in this paper, the existing arms control agreements, practices and institutions are not well suited to these emerging conditions. A much more ambitious strategy is needed.

The Present Arms Control Framework

In the realm of nuclear arms control, the two superpowers have signed several bilateral agreements, such as the 1972 ABM Treaty (to limit defenses against ballistic missiles) and the 1987 INF Treaty (to eliminate ground-based missiles of 500-5500 km range). These two nations have also played a central role in negotiations that have led to several multilateral agreements, such as the 1963 PTBT (to ban nuclear weapon tests in the atmosphere, in outer space and under water) and the 1967 Outer Space Treaty (which bans the stationing of nuclear weapons in space and the use of the moon or other celestial bodies for military purposes).[12]

Progress has also been made in limiting other types of weapons. In November 1990, twenty-two nations from NATO and the Warsaw Pact signed the Treaty on Conventional Armed Forces in Europe (CFE), mandating sweeping reductions in tanks, aircraft and other equipment. During the Washington Summit of May-June 1990, the

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10 Fred C. Ikle and Albert Wohlstetter (Co-Chairmen) et al., *Discriminate Deterrence, Report of the Commission on Integrated Long-Term Strategy*, Washington, DC, January 1988.

11 See, for example, Matthew Bunn, "A Persian Gulf War to Stop an Iraqi Bomb?", *Arms Control Today*, December 1990, pp 23-26.

12 For general background on nuclear arms control, see Julie Dahlitz, *Nuclear Arms Control*, George Allen and Unwin, London, 1983; and Committee on International Security and Arms Control, National Academy of Sciences, *Nuclear Arms Control: Background and Issues*, National Academy Press, Washington, DC, 1985.

United States and the Soviet Union agreed to cease production of chemical weapons and to reduce their stocks of such weapons so that neither will possess more than 5000 tonnes by the end of 2002. There remains hope that a comprehensive, worldwide ban on chemical weapons will be achieved during the 1990s. A multilateral convention banning biological weapons has been in force since 1975.

Against this backdrop, one agreement--the NPT--stands out as a symbol both of hope and of disappointment. The hope has been that a large body of nations can voluntarily eschew an entire class of weapons--in this case, nuclear weapons. The disappointment is that the NPT, largely because of flaws imbedded in it from its inception, has not reduced the risk of nuclear war or eliminated the prospect of additional nuclear-armed nations.

The NPT was signed in July 1968 and entered into force in March 1970, with an initial term of twenty-five years. In becoming a party to this treaty, a non-nuclear-weapon state pledges to refrain from acquiring a nuclear arsenal and accepts inspection of its civil nuclear sector by the International Atomic Energy Agency (IAEA). A nuclear-weapon state agrees not to transfer nuclear weapons to other nations and pledges to "pursue negotiations in good faith" on nuclear arms control and disarmament. The seriousness with which that pledge was initially viewed can be gauged from a statement by U.S. President Lyndon B. Johnson in June 1968:

> In keeping with our obligations under the treaty, we shall, as a major nuclear-weapon power, promptly and vigorously pursue negotiations on effective measures to halt the nuclear arms race and to reduce existing nuclear arsenals. It is right that we should be so obligated. The non-nuclear states--which undertake by this treaty to forgo nuclear weapons--are entitled to the assurance that powers possessing them, particularly the United States and the Soviet Union, will lose no time in finding the way to scale down the nuclear arms race.[13]

A large majority of nations have become parties to this treaty, but two declared nuclear-weapon states (China and France) and a number of other nations (including Argentina, Brazil, India, Israel, Pakistan and South Africa) have not.

Non-parties have often justified their position by claiming that the NPT is a blatantly discriminatory instrument designed to preserve the world order of the 1960s. Other factors have undoubtedly influenced these nations' positions, but it must be admitted that their claim has merit. The NPT curbs the nuclear activities of its non-nuclear-weapon parties while placing little restraint upon its nuclear-weapon parties. Moreover, the Treaty allows the United States to allocate nuclear weapons to several of its nominally non-nuclear NATO allies, to be released into their custody at a time of crisis or war. These allies constitute a subgroup of "crypto-nuclear" states within the group of non-

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13 Statement to the UN General Assembly on 12 June 1968, on the adoption of a resolution commending the NPT. See US Arms Control and Disarmament Agency, *Documents on Disarmament*, 1968, p 434.

nuclear-weapon parties to the NPT.[14] Yet, despite these and other deficiencies, the Treaty is a positive contribution to international security and provides a base of experience upon which more enduring agreements could be constructed.

As indicated earlier in this paper, nuclear arms control negotiations in the latter part of the 1940s were predicated on the idea that an international approach was needed. That idea remained influential through the 1950s but lost power during the 1960s and was relegated to obscurity with the signing of the NPT. At that point, nuclear arms control entered a bilateral phase, during which the United States and the Soviet Union conducted negotiations without recourse to UN forums and with little regard for the opinions of other nations. Both superpowers clearly felt that the NPT locked important industrial countries such as West Germany and Japan into non-nuclear-weapon status, thus clearing the way for a bilateral approach. Other nations (such as India) were of lesser concern to the superpowers, as evidenced by their joint refusal, during the NPT negotiations, to make concessions which might have brought such nations into the NPT fold.[15]

Had the superpowers vigorously pursued negotiations to halt the arms race and reduce their nuclear arsenals, as promised by President Johnson in the quote above, the period of bilateral arms control during the 1970s and 1980s might have been an appropriate and productive sequel to the multilateral negotiations of the 1960s and before. However, the nuclear arms race continued apace during that period, the survival of the ABM Treaty (the principal product of the period) still remains in question, and negotiations to reduce strategic arsenals have proceeded at a glacial pace. The long-sought goal of a comprehensive ban on all nuclear tests, a measure singled out for mention in the preamble to the NPT, seems as far away as ever. This poor record has been a contentious issue at every NPT review conference, preventing consensus on a final declaration at both the 1980 and 1990 review conferences.[16]

