Testing Fever
Preparing for the Future Arms Race on Earth and in Space

- South Asia and Non-Proliferation
- Missiles, Space and Missile Defense
- Nuclear Weapons Development
- German Plutonium Balance
- New Agenda for a Nuclear-Weapon-Free World
The focus of this INESAP Bulletin has been planned since one year, when it became increasingly clear that the nuclear arms race had not ended, but was entering a new phase. Even before the nuclear detonations in South Asia shattered the world, there were plenty of indicators that major players in the international arena were preparing for military competition in the next millenium. Far ahead of all others, the last remaining superpower, in its all-encompassing quest for security against diminishing threats, continued to provoke new threats and subdue the development of high technology to the projected future battlefields on earth and the high grounds in space.

Since the beginning of the space age, the control of this new dimension of competition has been a central focus of US security policy. While the race to the moon was in the center of public debate in the 1960s (now revived with the Mars mission, films like Apollo 13 or John Glenn's return into orbit), the cold war inflamed a fierce battle between the US and the USSR on the military use of space. The fears of a “red space” are over now, but the alternative of a US-dominated space (John Pike) is not very attractive to the rest of the world. Expansionist attitudes, based on the experiences at frontiers in the Wild West, run through a number of recent documents on US space strategy, like the 1997 Long Range Plan “Vision for 2020” of the US Space Command or the 16-volume set “New World Vistas - Air and Space Power for the 21st Century” which was prepared by the US-Air-Force in 1996 (Regina Hagen).

What is at stake is the exploitation of the supposedly unlimited resources in space, which would serve the interest of those who are “first”. The struggle for being first would be a fall-back to attitudes of “survival of the fittest”. Justification for the expected revival of power play has been outlined in books like “The Clash of Civilizations” by Samuel Huntington or “War and Antiwar” by Alvin and Heidi Toffler. Such books do not “predict” future, they “invent” it. The underlying assumption of good and bad guys, of democratic and rogue states is nothing but the projection of the own attitudes towards others.

Unfortunately, nuclear weapons are an essential element of such awkward thinking, despite the assertions that future warfare would be based on surgical strikes and clean battlefields without casualties. Nothing can be less “surgical”, less “clean” and create more victims than nuclear weapons, despite all attempts to control their impact. In the previous years, the United States and NATO gave the clear symbol that nuclear weapons will remain a cornerstone of their security policy and will not be given up but need to be “modernized” (Jackie Cabasso). This message has been understood by Russia and by the emerging powers in the South. Therefore, it is not so unexpected that the year 1998 has seen India and Pakistan emerge as new declared nuclear weapon states (Zia Mian, M.V. Ramana, Merav Datan, Götz Neuneck) and a number of ballistic missile tests in various parts of Asia (India, Pakistan, North Korea, Iran).

After the nuclear shockwaves from the Rajastan desert in India, Bill Clinton’s regret to see “the Indian subcontinent repeat the worst mistakes of the 20th century”, might have been said honestly, but it also reflects the perception of a President who is more involved in personal affairs than in understanding the own role in the world’s conflicts. How can the commander of the greatest and most sophisticated nuclear force in the world ignore his own nuclear arsenal and attack India, a country which has demanded nuclear disarmament since five decades? Of course, India’s and Pakistan’s reasons to go nuclear need to be condemned like anywhere else, but it was ultimately the refusal of the nuclear haves to give up their arsenals that helped hawks in India to prevail and put the Gandhi tradition to rest. Now that India has behaved alike, the rogue states doctrine feels confirmed: don’t trust anyone. But it rather confirms the simple message from the cold war times: hawks need each other, wherever they are.

Different from the rather simple bilateral East-West arms race, the expected North-South and South-South arms races by far exceed the complexity of previous experiences. What makes it difficult to predict or control, is the diversity of states and their interests, the variety of conflicts and their causes, combining political, military, economic, ecological, religious or ethnic dimensions. Increasingly, the driving motives are related to the competition on the planet’s dwindling resources. This is especially true for Asia, where everything seems interconnected. For instance, nuclear testing by India can be seen as a reaction to the nuclear weapons of China and the United States, but it automatically provoked Pakistan to do the same. Pakistan has neighbors in the Middle East, who recognized the first Islamic bomb. Together with Iran and other Arab competitors this could stimulate Israeli threat perception and reactions, e.g. in missile defense. The same can be said for North-East Asia where in addition to the struggle between India and China a competition between China and Japan is on the horizon. The North Korean missile test, announced as a space launch (David Wright), has added to a strengthened cooperation of Japan with the US in missile defense, which in turn could lead to strong responses by China (Wu Chunsi).

The United States should help to contain this emerging arms race, rather than to fuel it by a missile defense system that undermines the basis of arms control, the ABM Treaty (George Lewis). The newly declared nuclear weapon states are a severe challenge to the current non-proliferation regime (Rebecca Johnson) and point to its transitory character. There is a bifurcation between a world with every nation having the right to go nuclear or a new norm which neglects this right to everyone. The way out of this dilemma is the design of new rules and international agreements, which strengthen international cooperation on earth and in space.

Despite the negative developments of this year there are still signs of hope (Janet Bloomfield, Pamela Meidell). One is the election of non-conservative governments in much of Europe, with the red-green government in Germany being the last one. This trend could form a basis for ending the century of violence as well as the nuclear age, in the civil and the military sector. For both, adequate accounting of plutonium is an important basis (Martin Kalinowski, Wolfgang Liebert, Silke Aumann). Another indicator are the on-going initiatives among governments to implement steps leading towards a nuclear-weapon-free world in the UN system, above all the New Agenda and the disarmament resolutions in the UNGA, which led to a shift of the anti-abolition stand of many NATO members. Still most activities occur on non-governmental levels, including the Middle Powers Initiative, the Model Nuclear Weapons Convention, the statements of US Bishops, the nuclear-weapon-free communities (Regina Hagen) and growing citizens inspections of nuclear and missile facilities.

Jürgen Scheffran
Table of Contents

Testing Fever
Preparation for the Future Arms Race on Earth and in Space

Non-Proliferation and the Nuclear Crisis in South Asia

The Non-Proliferation Regime in Disarray 4
Rebecca Johnson

Missile Test in Iran 7

India’s Nuclear Program 8
M. V. Ramana

Pakistan’s Nuclear Descent 10
Zia Mian

Stepping Away from the Nuclear Abyss - Some Proposals 12
Zia Mian, M. V. Ramana,

The Pakistani Ghauri Missile 14
Ashutosh Misra (excerpts)

Bringing Prithvi Down to Earth 15
Z. Mian, A. H. Nayyar, M. V. Ramana

Statement by Indian and Pakistani Military Personnel 16

South Asia and Nuclear Security 17
Merav Datan

Nuclear and Missile Development in South Asia 18
Data compiled by Götz Neuneck

Missiles, Space and Missile Defense

Tactical Missile Defense and East Asian Security 20
Wu Chunsi

Analysis of the North Korean Missile Launch 23
David Wright

The U.S. "3+3" NMD Program and the ABM Treaty 26
George Lewis

American Control of Outer Space in the Third Millenium 29
John Pike

High Gound in Space 34
Regina Hagen

Nuclear Weapons Development

Nuclear Hypocrisy in the US 37
Jacqueline Cabasso

Plutonium in Germany

A German Plutonium Balance 39
Martin Kalinowski, Wolfgang Liebert, Silke Aumann

News

Nuclear Weapons Free Darmstadt 45
Regina Hagen

New Agenda for a Nuclear-Weapon-Free World 48

Abolition 2000 Progress Report 50
Janet Bloomfield, Pamela Meidell,

The Morality of Nuclear Deterrence 53
Evaluation by US Pax Christi Bishops

1998 Summer Symposium 55
David Wright

Martin Kalinowski Moves to Vienna 56

Scientific Meeting “Space Use and Ethics” 56

Supplement

Achievements of INESAP from 1993 to 1998
The Non-Proliferation Regime in Disarray

Rebecca Johnson

The second session of the Preparatory Committee (PrepCom) for the 2000 Review Conference of the Parties to the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) closed in disarray in the early hours of 9 May, 1998. Within days, India shocked the world with a series of underground nuclear tests. A few weeks later, Pakistan responded with its own nuclear explosions. Three months later, India and Pakistan agreed to let the Geneva Conference on Disarmament (CD) start negotiations on a fissile materials treaty (FMT), which each had blocked (for different reasons). A month later, intensive negotiations with the United States and each other resulted in the two Prime Ministers announcing in New York that they would be prepared to sign and even ratify the comprehensive test ban treaty (CTBT) by September 1999. Ratification of the test ban treaty in the United States and Russia, however, will not come easy, as arms control continues to fall victim to domestic disarray and the manoeuvring of local hawks in the Duma and Congress. In the wake of 1998’s developments, what are the prospects for arms control, disarmament and non-proliferation?

Failure of the NPT Review meeting

The second session of the NPT review process set up in 1995 took place in Geneva over two weeks, but failed to come to agreement on anything but a bare skeleton of procedural decisions to enable next year’s meeting to take place. The main causes of failure were fundamental disagreements over implementing the 1995 Middle East Resolution, calling for a zone free of weapons of mass destruction in that region, and nuclear disarmament in compliance with the NPT’s Article VI. Determined not to antagonise the Israeli government during attempts in Washington and London to reinvigorate the Middle East peace process, the United States blocked attempts by the Arab States, led by Egypt, to address Israel’s nuclear weapon capabilities as part of the NPT review process. At the same time, all five nuclear weapon States (NWS) sought to ignore or sideline proposals by Canada, South Africa, Sweden, New Zealand and others for addressing nuclear disarmament more systematically and effectively.

South Africa had put forward practical proposals for ways in which the NPT review process could establish more effective mechanisms to increase pressure and progress for nuclear disarmament, requiring the special allocation of time to this issue at future meetings and the establishment of more concrete discussions on the elimination of nuclear weapons in a ‘subsidiary body’ of the NPT Review Conference. Canada had proposed that the (almost) yearly preparatory meetings, as well as the five-yearly Review Conferences, should be able to make statements on contemporary issues. Canada suggested short paragraphs calling for ratification and entry into force of the CTBT and ratification of START II and further bilateral progress in nuclear arms reductions, as well as statements about issues which the preparatory meetings had allocated special time to, such as the Middle East and the proposed ban on the production of fissile materials. The NWS were generally united in attempting to suppress all such proposals and put an alternative model forward, whereby the enhanced review process would be turned into a four year exercise in drafting text for adoption by the next Review Conference. Their concept, which played down the 1995 decisions and sought to reinstate ‘business as usual’, was backed by many EU countries, but caused anger and frustration among the non-aligned States.