In frustration at the superpowers' inadequate disarmament record, diplomats of many countries have searched for ways to revive the international arms control approach which preceded the NPT. As a first step, a group of nations which are parties to the PTBT called on that Treaty's depositary nations (the United States, the United Kingdom, and the Soviet Union) to convene a conference of all the parties to consider amending the Treaty so as to convert it into a comprehensive nuclear test ban. These nations have

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14 See K. Subrahmanyam, "An Indian Perspective on Proliferation", in Gordon Thompson (editor), *Perspectives on Proliferation,* Volume 1, Institute for Resource and Security Studies, Cambridge, Mass., August 1985, pp 26-30.

15 For an analysis of the NPT's negotiating history, see William Epstein, *The Last Chance: Nuclear Proliferation and Arms Control*, The Free Press, New York, 1976.

16 For accounts of the 1990 NPT review conference, see, for example, Charles van Doren and George Bunn, "Progress and Peril at the Fourth NPT Review Conference", *Arms Control Today*, October 1990, pp 8-12; and Homer Jack with Masamichi Kamiya, *Stopping the Spread of Nuclear Weapons: The Politics of the Fourth Review Conference of the Non-Proliferation Treaty*, World Conference on Religion and Peace, New York, September 1990.

exploited an amendment provision that was inserted in the treaty to help attract a large number of non-nuclear-weapon states. [17] The amendment conference had an opening session in May and June 1990, and its first substantive meeting is being held in January 1991. If a vote is taken, the outcome is predetermined in the sense that the United States has made clear its intention to veto any amendment. However proponents of the conference have anticipated this situation. With skillful diplomacy, citizen support, and some good luck, the amendment effort may apply enough political pressure to the nuclear-weapon states, and to nations on the threshold of that status, that a comprehensive test ban will be achieved before 1995 (the end of the NPT's current term). In any event, the effort will yield experience which could assist subsequent multilateral arms control endeavors.

Thus, viewed broadly, the present arms control framework is an incomplete structure, but one which contains some strong pillars. Although flawed, the NPT is one of those pillars. It has codified the non-nuclear-weapon status of most of the world's nations and has helped to curb the nuclear activities of non-parties. The bilateral phase of arms control, now two decades long, has also yielded important pillars such as the ABM and INF treaties. Each part of the present framework is intrinsically important, but the total experience of arms control is even more so. The patient diplomatic toil which has been devoted to this field has established precedents, created forums, and raised expectations to the point where it is realistic to contemplate filling in the framework's missing parts.

There is already evidence of a resurgent internationalism in arms control, a trend which will allow the new framework to become a truly international structure. The PTBT amendment conference provides part of the evidence, but other developments are also important. Negotiations toward a ban on chemical weapons are proceeding with broad agreement that the ban should be comprehensive, universal, and administered by an international agency. The CFE Treaty, although not an international agreement, is a success for multilateral diplomacy. During the Kuwait crisis, the UN Security Council has fulfilled some of the hopes invested in it when the United Nations was founded. These and other developments, although not conclusive evidence, are encouraging.

Deficiencies in the Present Framework

The present arms control framework is deficient, not because its elements are inappropriate or wrongly conceived, but because it is incomplete. Important activities are left partially or totally unregulated, and the resulting loopholes are inevitably exploited sooner or later.

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[17] See William Epstein and Glenn T. Seaborg, "Non-nuclear states move to end testing", *Bulletin of the Atomic Scientists*, June 1989, pp 36-37.

In illustration of the present deficiencies, consider the following statement made in a US Congressional Research Service Study on missile proliferation:

> To be able to deter or retaliate against attacks by the new missile powers, the United States (and the Soviet Union) may have to retain a larger missile inventory than would have been necessary to counter its traditional adversaries. Both the United States and the Soviet Union may feel less able to agree to restrictions or reductions in future strategic arms control talks. Both sides may find it advisable to develop new offensive, as well as defensive, missile systems to counter threats from the new missile powers.[18]

Proliferation of ballistic missile capability is proceeding at a rapid pace, with only limited regulatory restraint. [19] Such proliferation creates a number of problems, including the one mentioned in the quote--its potential inhibiting effect on superpower arms control and arms reductions. Yet, missile proliferation is only one of the disturbing and poorly regulated trends in the proliferation of military capabilities.

Consider nuclear weapon proliferation, where it is helpful to think in terms of three primary "dimensions" of proliferation, a convention widely accepted in analytic circles. According to this convention, the first dimension is "horizontal", which refers to the acquisition of nuclear weapons by nations not previously possessing such weapons. The second dimension is "vertical", which refers to growth in the sizes or capabilities of existing nuclear arsenals. Finally, proliferation may occur in the "latent" dimension, which refers to growth in the capabilities of nations to develop, produce and deploy nuclear weapons and their delivery systems, even though those nations do not actually possess nuclear weapons.

Earlier in the nuclear age, it was feared that horizontal nuclear proliferation would proceed rapidly. To date, however, the club of committed nuclear-weapon nations includes only the five declared nuclear-weapon states plus Israel. India conducted a nuclear test in 1974, and a few other nations--including the NPT parties Iraq and North Korea--have ambiguous nuclear postures.[20] However, these nations do not possess the sophisticated weapons, delivery vehicles and infrastructure necessary to rank with Israel, let alone with the major nuclear-weapon states. That is not to say that these "threshold" states could not acquire greater nuclear capabilities. Indeed, a large and growing number of nations have the industrial strength to acquire nuclear arsenals.

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18 Robert D. Shuey et al., *Missile Proliferation: Survey of Emerging Missile Forces*, US Congressional Research Service, Washington, DC, 9 February 1989.

19 See, for example Janne E. Nolan and Albert D. Wheelon, "Third World Ballistic Missiles", *Scientific American*, August 1990, pp 34-40.

20 See, for example, Leonard S. Spector, *The Undeclared Bomb*, Ballinger Publishing Company, Cambridge, Massachusetts, 1988.

Vertical nuclear proliferation has proceeded with a vengeance since the beginning of the nuclear age. This process is well known and well documented, but two contemporary developments deserve mention here. First, current programs are expected to yield a "third generation" of nuclear weapons, which will be designed to channel their energy into particular forms (such as microwave radiation) and into particular directions.[21] Second, active preparations are under way for the militarization of space. If carried to completion, these plans will lead to the deployment of a variety of systems able to attack space objects from space or from within the atmosphere, or to attack ground, sea or airborne targets from space. Such deployments could have profound effects on the strategic nuclear balance and, indeed, on the entire world order.[22]

Latent nuclear proliferation is, to a degree, an inevitable by-product of industrial development. In the modern world, any prosperous and industrially sophisticated nation could produce its own nuclear arsenal. However, the spread of civil or naval propulsion nuclear technology adds to this potential, because it leads to growth in infrastructure and expertise that could readily be transferred to the development and production of nuclear weapons. This problem is well illustrated by the growing availability of fissile material.

Large amounts of fissile material (plutonium, to be specific) are becoming available as a result of programs for the reprocessing of spent fuel from commercial nuclear reactors. Current plans for such reprocessing imply the separation of about 350 tonnes of plutonium in non-communist countries by the end of the century, including separation of about 30 tonnes in Japan and 4 tonnes in India.[23] For comparison, the cumulative production of military plutonium by the United States and the Soviet Union is roughly 100 tonnes in each case.[24] As new techniques of isotope enrichment spread, there is the further concern that a number of countries may acquire the capability to produce substantial amounts of highly enriched uranium.

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21 See Theodore B. Taylor, "Third-Generation Nuclear Weapons", *Scientific American*, April 1987, pp 30-39.

22 For critical analyses of space militarization, see, for example, John Tirman (editor), *Empty Promise: The Growing Case Against Star Wars*, Beacon Press, Boston, Massachusetts, 1986; and Yevgeni Velikhov, Roald Sagdeev and Andrei Kokoshin (editors), *Weaponry in Space: The Dilemma of Security*, Mir Publishers, Moscow, 1986. The potential for attacks on targets within the atmosphere using space-based systems is addressed in the latter of these two books and in Caroline L. Herzenberg, "Nuclear Winter and Strategic Defense Initiative", *Physics and Society*, Volume 15, No. 1, January 1986, pp 2-5.

23 These estimates are from David Albright, *World Inventories of Plutonium*, Report PU/CEES No. 95 (Rev. 1), Center for Energy and Environmental Studies, Princeton University, Princeton, New Jersey, June 1987. As a result of technical problems, citizen opposition, and the adverse economics of reprocessing, it is likely that these projections will not be entirely fulfilled. Nevertheless, a trend towards greater plutonium separation remains in effect.

24 See Harold A. Feiveson, Frank von Hippel and David Albright, "Breaking the fuel/weapons connection", *Bulletin of the Atomic Scientists*, March 1986, pp 26-31.

As pointed out above, a growing number of nations could join the nuclear-weapon club if sufficiently motivated to do so. For example, Japan and West Germany each have the industrial capability to deploy large and sophisticated nuclear arsenals. It might therefore be argued that there is no reason for additional concern if such nations have access to large amounts of fissile material. That argument neglects the fact that access to a stockpile of fissile material could substantially decrease the time required for a nation to field a nuclear arsenal.[25] During a turbulent period of world affairs, this factor could be decisive in a government's decision to "go nuclear". If a government had access not only to a fissile material stockpile but also to a significant missile capability, the balance of judgement could be tipped even further. Moreover, the possession of such resources by one government could spur governments of other nations in a region into competitive efforts, with potential loss of regional stability.

Thus, nuclear proliferation is proceeding at different rates in the three primary dimensions. Fortunately, horizontal proliferation is proceeding relatively slowly. Vertical proliferation has a four-decade history of rapid development, curbed in limited respects by arms control agreements, with some prospect of further restraints. Latent proliferation is, however, proceeding at a growing pace, with no immediate prospect of restraint. If international conditions were to change substantially, this latent proliferation could be transformed into rapid rates of horizontal and vertical proliferation. A fully developed arms control framework would address these three dimensions in proportion to the threat which each represents. That is not the case at present.

Horizontal nuclear proliferation is curbed by the NPT and by a variety of other means, which collectively constitute an international non-proliferation "regime". In addition to the NPT, elements of this regime include: the "safeguards" system administered by the IAEA; regional treaties (such as the 1985 South Pacific Nuclear Free Zone Treaty) and their associated institutions; national measures (such as the 1978 US Nuclear Non-Proliferation Act); and a variety of bilateral or multilateral restrictions on trade in nuclear technology and materials. On the whole, the regime has been surprisingly successful. Although many nations would have sought to retain a non-nuclear status even in its absence, there is little doubt that it has provided a framework which has encouraged and facilitated such a status. At times, the regime has also provided an important barrier to nations which appeared to be seeking an ambiguous or overt nuclear posture.