In refusing to address the implementation of the 1995 Resolution on the Middle East, the United States called into question whether that resolution was an integral part of the indefinite extension package. The Resolution had been proposed by the depositary States (Britain, Russia and the United States) and adopted without a vote at the same time as the three decisions on extending the NPT and strengthening its review process. In challenging the status of the Middle East Resolution, the United States raised questions not only about whether that particular resolution had lasting validity beyond the political context of the 1995 Conference, but also about the validity and role of all the decisions on strengthening the review process.

The second PrepCom was never going to be easy. It took place in a context of serious regional problems and mounting frustration over the CD’s continued stalemate over its work programme following the conclusion of the CTBT. In order to gain consensus in 1995, the decisions on strengthening the review process were carefully phrased and ambiguous in places. The difficulties of the 1998 PrepCom were due in part to the contest between competing interpretations of the meaning and intent of the 1995 decisions and, perhaps, the NPT itself. The NWS want the Treaty to function as a lid on proliferation, preventing new countries from acquiring nuclear arms. The NNWS wanted non-proliferation, but they also wanted the Treaty to act as a lever for nuclear disarmament. The primary rationale for opposing indefinite extension was concern that it would remove their only leverage on the NWS for nuclear disarmament. Their acceptance of the extension decision (offering permanence) was therefore bought with the strengthened review process, which purported to be a different type of lever for accountability and implementation.

At the time of the second preparatory meeting, complacency appeared to be the biggest threat to the NPT regime. The NWS and a number of their allies seemed to have got what they wanted with indefinite extension and were thenceforward keen to suppress the aspirations prompted by the 1995 decisions on strengthening the review process. While China, Britain and France appeared genuinely worried by the collapse of the second PrepCom, some of the representatives of the United States and Russia were more sanguine, giving the impression that the failure of the new review process would not be lamented if it hastened a return to the less expensive and relatively manageable five-yearly Conferences — i.e. business as usual.
The South Asian nuclear crisis, with its implications for international non-proliferation and the Middle East may prompt a rethink. The United States has to tread a precarious tightrope between its Middle East strategy and non-proliferation objectives. If it operates double standards, as appeared to be the case at the meeting in May, the United States risks undermining the rationale and respect on which the non-proliferation regime relies.

The implications of the South Asian nuclear tests

Whether the tests conducted by India and Pakistan in May were of the actual number and type publicised by the governments of those countries is doubted by many, but is not central to the political debate. The tests shook the world in part because of their timing: less than two years after the signing of the CTBT. Despite India’s public rejection of the final treaty in 1996, most analysts had considered that the CTBT created a norm which would carry force even if it never took full legal effect. By testing, India was perceived to be threatening the credibility of the test ban and of the NPT regime, of which the CTBT formed a part. India’s tests, shortly followed by Pakistan, raised the spectre of a nuclear arms race in one of the more unstable regions of the world.

Although India, Pakistan and Israel have long been characterised as ‘nuclear capable’ states or even de facto nuclear states, the nuclear tests in May did more than confirm this. By means of the tests and in international fora since, India has sought to declare itself a nuclear weapon state. What does this mean? If the term is merely descriptive of the ability to manufacture nuclear weapons, then India was already a nuclear weapon state. The new danger is that of weaponising the ‘ambiguous’ capabilities. But the tests also threaten the basis of the non-proliferation regime. Since 1968 ‘nuclear weapon State’ has had a legal meaning, as defined in the NPT. Recognition in this context appears to be India’s real objective. In India’s view, the NPT conferred rights on the defined nuclear weapon States, which it considered that the 1995 decisions had made permanent. India has long castigated the impunity with which the NPT-nuclear powers carried on building up their arsenals through the 1970s and 1980s. Now, by declaring itself a NWS, India seems to want the prestige and technology-acceptance it associates with the NPT-nuclear powers. As a long time rhetorical advocate of nuclear disarmament, however, India sought to justify its tests as a challenge to the non-proliferation regime and those NWS which had treated the indefinite extension of the NPT as a permanently conferred acceptance of their privileged possession of nuclear weapons. In the legal sense, no amount of nuclear testing after 1 January 1967 can make India a nuclear weapon state under the NPT. Practically, however, it has become impossible for the non-proliferation regime to continue turning a blind eye to the capabilities and weapons of what used to be called ‘threshold states’. It is imperative therefore to find mechanisms to bring India, Israel and Pakistan into accepting obligations and constraints associated with arms control without in any way legitimising the acquisition of nuclear weapons. It is also necessary to underline that the definition of ‘nuclear weapon States’ in the NPT was not intended to legitimise the possession of nuclear weapons by anyone, but to identify and impose differential obligations, including nuclear disarmament. This fact has, however, been largely ignored, since the actual policies of the NWS do not appear to have been affected by their undertaking of the NPT’s rather vague commitments to nuclear disarmament: this is a problem for the regime, not a justification for accepting further NWS.

For both India and Pakistan, the decisions to test were driven mainly by domestic considerations, though for different reasons.1 Actual security considerations were either not high on the agenda or were not well analysed. Although both are keen to develop effective missile capabilities, neither country appears to have thought through how they would integrate nuclear weapons with their military force structures. By pushing Pakistan into accelerating its programme, however, India has nuclearised its regional relations, including the conflict over Kashmir, and challenged the credibility of international security based on nuclear non-proliferation.

Neither country can win the nuclear rivalry that has been set in motion; the question is rather, who will be the bigger loser? In India, public support for the Bharatiya Janata Party (BJP)-led coalition government, as well as the nuclear tests, has substantially eroded, proving that the electoral effects of the post-test euphoria were very short lived. Pakistan’s shaky economy is much more vulnerable to the effects of sanctions. Its weaker defence capabilities, combined with strong nationalistic sentiment, are factors that could give rise to nuclear adventurism, even pre-emptive first strike. Paradoxically, the need to get the sanctions lifted has resulted in both countries lifting their objections to the start of fissban negotiations in the CD and pledging to accede to the CTBT by September 1999. Such moves should be encouraged but cannot be fully relied upon in the long term. It may also be necessary to reconsider some form of security guarantees, especially for Pakistan, even though they are almost certain to remain outside the NPT. India and Pakistan urgently need to put in place better measures to enhance bilateral confidence-building and transparency, while at the same time all states with nuclear weapons or nuclear weapon capabilities must be encouraged to disarm or not to disarm; to de-alert, preferably by separating warheads from delivery systems; to commit to no use of nuclear weapons; to freeze their fissile materials stocks and place all nuclear facilities under fullscope safeguards, with a view to entering into negotiations on reducing stocks and eliminating all nuclear weapons.

FMT negotiations started in the CD

After years of trying, the CD on 11 August 1998 finally agreed to convene an ad hoc committee to negotiate a ban on the production of fissile materials (plutonium and enriched uranium) for nuclear weapons or other explosive devices. The conflicting political interests which held up the committee’s establishment were not resolved, but rather transferred to the context of negotiations. Three issues are likely to be most fiercely contested: the scope, and whether to include stocks; verification, especially the role of intrusive inspections at nuclear facilities; and the political purpose, namely how the measure relates to non-proliferation or nuclear disarmament objectives.
If stocks are ignored, the treaty runs the risk of appearing to legitimise the continued possession of weaponusable plutonium and enriched uranium by both the NPT-nuclear powers and the three nuclear capable States which have rejected the NPT. As such, it would barely contribute to disarmament and could undermine the basis of the non-proliferation regime. Including stocks, however, carries another set of problems. Firstly, what is meant by stocks: material excess to requirements (who determines?); material not contained in weapons (how to count?); the sum total of past production (including what is in current warheads?) or some other categorisation? Secondly, what is to be done with the stocks: just accounting, with greater transparency; reduction (on what basis or time frame?); placing under safeguards? In view of the opposition by the NPT-nuclear weapon States, India and Israel to including stocks in the proposed treaty, the negotiations would not have got started if stocks had been definitely included. In their view, such a measure would be tantamount to nuclear disarmament by attrition — which is precisely the attraction of this approach for disarmament advocates.

There are good arguments for increasing the levels of transparency and accounting regarding stocks, as that would also enhance the fissban’s verification. But even this will be resisted by (at least) China, India and Israel, whose nuclear policies rest to some degree on ambiguity. Following the post Cold War dismantlement of various nuclear weapons, the United States, Russia and Britain have each taken unilateral steps to place some of their excess weapons material under safeguards, so that it cannot be re-used in future weapons. Voluntary measures such as these could be widened and encouraged, but they do not address the underlying political concerns.

The stockpiles of India, Israel and Pakistan are much smaller than those of the NPT-nuclear powers. Globally their size may pose less of a threat, but they carry greater political burdens for two reasons: they breach the line drawn by the NPT; meant to limit nuclear possession to five; and they exacerbate regional rivalries in the Middle East and South Asia, complicating a context where conflict and distrust are already high. Not unsurprisingly, therefore, the principal advocates of including stocks in the fissban are Arab States. Pakistan, whose current stocks of highly enriched uranium are meagre in comparison with India’s plutonium reserves, is at the forefront of pushing for stocks to be declared, controlled and reduced to equal levels; if greater transparency and controls were in fact instituted, however, Pakistan might be less enthusiastic. Widening the ban, as a few delegations would like, to include commercial reprocessing (already under safeguards, but presenting long-term proliferation problems) and tritium, a fusional gas used to boost the yield of nuclear weapons, might be sensible from technical and disarmament viewpoints, but are nowhere near the horizon of political feasibility at present.

**New Agenda for nuclear disarmament**

On 9 June, eight foreign ministers, representing a cross section of political and geographical interests, issued a joint ministerial declaration for a nuclear weapons free world, identifying the need for a new agenda. The concept of this ‘New Agenda Coalition’ originated as an Irish-Swedish initiative, reflecting a growing unease about the ‘complacency’ of the nuclear weapon states and their squandering of the post Cold War opportunities, resulting in ‘meagre and disappointing’ progress on nuclear disarmament. It predated the NPT impasse and South Asian tests, but these both injected a sharper sense of urgency.

**Conclusion**

The lessons from the nuclear crisis in South Asia and the political and international impasse on nuclear disarmament must be assimilated. The alternatives will have to be spelled out uncompromisingly: nuclear free or nuclear-free-for-all. Non-proliferation based on the possession of nuclear weapons by a small elite group of ‘haves’ is inherently unstable and cannot be sustained indefinitely. If the NPT review process is not taken seriously, the non-proliferation regime could get into deep trouble. Although it is possible to offer suggestions for working out some of the procedural difficulties that will not address the fundamental division of interests regarding the purpose, objectives and implementation of the review process and, indeed, the Treaty itself.

Frustration with the lack of progress on Article VI and concern about the Middle East and the South Asian nuclear tests are prompting some NGOs to explore the process for amending the NPT, with a view to converting Article VI into a commitment to a nuclear weapon convention. The arguments in favour rest on the stated position of India (and assumed of Pakistan) that they would respect only a non-proliferation regime based on nuclear disarmament for all. Furthermore, the example of the Partial Test Ban Treaty (PTBT) is cited. A PTBT Amendment Conference was finally held in January 1991, at the request of one third of its signatories. Although no amendments were passed, because of opposition from the depositary NWS (Britain, the Soviet Union and the United States), the initiative is credited with having contributed to the mounting political pressure which finally gave the CD a mandate to negotiate the CTBT two years later. The principal argument advanced against this strategy for the NPT is that the Treaty could be fatally injured by attempts to amend it. There are two implicit assumptions here: that the NPT will remain robust despite threats of non-implementation to article VI and the further development of nuclear weapons by states outside the Treaty; and that the NWS would not commit themselves to actual nuclear disarmament, even to save the NPT.

The military postures of the NPT nuclear powers a decade after the end of the cold war suggest that the second assumption may be correct; in that case, the NPT rests (and has perhaps always rested) on false premises. Does this matter, if the Treaty functions as an effective proliferation inhibitor as it is? False ground is inherently unstable. The South Asian nuclear crisis and the conflicts of perception and purpose which stymied the second PrepCom (and which also contributed to the CD’s long paralysis) are illustrations of the growing importance of resolving the relationship between non-proliferation, nuclear arms control and nuclear disarmament. Papering over the cracks is no longer adequate.

Whether the NPT and further international obligations to nuclear disarmament are taken seriously is a fundamental question which is subject to rhetoric but seldom really examined. All pay lip serv-
As a way to keep the lid on the nuclear disarmament and those who see it as a vehicle to promote and achieve nuclear disarmament and those who see it as a way to keep the lid on the status quo.

From 1970, the Article VI obligations have never actually affected policy decisions in the nuclear weapon States. Article VI has a diplomatic but not operational function in their thinking. So what would be the implications for the non-proliferation regime if the NWS and many of their nuclear-umbrella allies were openly to acknowledge that they do not envisage real nuclear disarmament, but would actually prefer the maintenance of a very limited nuclear club with nuclear arsenals that are much less numerous than at present (but perhaps more advanced and flexible), combined with more efficient arms control and anti-proliferation mechanisms? Where does such a scenario leave the majority of countries without a nuclear ‘Big Brother’ to scare off the bullies (including other States’ nuclear brothers)? How would such a declaration be regarded by domestic populations, when more than 80 percent tell opinion polls that they want nuclear weapons to be totally eliminated? If it were possible to restrict the nuclear club to just a few holders, is this discrimination in favour of the ‘Big Five’ morally or politically desirable — or feasible?

In the wake of the South Asian nuclear tests it is important to reconsider the options and risks of different scenarios. Is it possible to have a stable non-proliferation regime without nuclear disarmament? If nuclear disarmament is not the real objective of the NWS and their allies, is it still valid to use the multilateral fora to prevent further proliferation and to encourage nuclear arms control and reductions? How seriously should States such as Egypt and South Africa be taken, when they say that they might have to reconsider their NPT obligations if nuclear disarmament is not effectively pursued or if the nuclear club is widened to accept India, Pakistan or Israel? The morning after conclusion of the NPT Review and Extension Conference in May 1995, its President, Jayantha Dhanapala, warned of the „grave danger“ of a mass exodus from the Treaty if the nuclear weapon states disregard the nuclear disarmament commitments. Are warnings such as these merely diplomatic ritual, or could this happen, and if so, what would be the consequences?

The prospects for nuclear disarmament are not encouraging, even though the CD has finally managed to begin negotiations on a Fissile Materials Treaty. The New Agenda Coalition has taken the lead in breaking the stale hegemony of the Cold War political groupings, but the United Nation First Committee votes will show whether they can draw in more countries from the middle ground, such as Japan, Canada, European Union and former Soviet States. They will need to beware of being co-opted by the non-NPT nuclear States (India has already announced its warm support), watered down by supporters of the NWS and nuclear alliances, or radicalised beyond the timid horizons of the all-important but frustratingly slow middle ground.

The role of non-governmental organisations can be two-fold: to identify and raise public support for the goals beyond the horizon and also the immediate steps that need to be undertaken; and to provide information and analysis to assist strategising and focus negotiations.

References
1. For a good summary of the motivations and regional implications, see Chris Smith, Nuclear Tests in South Asia, ISIS Briefing Paper No 69, June 1998.
2. See the Joint Ministerial Declaration by Brazil, Egypt, Ireland, Mexico, New Zealand, Slovenia, Africa and Sweden, entitled ‘A Nuclear-Weapons-Free World: the need for a new agenda’. See also the statement from David Andrews, foreign minister of the Republic of Ireland, 9 June 1998; statement from Swedish Foreign Minister.
4. A model nuclear weapon convention was first introduced by scientists, lawyers and disarmament experts during the 1997 NPT PrepCom and has subsequently been published as UN doc. A/C.1/52/7.

Author's Address: Disarmament Intelligence Review, 24 Colvestone Crescent, London E82LH, England, tel 44(0)1715038857, fax -9153, email: acronym@gn.apc.org

Iran successfully test-fires medium range missile

On July 22, 1998 Iran successfully test-fired a medium range missile with a range of about 800 miles, according to a senior administration official quoted in the “New York Times”.

The new weapon would put all Israel, all of Saudi Arabia, most of Turkey and a tip of Russia within Iran's striking range, and would alter the political and military balance of power in the Middle East, according to the official.

The test was detected by a US spy satellite, and intelligence officials were studying data from the launch. Analysts here believe that the missile was a Rodong missile bought from North Korea. It was launched and landed within Iran's borders.

A former intelligence official said: “The major reaction to this is going to be from Israel and we have to worry what action the Israelis will take, because the Israelis clearly view the Iranians as their main threat in the Middle East.” Israel is the only nuclear power in the region and its missiles are believed to be capable of striking any nation in the Middle East.

Iran is believed to be working on developing a nuclear warhead, but it is thought to be years away from making and testing such a weapon. The US is less certain about the size or sophistication of its programmes to develop weapons of mass destruction.

“The test will not come as a big surprise to the Israelis because they have been following Iran’s missile programme very closely,” an official said. “And they know, and we know, that ability to testfire a missile and the ability to develop, produce and deploy a large scale force are two very different things. It could take years for Iran to achieve that capability and we have to do our best to retard that.”

According to a senior administration official, Iran’s aim is not to strike at its enemies, but to be seen as a political and military force to be reckoned with in the Middle East. “There is some prestige element here,” he stated.

Iran has purchased technology for several ballistic missile programmes in parallel, buying Russian, Chinese and North Korean technology for many years. But officials here claim that they have had some success in limiting Russian and Chinese military assistance to Iran.

“The important point here is that they have very little indigenous internal capability to make a real missile, and they have required extensive outside technical support,” the former intelligence official said. “But they have been, willing to spend money. I would guess the Rodong would cost 10 million dollars.”

India’s Nuclear Program – From 1946 to 1998

M. V. Ramana

On 26 June 1946, when addressing a public gathering in Bombay, Pandit Jawaharlal Nehru, soon to be India’s first Prime Minister, said: “As long as the world is constituted as it is (emphasis added), every country will have to devise and use the latest scientific devices for its protection. I have no doubt India will develop her scientific researches and I hope Indian scientists will use the atomic force for constructive purposes. But if India is threatened, she will inevitably try to defend herself by all means at her disposal (emphasis added).”

After the nuclear tests of May 1998 the Indian Prime Minister Atal Behari Vajpayee triumphantly announced that India was now a Nuclear Weapon State. In his view, this was “India’s due, the right of one-sixth of humankind...” and that “these are weapons of self-defence.” Having supported the acquisition of nuclear weapons for forty years, he declared that India now had a “big bomb.”

The early beginnings

The Indian nuclear program was started in the mid-forties, around the time it gained independence from British rule, and soon after the United States bombing of Hiroshima and Nagasaki. The legacy of colonial rule and the destruction of Hiroshima and Nagasaki had a powerful impact on Indian leaders. They saw India’s technological backwardness and military inferiority as the main causes of colonization over two centuries ago. It was therefore natural that India would also follow the dominant power at the end of the Second World War, the United States, which relied on nuclear technology for energy as well as defense.

From the very beginning, the Indian nuclear program was ambitious and envisaged covering the entire nuclear fuel cycle. Over the years, apart from nuclear reactors, India also developed facilities for mining heavy water, reprocessing spent fuel to extract Plutonium and, more recently, enriching Uranium. Investment in this wide range of activities was often uneconomical. But it was justified on the grounds of self-sufficiency, a theme popular in post-colonial India.

At the same time, India under Nehru also tried to change the world so that it was no longer “constituted the way it was”. As a champion of the non-aligned movement, Nehru had made several disarmament proposals. Prominent among them was the Comprehensive Test Ban Treaty (CTBT). In a proposal dated April 8, 1954, he requested the nuclear weapon states to negotiate: “Some sort of what may be called ‘Standstill Agreement’, in respect at least, of these explosions, even if arrangements about the discontinuance of production and stockpiling must await more substantial agreements among those principally concerned.” The proposal, coupled with worldwide concern about the dangers of radioactive fallout, galvanized opposition to testing and resulted in the Partial Test Ban Treaty of 1963.