It may be, however, that the non-proliferation regime has been fairly successful because it has not been strongly challenged. For many years, there was little question that non-nuclear-weapon parties to the NPT were fulfilling their Treaty obligations. More recently, developments in Iraq and North Korea have aroused concern. US Senator John Glenn recently wrote:

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[25] It is now well established that nuclear weapons can be made from the plutonium generated by reprocessing commercial spent fuel. See, for example, Amory B. Lovins, "Nuclear weapons and power-reactor plutonium", *Nature*, 28 February 1980, pp 817-823.

> Iraq is proceeding toward a nuclear-weapon capability without any apparent violation of its commitments under the Nuclear Non-Proliferation Treaty (NPT), and can come very close to acquiring nuclear warheads before a violation would occur (assuming it would even be readily detected).[26]

Since acceding to the NPT in late 1985, North Korea has resisted signing a safeguards agreement with the IAEA, while building a reactor, reprocessing plant, and other facilities at Yongbyon. Looking further ahead, some analysts argue that horizontal nuclear proliferation is a likely characteristic of the evolving Europe and may even be a stabilizing influence there.[27] The non-proliferation regime is not well equipped to address these and other possible challenges.

Some aspects of vertical nuclear proliferation have been curbed, primarily through bilateral arms control agreements. Many important aspects remain, however, weakly or not at all regulated. For example, there are few or no restrictions on the development and deployment of third generation nuclear weapons, new nuclear weapon delivery vehicles, anti-satellite systems or anti-submarine systems. Moreover, bilateral agreements do not restrain the lesser nuclear powers. Britain's nuclear-weapon activities are somewhat limited because of the extent to which these activities depend upon actions by the United States, but China, France and Israel are relatively free agents.

Multilateral arms control measures have not, as yet, placed any significant restraint on vertical proliferation. Indeed, multilateral measures have bestowed a kind of sanctity on such proliferation. For example, the framers of the 1985 South Pacific Nuclear Free Zone Treaty took pains to ensure that the treaty would not interfere with the nuclear-weapon activities of the superpowers. Where multilateral measures might appear to restrain vertical proliferation, that appearance is illusory. For example, nuclear-weapon parties to the NPT pledge not to transfer nuclear weapons "to any recipient whatsoever". Yet, as mentioned above, the United States has allocated specific weapons to its crypto-nuclear NATO allies, to be released into their custody at a time of crisis or war. Also, Britain has for many years openly traded nuclear weapons materials and design information with the United States (Britain being the junior partner in this deal). Recently, it has been disclosed that the United States has, since 1973, secretly maintained a similar relationship with France.[28]

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[26] John Glenn, "Proliferation Watch on Iraq", *Proliferation Watch*, US Senate Committee on Governmental Affairs, October 1990, pp 1-2.

[27] Differing perspectives on this theme are provided in John J. Mearsheimer, "Back to the Future: Instability in Europe after the Cold War", *International Security*, Summer 1990, pp 5-56; and Stephen Van Evera, "Primed for Peace: Europe after the Cold War", *International Security*, Winter 1990/91, pp 7-57.

[28] Richard H. Ullman, "The Covert French Connection", *Foreign Policy*, Summer 1989, pp 3-33.

Turning now to restraints on latent nuclear proliferation, one finds a very patchy picture. Efforts (often successful) have been made to deny specific nuclear technologies to selected nations. Such denial has probably been in the general interest, in the sense that it has helped to curb horizontal proliferation. However, relatively weak nations have been selected for this treatment, while powerful nations have been free to acquire or develop nuclear technologies more or less at will. Nuclear fuel reprocessing is a case in point. It is clear that this is currently an uneconomic technology, as was amply demonstrated by its failure to take root in the United States under the free market conditions imposed during the Reagan Administration. Yet, a number of countries (such as Japan) persist with large programs.

In the realm of non-nuclear, non-conventional weapons, arms control is largely confined to voluntary understandings on export controls. Exceptions, each of which has been mentioned above, are: the Biological Weapons Convention; the INF Treaty (which eliminates missiles rather than warheads); and the 1990 US-Soviet agreement on chemical weapons. For technologies and materials that can contribute to chemical weapons capabilities, voluntary export controls are coordinated by the Australia Group, an informal group of nations first formed in 1985. For missiles, a similar arrangement exists. In April 1987, seven Western nations announced the Missile Technology Control Regime. Under this arrangement, the partners agree to restrict exports of missiles, and their supporting technologies, where the missile could carry a 500-kilogram or heavier warhead over a distance of 300 kilometers or more.

Although valuable, these voluntary curbs on exports fall far short of what is needed. Many nations do not participate in these export control arrangements, which also lack the force of formal treaties. More fundamentally, an arms control policy based solely on export controls cannot succeed in the longer term. The discriminatory nature of such a policy invites circumvention for three powerful reasons. First, the symbolism associated with dividing nations into two camps, one of which is denied access to particular technologies and materials, supplies a compelling motive for circumvention. Second, the "second-class" nations may fear--perhaps with justification--that they will suffer a security disadvantage if they do not acquire the denied items. Finally, the excluded technologies may have, or be thought to have, civilian application, thus providing an economic motive for circumvention.

When one turns to conventional weapons, one finds a dearth of arms control. The CFE Treaty and other regional agreements are important in their particular contexts but have limited international significance. The United States and the Soviet Union held talks on mutual arms trade restraints during the late 1970s but failed to reach agreement. Thus, there are no international agreements limiting trade in conventional weapons, despite the obvious destabilizing effects of such trade.

In sum, the present arms control framework lacks many important components. It does not address all the threatening trends in weapons proliferation, and where it appears fairly

robust--as in the case of the NPT--it may in fact be fragile. Opportunities to build a more complete and resilient structure have been passed by, often because of the superpowers' insistence on controlling the process. There has been a recurring tendency to resort to discriminatory mechanisms, a tendency which ultimately limits the effectiveness of arms control.