The first shift

Three events mark the shift in India’s nuclear program during the early sixties. The first was the completion of a reprocessing plant at Trombay and the CIRUS research reactor, which gave India the ability to extract plutonium and thus to make nuclear weapons. The second was the death of Jawaharlal Nehru. While encouraging the development of a militarily capable nuclear infrastructure, Nehru had always opposed explicit weaponization. The third event was the first Chinese nuclear test in 1964, barely two years after India lost the war with China.

In hindsight, the Chinese nuclear test was the most significant since the Chinese nuclear program allowed and has continued to allow the construction of a security rationale for the Indian nuclear program. With Nehru’s death the most significant political opposition to an explicit nuclear weapons program had been removed. Following the Chinese test, several influential individuals among the bureaucracy, political parties and intellectuals started arguing for India developing nuclear bombs. The chief arguments for developing nuclear weapons were largely based on the rationales used by the U.S. and the Soviet Union during the cold war. The “bomb lobby” argued that nuclear weapons are required to counter nuclear weapons, they guarantee security, and that they are relatively cheaper than conventional weapons and provide more destructive power. The elite in India also identified having a nuclear bomb as a source of international prestige.

The first official policy decision shaped by this constellation of factors was at the negotiation of the Nuclear Non-Proliferation Treaty (NPT) in 1967. After initial attempts to seek security assurances from the nuclear weapon states, India decided to vote against the treaty and argued against the its discriminatory aspects and pushed ahead with its nuclear program.

A little over a year after the NPT went into force, India and Pakistan fought their third war. During this war the US Seventh Fleet, led by the USS Enterprise, was sent into the Bay of Bengal. Henry Kissinger, Secretary of State at the time, claimed the move was designed not only to “assist” Pakistan, but also to “back up the Chinese”. For some Indian policy makers, however, the 1971 intrusion was a form of “gunboat diplomacy” – one that was possibly nuclear. This is regarded by some as a factor in the decision to conduct India’s first nuclear test.

The “Peaceful Nuclear Explosion” and after

On May 24, 1974, at the height of a nation-wide railway strike (led by George Fernandes, who was then a trade union leader and is now the Defense Minister), India conducted its first nuclear test at Pokharan in the desert in Rajasthan. The device tested is believed to have been large and heavy with a yield of about 8-12 kilotons, a little less than the weapon that was dropped on Hiroshima. The test used Plutonium from the CIRUS reactor reprocessed in the Trombay reprocessing plant.
The test led to the withdrawal of practically all cooperation in nuclear technology with the US and Canada. To avoid such problems in the future, India subsequently built a similar, but larger, research reactor called Dhruva. Dhruva started functioning in 1985. It has been estimated that India could have accumulated about 300-500 kgs of Plutonium from these two reactors. Assuming that Indian designs use less than 5 kg of Plutonium for each nuclear bomb, India may have sufficient stocks of fissile material for over 60 to 100 bombs. India has also built a uranium enrichment facility, ostensibly for the nuclear submarine program that was started in the late 1970s.

**The missile program**

The quest for nuclear capability also extended to developing vehicles for delivering nuclear weapons. As with the other nuclear weapon states, it was argued that having airplanes alone did not suffice. Consequently, in 1983, the Integrated Guided Missile Development Program (IGMDP) was set up. The program started with the development of five missile systems - the short range Prithvi (Earth), the intermediate range Agni (Fire), the surface to air missiles Akash (Sky) and Trishul (Trident), and the guided anti-tank Nag (Snake). By 1988, the results of the new program were visible - the first test of Prithvi was conducted on 25 February 1988. This was followed the next year with a test of Agni. Other missile systems are also reportedly under development – the Pinaka, the Sagarika and the Astra.

**The indefinite extension of the NPT and the CTBT**

In 1995, the NPT reached the end of its 25-year life and came up for review. A decision about extending it had to be made. Despite opposition by the Non Nuclear Weapon-States, the Nuclear Weapon-States, led by the US, forced through an indefinite extension of the NPT. The indefinite extension of the NPT provided grounds for a renewed campaign for nuclear weapons. In the domestic debate, the Indian bomb lobby argued that nuclear weapons were going to be around forever and India should either develop nuclear weapons or settle for permanent second-class status. To develop militarily useful nuclear weapons India had to test. Therefore it had to reject the Comprehensive Test Ban Treaty (CTBT). In 1996, India voted against the CTBT.

**The May 1998 tests**

The two Indian Prime Ministers (belonging to the center-left United Front party) who held office since 1996, despite voting against the CTBT, did not authorize any nuclear tests. This was left to the Hindu Nationalist Bharatiya Janata Party (BJP) under Prime Minister Atal Behari Vajpayee, who also declared that he has wanted India to have nuclear weapons for 40 years and that such weapons were the “due” of one-sixth of humanity.

Speaking at a press conference following the tests of 11 May 1998, the Prime Minister said that there had been three tests. One was a fission device with a yield of “about 12 kilotons,” a thermonuclear device with a yield of “about 43 kilotons,” and a sub-kiloton device. This was followed by two more tests on 13 May 1998, whose yields are claimed to be “in the range of 0.2 to 0.6 kilotons.” There has been much debate over these yields. Based on seismic data, several analysts have claimed that the yields are exaggerated and the real yield is much lower. In particular, no seismic signals from the May 13 tests have been detected. The uncertainty in the yield leads to grounds for skepticism over the claim that one of the devices tested is a thermonuclear fusion device (i.e. a hydrogen bomb).

These doubts notwithstanding, it is clear that unlike the 1974 test, these tests are clearly intended as steps towards weaponizing India’s nuclear capability. In the words of Abdul Kalam, the head of the Indian Defence and Research Development Organization (DRDO) and the architect of the Indian missile program, “Weaponization is now complete. We have tested the size, weight, performance, and vibrations” for nuclear warheads designed to go on Prithvi and Agni missiles. The DRDO has claimed responsibility for “weaponizing proven designs,” being involved in the “design, testing and production of advanced detonators, ruggedized high volt trigger systems, interface engineering, systems engineering and systems integration to military specifications” as well as “contributions in aerodynamics, arming, fusing, safety interlocks, flight trials…” There have also been statements that the tests have provided “critical data for the validation of our capability in the design of nuclear weapons of different yields for different applications and different delivery systems” and “significantly enhanced our capability in computer simulations of new designs and taken us to the stage of sub-critical experiments in the future, if considered necessary.” The Indian Prime Minister also stated that a Command and Control system was in place, thus making it clear that it is possible to deploy these weapons.

All these statements imply that India may be on the verge of fielding a full-fledged arsenal. Just as with the arsenals at the hands of the nuclear weapon states, these pose an immense danger to the people of South Asia and the World. The task of nuclear disarmament is urgent and important.

**References**


M.V. Ramana is researcher at the Center for Energy and Environmental Studies, Princeton University, Princeton NJ 08544 USA; tel +1-609-253-8092, fax -9330; email: ramana@princeton.edu. His work is supported by a SSRC-MacArthur Postdoctoral fellowship on International Peace and Security in a Changing World.
Pakistan’s Nuclear Descent

Zia Mian

Pakistan’s nuclear programme has always been seen by its leaders as part of a larger multi-dimensional strategic contest with India. What has changed has been the role and significance of the program in this contest. With the nuclear tests in May 1998, Pakistan’s leaders and nuclear weapon scientists have joined their peers in India and the other nuclear weapon states in preparing the means to devastate that which they claim to defend.

The government of Pakistan first announced that it was setting up an organisation for nuclear research and development in October 1954. Making the announcement, the Minister for Industries declared “the Government is conscious that with the enormous progress the world is making towards the utilisation of atomic energy for civil uses, adequate steps have to be taken without delay in Pakistan to work out a phased program of survey, research and ultimate developments in this field.” The motivation for this step was not hard to find. On the day of the announcement the Pakistani Prime Minister was meeting with President Eisenhower in the White House, who less than a year earlier had launched the U.S. Atoms for Peace Program. It was as with Bhutto as a cabinet minister that in 1963 that the government of Pakistan first “dissussed seriously” whether it should build nuclear weapons, or as he put it “embark on a coherent nuclear programme.” At that time, he claimed “the government of the day chose not to embark on a coherent nuclear programme.”

Pakistan’s desire to join the Atoms for Peace Program was not without strategic significance. At that time Pakistan was attempting to build a relationship with the United States in almost every possible area of social, political, economic and military activity. In 1954, US economic advisors were invited into Pakistan’s Planning Commission to write the Five Year Plans and shape the future of Pakistan’s economy. In the same year, the US agreed to give military aid, military advisors began to re-shape Pakistan’s armed forces, and Pakistan joined the first of several US led military alliances. Pakistan’s diplomats meanwhile defended US policy at almost every occasion, in the UN and other international fora, even though there was significant popular opposition within the country.

The reasons for these policies were straightforward. The US badly needed allies in the Cold War, especially in Asia and the Middle East area. Pakistan’s political and military leaders were prepared to provide such support, in the hope that the strategic relationship with the US and the military and economic aid that went with it would strengthen Pakistan in its contest with India. By supporting President Eisenhower’s grand new Atoms for Peace Program and setting up its nuclear program Pakistan was simply taking another initiative to show itself to be a reliable partner and ally.

It took almost a decade before Pakistani policy makers started to think about what they could do with their nuclear program. The first of these was Zulfikar Ali Bhutto, who had been educated in the US in the late 1940s – while the US was coming to terms with having used nuclear weapons to destroy Hiroshima (and thus it was claimed ending the war) and the start of the Cold War (with the first Russian nuclear test in 1949), and then at Oxford after 1950 – when Britain was setting up its own nuclear weapons programme, in part as response to the loss of empire.

It was as with Bhutto as a cabinet minister that in 1963 that the government of Pakistan first “dissussed seriously” whether it should build nuclear weapons, or as he put it “embark on a coherent nuclear programme.” At that time, he claimed “the government of the day chose not to embark on a coherent nuclear programme.” It appears the matter was taken up again in 1965, since Bhutto claimed “I know of two officials, who in 1965, ... vehemently opposed a coherent nuclear programme and supported the then President in the decision not to have a coherent nuclear programme.”