The Case for a Comprehensive, International Arms Control Strategy

Many times throughout history, dominant groups have failed to recognize when the time has come to share power. Frequently, the results of this failure have been tragic. Governments of the superpowers and their allies should be asking themselves if they are in danger of making a similar error in regard to arms control. People everywhere should be interested in their answers, because an error in judgement could significantly increase the risk of war, including nuclear war. India's Prime Minister Rajiv Gandhi articulated this concern in a June 1988 address to the UN General Assembly, which included the statement:

> We cannot accept the logic that a few nations have the right to pursue their security by threatening the survival of humankind. It is not only those who live by the nuclear sword who, by design or default, shall one day perish by it. All humanity will perish. Nor is it acceptable that those who possess nuclear weapons are freed of all controls while those without nuclear weapons are policed against their production.[29]

This paper argues that power should now be shared, in the sense that the powerful nations should welcome and facilitate a transition of arms control, away from its previous bilateral focus and towards an international strategy. At the same time, other nations should be willing to accept the constraints that such a strategy will imply. Although far-reaching in its implications, the transition could, if voluntarily initiated, be gradual. Ultimately, after some decades, it will lead to a condition of international parity, in which nuclear arsenals have been eliminated and conventional weapons are severely limited. Initially, the transition will affect only the ways in which arms control issues are framed and debated. Five lines of argument in favor of such a transition are offered here, as follows.

First, the adoption of a comprehensive, international approach to controlling armaments would be a precedent for action on other international security problems. The existing arms control framework is more elaborate than the analogous frameworks currently available to address global environment, development, economic, and peacekeeping issues.

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[29] Prime Minister Rajiv Gandhi's Address to the Third Special Session on Disarmament of the United Nations General Assembly, 9 June 1988 (text provided by the Indian mission in New York).

Thus, the world community is better prepared for debate and action on arms control than for such efforts on other international security issues. Also, the social and political changes implied by an international approach to arms control, although substantial, would be considerably less than those required to resolve, for example, the "global warming" problem. Moreover, the adoption of a mature approach to nuclear and other weapons would set a tone of international cooperation, without which there seems little prospect of responding to the other international security imperatives.

Second, the present situation is potentially unstable. For example, continuing failure to address latent nuclear proliferation could lead to regional or global instability, precipitating a flood of horizontal and vertical proliferation. In that new and unfamiliar world, the risk of nuclear war would be increased. Yet, there seems little prospect of curbing latent proliferation unless vertical proliferation is reined in too. This is not simply because of resentment and wounded pride on the part of non-nuclear-weapons states (although that is important), but also for objective reasons. While the nuclear-weapon states continue to refine their arsenals, many nations will consider it imprudent to surrender all their offsetting capabilities. For example, a medium-sized industrial nation or a large Third World nation may be reluctant to surrender its actual or potential nuclear weapon capability if one or more of the superpowers retains the capability to wage war in or from space.

Third, the superpowers, as mentioned above, find their military burdens increasingly onerous. Thus, it is likely that they will be increasingly drawn to international measures of arms control through their sheer inability to achieve security in any other way. This trend is already evident in current negotiations on chemical weapons, and a similar trend may occur as further efforts are made to curb the proliferation of missiles. Over time, powerful nations will come to accept that the benefits to be gained from international measures can outweigh the loss of privilege entailed by submitting to such measures. Reductions in superpower nuclear forces will reinforce this trend. For example, these reductions may decrease the confidence with which allied nations view their superpower's "nuclear umbrella". A potential response, particularly at a time of international turbulence, would be for such a nation to acquire its own nuclear capability. Moreover, as the superpower nuclear arsenals shrink, it will become easier for other nations to become significant players in the nuclear game. Thus, paradoxically, superpower nuclear disarmament could place the non-proliferation regime under great strain.[30] An appropriate response by the nuclear-weapon states, and indeed by all nations, would be to promote an international strategy of arms control.

Fourth, an international arms control approach has a practical and moral basis which could command substantial public support in many countries. This is a factor which

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30 The stresses that may be imposed on the non-proliferation regime by superpower nuclear disarmament are addressed in Richard Leaver, *Australian Uranium Policy and Non-Proliferation*, Working Paper No. 45, Peace Research Centre, Australian National University, Canberra, June 1988.

advocates of a "realpolitik" approach tend to scorn, but which could be immensely important. After all, nations remain powerful only by enlisting the active support of their citizens. In a world of mass communications and global interactions, it is becoming increasingly necessary to extend this principle to the entire world population. Policies affecting international security must be seen as unsound unless they attract wide public support around the world.[31]

Finally, national policies in some key countries are evolving in directions consistent with a global arms control approach. The Soviet Union, through such actions as its 1985-1987 and 1989-1990 moratoria on nuclear testing, its December 1988 announcement of unilateral reductions in military forces, and its acceptance of intrusive inspections under the INF Treaty, is exhibiting behavior which contrasts favorably with its former stance. In the United States, the Reagan Administration's views on arms control matured markedly during Reagan's eight years in office. India has signaled its willingness to commit itself to a non-nuclear status. In his June 1988 speech before the UN General Assembly, Prime Minister Gandhi proposed a successor treaty to the NPT, to:

> give legal effect to the binding commitment of nuclear weapon States to eliminate all nuclear weapons by the year 2010, and of all non-nuclear weapon States to not cross the nuclear weapons threshold.[32]

This proposal should be regarded as an opening position for negotiations, and it should not necessarily be assumed that India would insist upon total nuclear disarmament by 2010 as a condition for its participation in a global arms control process. Through its position in the Non-Aligned Movement, India could also be influential in bringing other countries into that process.

Taken together, these arguments provide a compelling case for international arms control. Let us turn to examining the potential characteristics of such an approach.

Characteristics of International Arms Control

The ultimate guiding principles of international arms control are threefold. First, all dimensions of weapons proliferation should be addressed. Second, relevant activities in all countries should be controlled. Finally, all nations should share the responsibility for debating, deciding upon, and implementing the necessary regulations and constraints.

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31 For an alternative to realpolitik, see Stanley Kober, "Idealpolitik", *Foreign Policy*, Summer 1990, pp 3-24.

32 See note 29.

It must be accepted that these guiding principles cannot be put into full effect immediately. A transition period of some decades would be required, and it is premature to speculate about the course which that transition might take. However, three essential features of the transition can be brought into clear focus. First, the end-state of the transition must be one in which nuclear arsenals are eliminated. More precisely, the end-state must be one of "weaponless deterrence", a concept which we owe to Jonathan Schell.[33] Under this arrangement, the production, deployment or use of nuclear weapons by any nation would be deterred by the guaranteed capabilities of other nations to produce and deploy their own weapons.[34] Due to irreducible levels of latent proliferation, these capabilities would, to varying degrees, be possessed by all industrial nations. Second, the transition must rely heavily on the voluntary compliance of nations. The alternative is enforcement by a world government, an option which, even if feasible, would be fraught with difficulties.[35] Third, the transition must, at an early stage, draw all nations into a process whereby arms control issues are framed and debated. This would allow the most rapid possible translation of debate into action.

Since the central purpose would be to create a complete arms control framework, it would be important to preserve the already completed parts of that framework. This immediately raises the question: what is the appropriate future for the NPT? Unlike the PTBT and many other agreements, which have indefinite duration, the NPT's current term expires in 1995, at which time a conference is to be convened to decide "whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods". An indefinite or long-term (say 25-year) extension of the NPT in its present discriminatory form would be inconsistent with the concept of comprehensive, international arms control, while an immediate lapse of the treaty would be a major step backwards in international security. In fact, no responsible party would wish to see the NPT lapse without a replacement, and so its medium-term future is relatively secure (although some parties might be lost in 1995).

Now that a conference has been convened to consider amending the PTBT to convert it into a comprehensive test ban, it is natural to ask if it is appropriate to seek amendments to other multilateral treaties. In fact, such amendments have been discussed. For example, the former British diplomat M.J. Wilmshurst (now an IAEA official) has proposed amending the NPT to eliminate the possibility of peaceful nuclear explosions

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33 Jonathan Schell, *The Abolition*, Alfred A. Knopf Inc., New York, 1984.

34 For a critique of Jonathan Schell's ideas and an analysis of the prospects of minimizing nuclear arsenals, see James N. Miller, "Zero and Minimal Nuclear Weapons", in Joseph S. Nye, Graham T. Allison and Albert Carnesale (editors), *Fateful Visions: Avoiding Nuclear Catastrophe*, Ballinger Publishing Company, Cambridge, Mass., 1988, pp 11-32.

35 For an analysis of the prospects of world government and its relationship to nuclear disarmament, see Lee D. Neumann, "World Government", in Joseph S. Nye, Graham T. Allison and Albert Carnesale (editors), *Fateful Visions: Avoiding Nuclear Catastrophe*, Ballinger Publishing Company, Cambridge, Mass., 1988, pp 197-214.

and to encompass the concept of a "potential nuclear-weapons state".[36] However, the amendment provisions of the NPT make it likely that amendments will be defeated, and so the pursuit of such amendments may not be a fruitful diplomatic endeavor.

In view of the near-term need to draw nations into a process to frame and debate arms control issues, it is essential to consider the available options for that process and its agenda. Notably, forums are needed wherein all countries can consider the issues. The five-yearly NPT review conferences offer a potential forum on nuclear issues, but these conferences are too infrequent and are not open to all nations. A forum which deserves careful consideration is the UN Disarmament Commission. Set up pursuant to the Final Document of the UN's first Special Session on Disarmament in 1978, this body meets annually in New York to consider and make recommendations to the UN General Assembly. All UN members are also members of the Commission. To date, the Commission has been rather unproductive, in recent years remarkably so. However, reformed procedures and the new international climate made the 1990 session more productive than hitherto. Perhaps this forum is ready for a new mission.

Identification of suitable forums is only one requirement. It will also be necessary to establish an agenda to guide the debate. This agenda must go beyond rhetoric, dealing instead with the specifics of arms control. One way of framing the agenda would be in terms of a disarmament scenario. Such a scenario, encompassing three stages over the period 1988-2010, was in fact articulated by the Indian government as an accompaniment to Rajiv Gandhi's address to the UN General Assembly in June 1988.[37] However, a potentially more useful way of setting the agenda would be to employ a "modular approach", as explained below.

While appropriate forums and a suitable debating agenda are essential to reaching agreement on international arms control measures, the implementation of those measures will require new international agencies. These could take a variety of forms, and could supplement or subsume the IAEA. Their functions would include treaty interpretation, verification, and determination of compliance.[38] Responses to non-compliance should probably be pursued under the auspices of the UN Security Council.

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36 M.J. Wilmshurst, "Reforming the Non-Proliferation System in the 1980s", Chapter 7 and Appendix A in John Simpson and Anthony G. McGrew (editors), *The International Nuclear Non-Proliferation System*, MacMillan Press Ltd., London, 1984.

37 Rajiv Gandhi's address referred to an "Action Plan for Ushering in a Nuclear-Weapon-Free and Non-Violent World Order" (see note 29).