This latter discussion may have coincided with the 1965 India-Pakistan war, towards the end of which there was significant media speculation that India was only “10 months” away from a nuclear test, and public demands that Pakistan should pursue its own nuclear weapons programme. These demands also came from within the Pakistan Atomic Energy Commission. An editorial in The Nucleus, the official quarterly journal of the Commission argued “The recent war, inflicted by India on us, has shown once again, that even the best intentions can lead one to the battlefield. Every community has the duty, in the interest of its own survival, to contribute its share to the defense efforts. We as scientists shouldered a rather special responsibility: we have accepted the challenge of atomic energy and we must now try to prove ourselves equal to the task, be it peace or war.”

When Bhutto took office as president of Pakistan, in the wake of the 1971 war with India, he proceeded to do what he had wanted earlier governments had been reluctant to do. The decision to embark on a “coherent nuclear programme” was taken in Multan in January, 1972.

India’s 1974 nuclear weapon test increased the urgency of Pakistan’s fledgling nuclear weapons program. While its diplomats and leaders began to make one proposal after another on nuclear disarmament, as a way to restrain India’s nuclear weapons development, Pakistan’s nuclear scientists tried to gain access to the technology to make the material needed for nuclear weapons. The first effort was to try to acquire plutonium from spent nuclear fuel by using a reprocessing plant. Lacking such a plant, Pakistan tried to buy it. Despite all the evidence that it would be used to make nuclear weapons material, France initially agreed to the sale of such plant to Pakistan. However, US pressure on France eventually killed the deal.

Denied reprocessing technology, and thus plutonium, Pakistan turned to enriched uranium as the only other option. According to A.Q. Khan, the head of the enrichment programme, it was on July 31, 1976 that the Engineering Research Laboratories were set up at on the order of Zulfikar Ali Bhutto with the purpose of establishing a Uranium enrichment plant. Preliminary work began at a site in Rawalpindi, a pilot plant was established at Sihala and construction began of a main facility at Kahuta.

There are some problems with determining the progress of the enrichment program. A.Q. Khan has claimed that “within three years we had put up working prototypes of centrifuges.” This would suggest that engineering problems of setting up
and running the centrifuges had been solved. He claims “the first enrichment was done on April 4th, 1978,” and the plant (presumably Kahuta) was “made operational in 1979, and by 1981 was producing substantial quantities of uranium.” He claims that in 1982 they had successfully enriched uranium by 90%.

At the same time as the fissile material was being produced, work was going on preparing a nuclear test site. Work seems to have started in 1977-1978, and completed in 1982, after five years of work by the Pakistan Atomic Energy Commission and the Pakistan army. The work was by no means secret. Newspaper reports from that time noted that something was certainly going on, the New York Times reported in 1979 that US government officials claimed Pakistan was preparing an underground test site in a southern region of the country. The test site has been described as in the Raskoh range of mountains in the Chagai area in Southern Balochistan

The design and development work on nuclear weapons, carried out by scientists from the Pakistan Atomic Energy Commission, started at around the same time as the fissile material production and the testing site. The process has been described as one where PAEC mines uranium and turns it into hexafluoride which is then sent to Kahuta for enrichment. This enriched uranium is sent back to PAEC where it is turned into metal, and the weapons assembled.

It was in 1983, A.Q. Khan has claimed, that “cold tests” of a nuclear device were carried out. This gave the weapons scientists sufficient confidence in being able to test a weapon that “in 1984 we told General Zia that whenever you order, it will not take more than a week or two to do it.” More specifically, he said that the capability to explode a nuclear device was “attained at the end of 1984.” These tests have been reported in the international media. the New York Times claimed that “since mid-1985, according to American officials, the Pakistanis have tested several of the carefully shaped, high-explosive implosion devices.”

Having designed the weapons, and produced the fissile material, and having prepared a test site, not surprisingly the nuclear weapon scientists began calling for a nuclear test. A.Q. Khan has revealed that during General’s Zia’s government “some people asked him [Gen. Zia] to do so [test] but he said no.” Others have confirmed this, and claimed that “during 1993, A.Q Khan sought permission a number of times to carry out tests” but was prevented by the Foreign Office. Pakistan’s Prime Minister has gone on record as saying “our scientists have been pressing the government to detonate the device so as to enable them to check the nuclear data-base”.

Pakistan’s nuclear weapon scientists have been working on fusion weapons also. A.Q. Khan has said that “we are doing research and can do a fusion blast. If asked.” Similarly, Samar Mubarikmand has claimed that Pakistani scientists can produce thermonuclear devices: “Technically we can definitely make it but it will require a mandate and needs more funds for carrying out test firing of thermonuclear device.”

The Tests of May 28 and 30, 1998

The nuclear tests are reported to have been carried out by a team of over 100, mostly drawn from the Pakistan Atomic Energy Commission, and a few from the Defence Science and Technological Organisation and Kahuta Research Laboratories. By one account there the tests were carried out in a “a one kilometre tunnel, 12 feet wide and 10 feet high.” Another report describes the geometry as a 1km tunnel with an overburden of a 700m mountain. The tunnels were “sealed off with concrete to stop radiation leaking out.”

There are varying reports of the character and yield of the tests. A.Q. Khan has claimed that there were five tests, “one was a big bomb... of about 30-35 kilotons.. the other four were small tactical weapons of low yield.” A.Q. Khan has also claimed that all the weapons that were tested were boosted fission devices. However, one source, it seems from within PAEC, has categorically stated that “Pakistan tested no thermonuclear or tactical nuclear device.” PAEC has claimed the main test had a yield of 40-45kt, while the other four were of sub-kiloton yield, while Samar Mubarikmand has claimed that the yield of the five tests was 40-45kt.

The second test, on May 30th, took place in a different site, the Kharan desert, about 100 km from the site at Chagai. According to Ishfaq Ahmed, the head of PAEC, it was carried out in an L-shaped underground shaft.

There was initially some confusion about the number of tests on May 30th. National television and radio at first announced that two tests had been carried out. The official news agency, Associated Press of Pakistan, announced that there had been two tests. The same report went on to say that Pakistan’s Foreign Minister had confirmed that there had been two tests. Foreign Secretary, Shamshad Ahmed, in a press conference later that day said that there had only been one test.

There is a dispute over the number and yield of the tests as inferred from seismic data. Recent independent studies of the international seismological data suggest there only one explosion test on May 28 and on May 30, and that the yield of the May 28 explosion was only 9-12 kt, while the May 30 nuclear test had an estimated yield of only around 4-6 kt.1 These estimates are a factor of four smaller than what was claimed by Pakistani officials.

Despite the disputes over the actual number of tests and their yields, there is no dispute that nuclear weapons were tested. After two decades of hinting about Pakistan’s “nuclear capability,” while at the same time denying it, after innumerable leaks and interviews about having the option to make nuclear weapons but having chosen not to make them, the tests have been used to remove the lingering doubts about Pakistan’s nuclear weapons. As such India’s nuclear tests on May 11 and 13 created an opportunity that Pakistan’s nuclear weaponeers had longed hoped for. The Foreign Secretary said after the May 30th test “Today we have proved our credibility... There are no doubts left any more.” Foreign Minister Gohar Ayub claimed “What has been exploded, these are weapons.”

Reference

Stepping Away from the Nuclear Abyss
Some Proposals

Zia Mian, M. V. Ramana

F ollowing the examples set over the last fifty years by the U.S. and the other nuclear weapon states, the governments of India and Pakistan have now clearly chosen to rely on weapons of mass destruction and terror as the basis for their relationship with each other and the rest of the world. The nuclear tests they conducted in May 1998 and the accompanying political and military crisis raise genuine fears for the future of the people of South Asia. It is important therefore to understand some of the motivations and linkages that policy makers in the two countries work with and seek steps towards a safer future.

India’s current Bharatiya Janata Party can be distinguished from other Indian political parties and traditions by the fact that its politics are based on a violent intolerance of religious and ethnic minorities and determination to forge a new, Hindu, India. Just as it has not hesitated to use violence for achieving domestic ends, it regards the development of military might as the means to ensure that it gets its way in international affairs. This is at the core of its decision to move so decisively and quickly after coming to power and order the nuclear tests. The tests marked a rupture with over two decades of successive Indian governments supporting the nuclear weapons infrastructure but procrastinating about going the whole hog. Despite the many security-related justifications offered, for the BJP, the tests had as much to do with national pride as with other factors. In the words of India’s Minister of Science and Technology, the tests “reflected India’s endeavors to find a rightful place among the World’s powers.”

Such remarks coming from the highest levels of Indian government suggest that the BJP may not settle for anything less than a fully nuclear India, i.e. with deployed nuclear weapons. Reports of work on a new longer-range Indian missile and a nuclear submarine suggest the possibility that a real Indian nuclear force is being pursued. This, combined with the current levels of development of nuclear weapons and ballistic missiles, make it unlikely that India’s quest for a nuclear arsenal will be ended anytime soon.

Only if the nuclear weapon states genuinely moved to eliminate nuclear weapons would any Indian government be likely to consider nuclear disarmament. For in that case, India would have a status equal to that of the “great powers.” Indeed, shortly after the nuclear tests of May, the Indian government called for a convention banning nuclear weapons. More recently, as part of the South Asian Association for Regional Cooperation, India and Pakistan along with other SAARC countries called for the elimination of all nuclear weapons.

It is this perspective that suggests that while supporting reductions in nuclear arsenals of the nuclear weapon states, Indian political leaders are unlikely to accept serious restraints on India’s programs prior to a clear commitment by the nuclear weapon states that they are indeed disarming. It should be said, however, that there is a segment among India’s nuclear hawks, who have consistently espoused acquiring a full-fledged nuclear arsenal and opposed any restraint, who now see value in participating in arms control agreements that they had previously decried. Such participation now would, in their view, consolidate the gains they feel India made by carrying out its nuclear tests. India’s hawks may become its arms controllers.

The position of Indian opponents of nuclear weapons is a far more principled one. In a recent comment, Praful Bidwai, a leading anti-nuclear intellectual and activist, condemned India’s nuclear tests as “strategically irrational, politically outrageous and morally repugnant” and then went on to argue that India “should avoid the temptation of looking for devious bar-gains that... perpetuate nuclear weapon-states hegemonies and legitimize machtpolitik.”

Pakistan’s leaders have far simpler motivations and far smaller ambitions. For decades they have engaged in fearful competition with India, no matter how self-destructive. Pakistan’s nuclear weapons were presented first as a counter to India’s nuclear weapons, but have since become seen also as an “equalizer” against India’s conventional military superiority. In the wake of India’s tests and the attendant belligerence by the BJP government, Pakistan’s leaders took the opportunity offered them, an opportunity some of them had long hoped for, and followed suit. It is now hard to see Pakistan’s leaders giving up nuclear weapons without some sense of maintaining parity with India, and even insisting on creating such parity when it comes to conventional weapons. Pakistan’s refusal to agree to the No-First-Use proposal offered by India is a result of this perceived imbalance.

It is in this light that the linkage Pakistan’s leaders make between their nuclear weapons and the Kashmir dispute needs to be seen. Kashmir is undoubtedly a major flashpoint, one that has led to wars in the past. The recent shelling across the border indicates that the nuclear tests conducted by India and Pakistan have not stopped the low-intensity battle there, only the stakes have been raised. A settlement of the Kashmir dispute therefore seems vital as a way of reducing the risk of conflict escalating, perhaps inadvertently, into nuclear war.

However, there is a lesson to be learned from the persistence of massive nuclear arsenals in the U.S. and Russia after the collapse of the Soviet Union — even where the apparent source of conflict between two states is removed, if these states have nuclear weapons then the weapons remain, and so does the danger. The settlement of the Kashmir dispute may leave the same legacy. Settling Kashmir will also not remove the risk of war. The last war between India and Pakistan had nothing to do with Kashmir, and resulted in the largest number of casualties in any Indo-Pakistan war, the creation of Bangladesh from the former East Pakistan and 90,000 Pakistani prisoners of war.

Despite these reasons, if India does put caps on its nuclear program, Pakistan may...
well be forced to follow suit. Pakistan’s smaller infrastructure and economy is simply not capable of living up to the international pressure that is sure to ensue in the event that India acquiesces to the various arms control proposals suggested. The announcement of even limited sanctions after its nuclear tests was sufficient to trigger a near collapse of the Pakistani economy and has caused widespread hardship.

Seeking Pakistani participation in arms control through the imposition of sanctions and other punitive measures is, however, fraught with dangers. The last decade has seen Pakistan start to show signs of a deep crisis of legitimacy as a state and in its social order. The polity is fragmenting into warring religious and ethnic sectarian groups who battle out their differences on the streets of its cities amid collapsing infrastructure and lack of even basic social services. Sanctions have only led to further erosion of state authority and an increase in the popularity of religious nationalist groups.

In this context it is significant that the radical Islamist groups were the most vociferous in demanding that Pakistan conduct nuclear tests and they have subsequently adopted the bomb as their own. What is important is that many within the Pakistani state, the military and within the nuclear weapons program have sympathies with one or other of these groups. In such a situation, the state may not be able to ensure control over its nuclear weapons.

The site of conflict may not be restricted to Kashmir, even though Pakistan’s Islamist groups have played an increasingly important role there in the struggle against Indian occupation. They are also drawn to other profound and long-standing instances of injustice, such as the annexation of Pakistan itself. More broadly, the sanctions which have devastated Iraq and the pressures on Iran, presented largely in terms of containment and in its social order. The polity is fragmenting into warring religious and ethnic sectarian groups who battle out their differences on the streets of its cities amid collapsing infrastructure and lack of even basic social services. Sanctions have only led to further erosion of state authority and an increase in the popularity of religious nationalist groups.

In this context it is significant that the radical Islamist groups were the most vociferous in demanding that Pakistan conduct nuclear tests and they have subsequently adopted the bomb as their own. What is important is that many within the Pakistani state, the military and within the nuclear weapons program have sympathies with one or other of these groups. In such a situation, the state may not be able to ensure control over its nuclear weapons.

The site of conflict may not be restricted to Kashmir, even though Pakistan’s Islamist groups have played an increasingly important role there in the struggle against Indian occupation. They are also drawn to other profound and long-standing instances of injustice, such as the annexation of Pakistan itself. More broadly, the sanctions which have devastated Iraq and the pressures on Iran, presented largely in terms of containing proliferation “risks,” are widely seen as little more than a way of maintaining the dominance in the Middle East of a nuclear-armed Israel. In such an international environment, it seems inevitable that there will be crises which will lead to public pressure for Pakistan to intervene, despite the government insisting that their nuclear weapons are not an “Islamic bomb.”

In light of the Indian state’s insistence on some kind of parity with the nuclear weapon states, and the compulsions on Pakistan to follow despite socio-economic collapse, the challenge to the nuclear weapon states and those who would propose nuclear policies to them is to accept explicitly the need for nuclear disarmament and to begin fighting for it. This is undoubtedly a difficult challenge. But not as difficult as it once was. The peace movement and the non-nuclear weapon-states, which have struggled for decades to be heard, now find their arguments echoed by the likes of the former head of Strategic Command, George Butler, and other senior military and political figures from the nuclear weapon-states. It is also worth noting that on May 28, 1998, following the first set of nuclear tests by Pakistan, President Clinton said, “I cannot believe that we are about to start the 21st century by having the Indian subcontinent repeat the worst mistakes of the 20th century, when we know it is not necessary to peace, to security, to prosperity, to national greatness or personal fulfillment.” This is perhaps the closest any U.S. president has come to officially stating, albeit grudgingly and not focussing on U.S. policies, that it is a terribly wrong to believe that nuclear weapons are necessary for peace or security.

Steps Forward

Following India’s tests, the Prime Minister declared a moratorium on further nuclear tests. After its tests, Pakistan has made the same announcement. The positions of the two governments on signing the CTBT have been fluctuating. Recently, at the United Nations, both countries indicated a willingness to sign the test ban and help it enter into force provided sanctions were lifted, and other publicly unspecified conditions were met. There is however, a danger that refusal or delay in meeting India’s and Pakistan’s demands may lead to another round of tests. In all likelihood, as with France and China, after testing there would be prompt accession to the CTBT, rendering further sanctions and condemnation futile.

The other arms control measure that India and Pakistan have been encouraged to participate in is the Fissile Material Production Cutoff. Recently the Conference on Disarmament seems to have reached a breakthrough in getting India and Pakistan to agree to start negotiations on the FMCT. India has agreed to drop its condition that the FMCT be linked to a time-bound program of nuclear disarmament and Pakistan has agreed to negotiate on a treaty that would not consider past stockpiles. This is surprising and it is still to be seen if India and Pakistan maintain this new stance once negotiations start. Even after the tests, Pakistan’s ambassador at the Conference on Disarmament has said “as regards the FMCT, for Pakistan this issue is now depended on India’s nuclear status, its degree of weaponization and size and quality of its fissile material stockpiles. Pakistan cannot afford to allow India to once again destabilize the balance of deterrence in future through asymmetry in the level of stockpiles.”

In the atmosphere of distrust prevailing in South Asia, this divergence of interest in the FMCT makes the possibility of both countries signing the FMCT unlikely for some time to come. Since negotiations over such a treaty would take a long time, especially given the difficulties that are bound to arise in India and Pakistan over verification and inspections, starting negotiations alone is not sufficient.

A way round this problem is for the nuclear weapon-states, as part of preparing the ground for abolishing nuclear weapons, to formalize their existing moratoria on fissile material production and begin to place significant fractions of their fissile material under international safeguards. This would address India’s long-standing concerns that safeguards were discriminatory unless the nuclear weapon states allowed their facilities to be inspected. At the same time India could be asked to put its nuclear power reactors under safeguards. Without the possibility of running its power reactors at low burn-up, Indian capacity to produce large amounts of fissile material and so quickly build up its stocks is limited. This step gains in importance if it can be done soon, since India is scheduled to start reprocessing power reactor fuel at the new Kalpakkam Reprocessing Plant in the near future. In exchange for such a restriction on India’s fissile material production capability, Pakistan could be asked to not begin operation of its new plutonium production reactor at Khushab.

These agreements in themselves do little to reduce the immediate sense of dan-
ger to the people of the two countries. The most such measures could do is to restrict the potential devastation that they could wreak on each other. The other set of measures that should be pursued in parallel relate to the weapons themselves.

Over the last few years, it has been proposed that the nuclear weapon states take their deployed weapons off alert and introduce measures that increase the time it would take to launch a strike. In the case of South Asia, it is believed that India and Pakistan have not yet placed their nuclear weapons on missiles or otherwise deployed them. With this in mind, it is possible to build on proposals for a verified system of de-alerting the nuclear warheads of the nuclear weapon-states. It may be fruitful to invite India to participate in the verification of such de-alerting. This would meet some of its aspirations for recognition by engaging it in a process otherwise restricted to nuclear weapon states – India would be a participant-observer in the disarmament process. It may also put to rest some of the BJP government’s claimed concerns about China.

For its part, India could be asked to make an unverified commitment to keep its nuclear weapons de-mated as well as stop the testing and deployment of missiles, in particular the Agni missile, which is under development and which may allow it to threaten China. The relatively small size of the Indian arsenal means that India may be unlikely to accept full reciprocity in verification. In the current climate, if nuclear weapon-states demand reciprocal verification, India may well opt out.

An Indian agreement with the nuclear weapon-states freezing further development and deployment of its long-range missiles is likely to be seen as irrelevant by Pakistan. The contiguous border and the size and shape of Pakistan ensure that nearly all its major cities and military installations are within range of India’s short range Prithvi missile. There would therefore need to be a parallel but overlapping bilateral agreement between India and Pakistan covering such missiles.

One possibility would be for India to stop manufacture of its Prithvi missiles and agree to move its existing missiles to monitored storage far away from the border. In exchange, Pakistan would commit not to test or deploy long range missiles, such as the intermediate range Ghauri - which is justified by Pakistan’s government as a response to Prithvi. The difference in size between India and Pakistan means such an arrangement could remove the immediate threat to Pakistan’s major cities, while ensuring that Pakistan could not threaten any major part of India. The value of such a step for India is that despite public rhetoric in Pakistan, it is highly unlikely, that with just one test conducted so far, the Ghauri would be ready for deployment; halting future missile tests would therefore be significant.