38 See, for example, Markland Policy Group, *Disarmament's Missing Dimension: A UN Agency to Administer Multilateral Treaties*, Science for Peace/Samuel Stevens & Company, Toronto, 1990; and Walter Dorn and William Epstein, "The Case for a United Nations Verification Agency: Arms Control through International Control", Appendix V in Sadruddin Aga Khan (editor), *Non-Proliferation in a Disarming World: Prospects for the 1990s*, Bellerive Foundation, Geneva, 1990.

A Modular Approach to Arms Control (or "Peace by Piece")

A severe problem with broad-scope arms control and disarmament programs, such as the Indian plan mentioned above, is that their acceptance, in their entirety, demands exceedingly propitious international political circumstances. Indeed, for practical purposes one can disregard the possibility that all major nations will simultaneously agree to all aspects of a comprehensive arms control plan. Thus, such plans can best serve an educational function.

Another important problem is the need, under present multilateral arms control arrangements, for consensus. Because that need is assumed to be paramount, it is easy for a powerful nation to prevent agreement on a negotiating mandate, let alone a treaty. Experience at the Geneva-based Conference on Disarmament demonstrates this point. Of course, nations cannot generally be compelled to accede to treaties, so the importance attached to consensus is understandable. Yet, perhaps there is a way for a subset of nations to reach their own agreement on a treaty, after which political pressures may build so as to bring initially recalcitrant nations into the fold.

One answer to both of the above problems is to conceive a comprehensive arms control and disarmament plan (such as India's), and then to break that plan into many self-contained agreements. Here, the term "modules" is used for those agreements, following the engineering use of the term. To the engineer, a modular system is one composed of self-contained elements which are designed so that they can be combined in a variety of ways. Such systems have proved themselves in many engineering applications.

Here, it is assumed that each module would be completely non-discriminatory, so that any nation could accede to it without alteration of the text. Moreover, it is assumed that the usual duration of each module would be indefinite, and that its depositary would be the UN Secretary-General. It would be possible for a nation to accede to a module unconditionally, to accede for an interim period, or to make its permanent accession conditional upon accession by one or more specified nations.

If this modular framework could be agreed in principle, nations could accede to particular modules whenever they chose to do so. Debate as to a particular act of accession would focus on the conditions which must be satisfied prior to accession, rather than on the terms of a negotiating mandate or the details of a treaty. Figure 1 provides a simplified illustration of how the process would work. In this illustration, nation N_1 has acceded unconditionally to every module, while nations N_2 and N_3 have been more selective. The possibility of a deal between nations N_2 and N_3 is evident from the fact that each of them has pledged its interim accession to a module to which the other is not a party, and each has made its permanent accession to that module conditional upon accession by the other.

FIGURE 1
Illustration of a Modular Arms Control Framework

Arms Control Modules	Nations N_1	N_2	N_3	...etc...
(1)	U	U	--	
(2)	U	I(5)	U	
(3)	U	--	I(5), C(N_2)	
(4)	U	I(10), C(N_3)	--	
...etc...				

Key

U: unconditional, permanent accession
I(X): interim accession for X years
C(N_i): permanent accession, conditional upon accession by nation N_i

The development of a comprehensive modular arms control framework would be a substantial intellectual task, beyond the scope of this paper. To illustrate that task, partial texts for some sample modules are presented here.

Figure 2 shows two non-discriminatory modules which are adapted, respectively, from Articles I and II of the NPT. The first of these modules prohibits all transfers of nuclear weapons and prevents three types of actual or potential transfer which are permitted by the NPT: (i) a nuclear-weapon state providing nuclear weapon assistance to another nuclear-weapon state; (ii) the making of preparations to transfer nuclear weapons from a nuclear-weapon state to its allies in the event of crisis or war (as is NATO practice); and (iii) a non-nuclear-weapon state contributing to the manufacture of nuclear weapons by a

nuclear-weapon state. The second module bans all acquisition of nuclear weapons, as well as preparations to receive such weapons.

FIGURE 2
Sample Arms Control Modules Adapted from Articles I and II of the NPT

* Non-Transfer of Nuclear Weapons (Adapted from Article I)

Each State Party undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; not to make preparations to transfer such weapons or explosive devices, or control over them; and not in any way to assist, encourage, or induce any State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

* Non-Acquisition of Nuclear Weapons (Adapted from Article II).

Each State Party undertakes not to seek or receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to make preparations to receive such weapons or explosive devices, or control over them; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

Figure 3 shows a module which bans the testing, deployment and use of anti-satellite weapons and which also constrains some other applications of space weapons. The module further prohibits any party from providing assistance to a nation which conducts one of the banned activities.

FIGURE 3
Sample Arms Control Module Prohibiting
Anti-Satellite and Other Space Weapons

The module would have a number of Articles,[39] of which the following two would be fundamental:

(1) Each State Party undertakes not to destroy, damage, render inoperable or change the flight trajectory of space objects of other States.[40]

(2) (i) Each State Party undertakes not to place in orbit around the earth weapons for destroying, damaging, rendering inoperable, or changing the flight trajectory of space objects, or for damaging objects in the atmosphere or on the ground.

(ii) Each State Party undertakes not to install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

(iii) Each State Party undertakes not to test such weapons in space or against space objects.

(iv) Each State Party undertakes not to provide any assistance in the testing, deployment or use of such weapons.

In some cases, an international module would express commitments to which particular nations are already bound by regional treaty or national legislation. Such a case is illustrated by Figure 4, which shows a module prohibiting the stationing or entry of nuclear weapons in national territory. The module employs language drawn from the South Pacific Nuclear Free Zone Treaty and from New Zealand legislation.