The limited means available to both states and the importance they still attach to ambiguity about the numbers of nuclear weapons and missiles makes verification of such an agreement very difficult. However, the absence of even limited trust between the two states makes verification vital, especially since it is claimed Pakistan may have short-range Chinese made M-11 missiles which it has so far chosen not to deploy. One possibility would be for a single cooperative monitoring center, or two colocated ones, with international satellites providing Indians and Pakistanis identical high resolution imaging data from a several hundred km wide swath on both sides of the border. The exact width of the swath could be such as to ensure that neither Prithvi nor the M-11 could be deployed close enough to the border to be able to threaten significant areas of the other state without being detected.

Since both India and Pakistan could deliver their nuclear weapons by aircraft, any arrangement would have to cover not just missile development and deployment, but also airbases. India and Pakistan could simply agree to monitor activity at airbases through inspections.

This proposal, again, is only likely to create stability until the next crisis. The only certain way to prevent the deployment and possible use of nuclear weapons in South Asia as elsewhere is the absolute and unconditional abolition of nuclear weapons.

Reference


Zia Mian and M. V. Ramana, Center for Energy and Environmental Studies, Princeton University

The Pakistani Ghauri Missile

Ever since the Pakistani government announced in April its having conducted a test of the ‘Ghauri’ missile, 5th in the Hatf series, the debate is not so much on its lethality as its origins. In India, various theories have been floated in this regard. Pakistan claims it is indigenously developed but there are two schools of thought in India. One, attributing its lineage to China, and the other to North Korea.

According to Jasjit Singh of the Institute of Defence Studies and Analyses, “Ghauri is a CSS-5, a highly accurate weapon, which the Chinese themselves stopped producing some years ago but which has now made its appearance in Pakistan. Nobody had heard of Pakistan developing a missile with a 1500 km range. Its pedigree is not certain. It is not indigenous. That is certain.” Singh’s argument is strengthened by the fact that China supplied the M-11 (the so called, Hatf-3) missile variant to Pakistan. It is well known that 50 km west of Islamabad is a factory built with Chinese assistance at Fatehjung is said to have manufactured the guidance and control system and solid fuel for the M-11 (Hatf-3) missile variant.

The second school of thought is represented by the analysis conducted by S. Chandrasekhar, a former scientist at the Indian Space Research Organisation (ISRO), and now a faculty member at the Indian Institute of Management, Bangalore. Chandrasekhar attributes Ghauri’s origin to North Korea. He claims that it is a version of the Nodong I missile. Chandrashekhar has gone into the technicalities of the missile and investigated Dawn’s report that the missile weighed 16 tonnes, of which 13 tonnes was fuel. Dawn also reported that Ghauri had a one tonne warhead. Chandrasekhar argues that a solid propellant missile with these characteristics would not give Ghauri a 1500 km range. “If Ghauri, like Nodong, had a Scud lineage or four Scud engines clustered together, then it could be using a propellant combination of UDMH (unsymmetrical dimethyl hydrazine) and nitric acid, which would give around 235 seconds impulse”, he adds. Therefore, the missile could not go beyond 950 km. For Chandrashekar, Ghauri is a single-stage liquid fuel propelled vehicle.[…]

Whether the transfer constitutes an MTCR violation, and whether Ghauri has a 1500 km range with a 700 kg payload, and has been built indigenously, are matters that analysts want answers to. In the meantime, what is important is that India will have to compete with the missile technologies of China and North Korea. Sooner or later, the transfer of missiles to Pakistan would erode India’s technological superiority vis-a-vis the former.

Bringing Prithvi Down to Earth: Capabilities and Potential Effectiveness of India’s Prithvi Missile*  

Z. Mian, A. H. Nayyar, M. V. Ramana

This article summarises our technical evaluation of the effectiveness of India’s Prithvi missile. Our work, based on descriptions in newspapers, journals and magazines, suggests that if Prithvi is armed with conventional warheads and used against targets like airbases, command centres and radars, its military utility would be marginal.

Technical Features of Prithvi
- There are two versions of Prithvi. Prithvi I is said to carry a payload of 1000kg to a maximum range of 150km, while Prithvi II carries 500kg to 250km.
- The missile has a CEP (a measure of accuracy) of about 100-300 m, with the number 150 m quoted most often.
- Prithvi is fuelled by a liquid propellant, which is highly volatile, corrosive and toxic; thus, it has to be loaded just prior to launch, dangerous to crew in case of spillage or leaks, and cannot be used for practice exercises.
- Prithvi is deployed in missile regiments along with several other vehicles.
- The launch procedure is said to take about two to three hours.

Targets and Warheads for Prithvi
The descriptions of Prithvi’s intended use in the open literature are long and varied. Among these are “crippling air-bases, striking at large static (military) installations and headquarters.” Since the course of any war depends on achieving air superiority, Prithvi could best be used as a preamble to an air attack, it would make sense to target these.

Radars
Pakistan possesses several radars as part of its air defence system. If a missile attack is to be used as a preamble to an air attack, it would make sense to target these.

While these numbers are much smaller, it must be remembered that many radars are mobile; in order to attack them successfully, their exact location must be known. This requires extensive intelligence gathering capabilities.

Even without adding up all these separate requirements, with its current stocks estimated at around 60 missiles and a production capability of about 40 a year, it is clear that India lacks a sufficient number of Prithvis to mount a full-scale missile attack.

Airforce Capability
Many of the roles outlined here for Prithvi may also be performed by strike aircrafts. The IAF possesses Texas Instruments Paveway II guidance kits -used by the USA during the Gulf War to destroy Iraqi hardened aircraft shelters – for British bombs, and French anti-radar missiles. The total weapon load capacity of Indian aircrafts (with one sortie each) is equivalent to 3,000 Prithvi I or 6,000 Prithvi II missiles.

Missiles under Development
Our analysis also leads us to some conclusions about the effectiveness of the Indian and Pakistani missiles that are said to be under development.

Indian Missiles: If Prithvi is not militarily effective with conventional warheads, Agni and other long range missiles are likely to be even less effective since typically the CEP increases with range.

Pakistani Missiles: Like Prithvi, Pakistan’s Hatf missiles, or Ghauri, will also be militarily ineffective if used with conventional warheads. Since there are at least some indications that Pakistan is yet to develop sophisticated guidance systems, these would be more inaccurate than Prithvi and thus even less of a threat.

Conclusions
The present capability of India’s Prithvi missile, and the numbers that have been ordered to be incorporated into its armed forces, pose no significant immediate additional threat to Pakistan. However, Prithvi has already ignited a missile race, most evident in Pakistan testing the Ghauri. This progressive build up of missiles has only increased insecurity for both India and Pakistan. If the recent threats of the Indian government to induct nuclear weapons are carried out, and Pakistan follows its usual reactive policy, this insecurity is bound to increase.

<table>
<thead>
<tr>
<th>CEP (m)</th>
<th>N (missiles)</th>
<th>CEP (m)</th>
<th>N (missiles)</th>
<th>CEP (m)</th>
<th>N (missiles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>96</td>
<td>50</td>
<td>16</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>100</td>
<td>168</td>
<td>100</td>
<td>63</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>150</td>
<td>256</td>
<td>150</td>
<td>140</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>250</td>
<td>672</td>
<td>250</td>
<td>393</td>
<td>250</td>
<td>13</td>
</tr>
<tr>
<td>300</td>
<td>558</td>
<td>300</td>
<td>558</td>
<td>300</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 1: Prithvi Requirements for One Airbase  

Table 2: Prithvi Requirements for One Command Centre  

Table 3: Prithvi Requirements for One Radar

Joint Statement by Retired Indian and Pakistani Armed Forces Personnel Against Nuclear Tests and Weapons

Background

The recent nuclear tests conducted by India and Pakistan shocked many of us in the subcontinent and also many others worldwide. We as military professionals understand the devastating effects of such weapons and also the relatively primitive technologies, command and control systems that both countries can muster at this stage. Whilst not exonerating the hypocritical stand of the ‘Nuclear Five’, there is little doubt that neither India, nor Pakistan had done a detailed cost benefit analysis of taking such a far reaching decision. Many people argue that if USA can conduct over a thousand tests, and the others some hundreds, what is wrong if we go ahead with just a few? No one can fault the logic of the discriminatory aspect of this argument. However, what is at stake is not a demand for equality, but to determine whether any good will accrue to India or Pakistan by possessing these weapons. The traditional concept that this weapon gives you power, status and assured deterrence is flawed and totally discredited.

We are also well aware of the high risk involved in storing, maintaining and deploying such weapons. There is a high probability of these weapons being deployed accidentally or by design. In short all that these tests and weaponisation have done is to make both our countries that much more vulnerable to attack resulting in damage of incalculable proportions. How then, one may ask, will a joint statement from a few retired Armed Forces Personnel make any difference? If anybody should know the awesome effectiveness and the horrors of a nuclear exchange it would be men like us, some who have spent a lifetime in uniform, doing our duty by and for our countries, in war, peace and war and peace. So if we stand up now and tell our peoples that this madness of nuclear weapons in India, Pakistan and the rest of the world must end, chances are that they will take us more seriously than anyone else.

It will interest us to know that many others before us have also undergone a similar process of re-thinking about nuclearisation. As a part of the ‘Abolition 2000’ initiative, nearly 60 retired Generals and Admirals from a number of countries, including Gen Lee Butler, Head of U.S. Strategic command from 1992 to 1994, released a statement on December 5, 1996, calling for the elimination of all nuclear weapons. Gen Lee Butler had the awesome responsibility of controlling over ten thousand nuclear weapons during the cold war era. These people have been at the business end of nuclear weaponry, for many years and have come to the firm conclusion about the risks the world and its peoples are exposed to by the continuing retention of these weapons. A copy of that statement is available on the internet.