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39 These Articles are adapted from Appendix I of Union of Concerned Scientists, *Anti-Satellite Weapons: Arms Control or Arms Race?*, 30 June 1983.

40 The term "space objects" would correspond to "objects launched into outer space" in the 1967 Outer Space Treaty.

FIGURE 4
Sample Arms Control Module Prohibiting the Stationing or Entry of Nuclear Weapons in National Territory

The module would have three basic Articles:

(1) Each State Party undertakes to prevent in its territory the stationing of any nuclear explosive device.[41]

(2) Each State Party undertakes to prevent the entry into its internal waters of any foreign vessel which cannot be determined, by the Designated Official of the State Party, to not be carrying any nuclear explosive device.

(3) Each State Party undertakes to prevent the landing in its territory of any foreign aircraft which cannot be determined, by the Designated Official of the State Party, to not be carrying any nuclear explosive device.[42]

The Partial Test Ban Treaty fits most of the requirements of a module in that it is self-contained, non-discriminatory and of indefinite duration. If amended to ban all nuclear explosions, this treaty will become a more effective module. It will, however, differ from the concept of a module articulated here in that the amendment, once passed, will bind all nations which are Parties to the current treaty.

It appears that the Chemical Weapons Convention now under negotiation will satisfy most of the requirements for a module. Indeed, the Convention may set a precedent for the use of conditionality, in that some nations might make their permanent accession conditional upon certain other nations acceding.

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41 Article (1) is taken verbatim from Article 5(1) of the South Pacific Nuclear Free Zone Treaty.

42 Articles (2) and (3) have an intent similar to that of Parts 9 and 10 of the New Zealand Nuclear Free Zone, Disarmament and Arms Control Act 1987.

A great virtue of the modular concept is that it will allow progress toward a comprehensive, international framework to be made piecemeal. This will be equally true for the associated measures needed to address treaty interpretation, verification, and compliance. Such measures could be introduced as needed to support each new module, although the overall architecture of the verification system would need to be agreed on at a relatively early phase.

Because the modular concept can be implemented incrementally, while circumventing the need for consensus, it provides a practical basis for action during the 1990s. In some cases, modules might be used initially to address regional arms control needs, with subsequent expansion of their role to the global stage.

General adoption of the modular concept would allow the continuing debate about arms control and disarmament to turn not upon the ultimate objectives of the process or the nature of the arms control framework which would support these objectives, but upon the conditions required to sustain progress at any given time. If debate could be framed in that way over the next decade, then the problem of arms control could be said to have been "resolved" by the turn of the millennium, in the sense that the world community would have agreed on a standardized and predictable process to reach agreed objectives. The remaining task would be to continue the process for as many decades as necessary, until every nation had become a party to every agreement.

Clearly, arms control cannot proceed in a vacuum. Thus, progress of the kind outlined here could not occur unless other international security indicators were stable or improving. Yet, if the arms control problem were "resolved" in the sense describe above, those linkages could become specific and formalized, thus potentially facilitating continuing progress.

A Scenario for Application of the Modular Approach

The preceding discussion sketches a mechanism for building, module by module, the missing components of a global arms control structure. To illustrate that somewhat dry discussion, consider an optimistic scenario for the 1990s. Like any scenario, this should be viewed not as a prediction but as a tool to encourage imagination.

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In the early 1990s, especially in the wake of turbulent events in the Persian Gulf and Eastern Europe, citizen groups in many countries became aroused to the need to curb both conventional and mass destruction weapons. This sentiment was reinforced by a growing awareness that nations were becoming ever more interdependent, both economically and environmentally. In such an interdependent world, military forces were seen as a wasteful diversion of resources and political attention.

Governments of many small and medium powers responded to citizen pressure by pledging their commitment to arms control and disarmament measures. By the mid-1990s, these pledges began to take the form of formal treaty "modules", deposited with the UN Secretary-General. Germany and Japan took particularly prominent roles in this process, in response to their citizens' desire for a leading, but non-military, position in world affairs. As modules were deposited, a new international agency to administer them gradually took form. When the Chemical Weapons Convention was eventually signed, its administration was assigned to the same agency.

By the latter part of the decade, a majority of nations had formally eschewed any association with mass destruction weapons, long-range missiles, space warfare, and trade in conventional weapons. Many nations had made these commitments unconditionally, while others had conditioned the permanence of their commitments upon similar commitments by other nations. The United States and other military-oriented nations came under increasing political pressure, both foreign and domestic, to engage in international arms control.

As the 1990s drew to a close, the world was still far from disarmed. Yet, a clear consensus had emerged that uncontrolled production, deployment, use and trade of weapons was barbaric and obsolete. The broad outlines of a comprehensive, international arms control framework could be discerned, and a few nations had formally committed themselves to an entirely disarmed condition. A process was in place which had the potential, over subsequent decades, to bring all nations to that condition.

Conclusions

A comprehensive, international strategy of arms control is feasible, timely and necessary. Present arms control and disarmament arrangements are insufficient for the challenges of the coming decades, whereas an international strategy offers the prospect of keeping dangerous trends of weapons proliferation in check while facilitating deep reductions of existing arsenals and the ultimate achievement of a universal state of "weaponless deterrence".

This strategy can be pursued by building upon the existing international arms control framework. Successful amendment of the PTBT would represent an important step of that kind. The NPT, as an important part of the existing framework, should be preserved until replaced by agreements of at least an equivalent scope.

Although comprehensive, integrated goals are necessary, their practical achievement may demand that they be disaggregated. A piecemeal approach involving discrete, self-contained, "modular" agreements offers particular promise in this respect.

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