In our own modest way, Air Marshal Zafar A. Choudhry from Pakistan and myself, decided to launch a joint statement as given below. So far we have six signatories from India and one from Pakistan, as also one from Bangladesh who has especially asked to be included. We intend closing this list on 30 September after which I propose that we mail it to the Prime Ministers of Pakistan and India as also to the Heads of States of the Nuclear Five, and the Secretary General of the United Nations. Naturally we would like to get as many of the retired fraternity as possible to join us in this statement. Should any of you also share some of these concerns then please append your names or convey your willingness to do so to me or Ms Beena Sarwar <bsarwar@lakshmi.lhr-com.net> or to Harsh Kapoor <aiindex@mnet.fr>.

Kindly send us any other suggestions that you may have. With regards,

Admiral L. Ramdas - former Chief of the Naval Staff - India, 30 Aug 98

SIGNED

Air Marshal Zafar A. Choudhry
Admiral L. Ramdas (India)
Lt. Gen Gurbir Mansingh (India)
Major General M.A. Mohaiemen (Bangla Desh)
Brigadier John Anthony (India)
Brigadier Madhav Prasad (India)
Commodore Norman Warner (India)
Major Vijai Uppal (India)
Air Vice Marshal Saeedullah Khan (Pakistan)
Air Vice Marshal M. Ikrumullah (Pakistan)
Air Vice Marshal M. Y. Khan (Pakistan)
Air Vice Marshal C. R. Nawaz (Pakistan)
Air Commodore S. T. E. Piracha (Pakistan)
Air Commodore Rafi Qadar (Pakistan)
Air Commodore Ejaz Azam Khan (Pakistan)
Air Commodore Qamarud Din (Pakistan)
Air Commodore Habibur Rahman (Pakistan)
Air Commodore G. Mujtaba Qureshi (Pakistan)
Air Commodore A. Aziz (Pakistan)
Wing Commander N. A. Siddiqui (Pakistan)
Wing Commander M. Yunus (Pakistan)
Wing Commander Shajar Hussain (Pakistan)
Flight Lieutenant M. A. Mannan (Pakistan)
Group Captain N. A. Sheikh (Pakistan)
Group Captain Amir Shaf (Pakistan)
Group Captain M. Amin (Pakistan)
Group Captain G.M. Siddiqi (Pakistan)
Group Captain Khalid Jallil (Pakistan)
Group Captain Sirajud Din Ahmed (Pakistan)
Major Saeed A. Malik (Pakistan)
Dr. Capt. Tanig Rahman (Pakistan)
Brigadier Rao Abid Hamid (Pakistan)
Air Commodore Wahid A. Butt (Pakistan)

Contact Details: Admiral L. Ramdas (red), tel +91- 2141 - 48711, fax -48733, email lramdas@giadv01.vsnl.net.in.

Joint Statement

Recent developments in South Asia in the field of nuclear weapons and the means of their delivery are a serious threat to the well being of this region. The fact that India and Pakistan have fought wars in the recent past and do not as yet enjoy the best of relations, makes this development all the more ominous. The signatories of this statement are not theoreticians or arm-chair idealists; we have spent many long years in the profession of arms and have served our countries both in peacetime and in war. By virtue of our experience and the positions we have held, we have a fair understanding of the destructive parameters of conventional and nuclear weapons. We are of the considered view that nuclear weapons should be banished from the South Asian region, and indeed from the entire globe. We urge India and Pakistan to take the lead by doing away with nuclear weapons in a manifest and verifiable manner, and to confine nuclear research and development strictly to peaceful and beneficent spheres.

We are convinced that the best way of resolving disputes is through peaceful means and not through war – least of all by the threat or use of nuclear weapons. India and Pakistan need to address their real problems of poverty and backwardness, not waste our scarce resources on acquiring means of greater and greater destruction.

Source: South Asians Against Nukes (http://www.mnet.fr/aiindex/NoNukes.html)
South Asia and Nuclear Security*  

Merav Datan

With the recent round of nuclear testing, India and Pakistan have publicly submitted to the ideology of nuclear security. India, a longtime advocate of nuclear disarmament, points to its history of restraint as one reason for abandoning that restraint. Pakistan’s response was largely taken for granted, an indication of worldwide acceptance of the politics of arms races.

Nuclear security is the idea that the threat of nuclear mass destruction provides security. Over the decades, the nuclear weapon states have developed and refined arguments along these lines to support deterrence policy. They claim that nuclear weapons are essential for their own security, and that of their allies, but they deny these weapons to others. By testing, India and Pakistan have rejected the discriminatory nature of the current non-proliferation regime, while echoing nuclear weapon state security rationales such as self-defense and sovereignty. This new regional context exposes and magnifies the weaknesses and flaws of nuclear security.

Deterrence and proliferation

According to nuclear security logic, the weapons are necessary in order to ensure that they never be used. As justification for deterrence, its supporters point to a history of non-use of nuclear weapons. But non-use does not prove that deterrence has actually worked or explain why since the end of World War II nuclear weapons have not been used directly (though they have been used for political muscle flexing). Certainly nuclear weapons have not prevented war.

In any case, the facts of history do not prove that deterrence will work in the future. The continuing vertical and recent horizontal proliferation of nuclear weapons make it increasingly likely that nuclear weapons will be used, whether by design, accident or miscalculation. One state’s nuclear weapons are frequently the excuse for its neighbors and potential rivals to develop their own weapons of mass destruction, whether nuclear, biological or chemical.

Nuclear proliferation is fueled by continuing weapons development and deployment by nuclear weapon states, testing and other gestures that legitimize reliance on nuclear weapons, and the accelerating spread of nuclear materials and technology. The corresponding spread of reliance on deterrence policy increases the possibility that it will fail, that its assumptions will prove catastrophically false.

The pathology of nuclear security

At the heart of deterrence is the notion of security through military threat. Deterrence policy is used to mask the physical component of nuclear security — preparation for mass destruction — and to sidestep the moral and legal issues involved. The recent actions and statements of India and Pakistan mirror the security practices of the nuclear weapon states, highlighting the contradictions inherent in the underlying policies.

That nuclear weapons have come to be associated with progress and power is no mystery. Public support in India and Pakistan for the testing reflects this association and reveals widespread frustration with the nuclear weapon states and their stated intention to pursue nuclear disarmament. It also reveals the extent to which nuclear security has seeped into public consciousness worldwide. The illogic of nuclear security, the dependence on nuclear weapons for ‘national defense’ and the popular association of nuclear weapons with independence and development are inventions of the nuclear weapon states, imported wholesale into South Asia.

Reversing the current proliferation trend will therefore require a psychological shift, a rejection of nuclear weapons as a means to security or to anything but eventual unprecedented disaster. These weapons should not be a source of pride. They are carriers of the ugliest application human beings can make of their intelligence and resources. Their existence is a reflection of our greatest weaknesses: fear, distrust, greed and indifference to suffering.

Nuclear law

The debate within India over nuclear deterrence reflects the problematic nature of this policy. Some see deterrence as creating stability, while others see it as dangerous and irrational. The debate also reflects conflicting interpretations of international law and the Advisory Opinion of the International Court of Justice of July, 1996, on the threat or use of nuclear weapons. The Court did not directly address deterrence, but it did find the threat or use of nuclear weapons ‘generally’ contrary to the rules of international law.

The Court’s use of ‘generally’ represents its inability to determine the legality of the threat or use of nuclear weapons ‘in an extreme circumstance of self-defence, in which the very survival of a State would be at stake’. Indian analysts, like others, are divided over the significance of this possible exception to complete illegality. But the Court directs the way to resolve this ambiguity. The Court found that the difference of views on the legality of these weapons threatens the stability of international law and ‘the international order it is intended to govern,’ and that it is ‘important to put an end to this state of affairs’ through ‘complete nuclear disarmament’. In short, disarmament negotiations are the solution to the current instability, as demanded by international law and as interpreted by the highest international Court.

Nuclear weapons force the question: Rule of law or rule of terror? The choice is between a world kept ‘secure’ through constant threat of mass destruction and escalating risk of use, or a good faith effort to improve the function of legal and other mechanisms for genuine security. In the latter case, law is a tool, no more and no less. It can support conflict prevention and resolution, codify and standardize agreements, and help mediate conflicting interests.


Non-Proliferation and the Nuclear Crisis in South Asia
On the future of nuclear weapons the law is clear: negotiate and conclude nuclear disarmament. Fortunately, India’s role as a prominent player in the demand for disarmament has survived the nuclear testing. The Indian government, with strong public support, has called for a Nuclear Weapons Convention, a global, comprehensive and non-discriminatory regime for the prohibition and elimination of nuclear weapons. Halting and reversing the nuclear arms race in South Asia is only possible in the context of universal action toward complete nuclear disarmament. Keeping elimination in sight as a universal goal can also bring immediate steps into focus. Unilateral measures consistent with the final goal, such as fissile material cutoff, de-alerting and separation of warheads from delivery vehicles, will improve the credibility of the nuclear weapon states and the political climate for disarmament.

Are India’s calls for negotiations on a nuclear weapons convention genuine? According to the nuclear weapon states, they are not. The truth is probably more complicated. It is quite possible to have conflicting interests and goals, to have a state associate nuclear weapons with prestige and independence, even as its members would actually prefer the security of a nuclear weapons free world. But if the nuclear weapon states wish to discredit India’s demand, why not call India’s “bluff”?

The nuclear weapon states have enough of a military cushion that they have nothing to lose by responding to India’s call. Starting meaningful negotiations on complete nuclear disarmament would hurt no one and might reveal new approaches to stopping and reversing proliferation. Achievements to date have required great effort and risk, but have not prevented the growth of nuclear threats and nuclear insecurity. Negotiation, conclusion and implementation of a nuclear weapons convention and compliance with it are in the security interests of every single state on the globe.

Merav Datan is IPPNW’s new Director of Programs. Prior to joining IPPNW she was Research Director for the Lawyers’ Committee on Nuclear Policy (LCNP). Address: Physicians for the Prevention of Nuclear War, 126 Rogers Str., Cambridge, MA 02142, USA; tel +1-617-868-5050 x.216, fax -2560, email datan@igc.org.

### Security through Disarmament

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>Foundation of the Indian Atomic Energy Commission to explore uranium ore</td>
</tr>
<tr>
<td>1960</td>
<td>Beginning operation of the Cirus (Canadian-Indian Reactor, U.S.) heavy-water reactor by the “Bhaba Atomic Research Center” BARC in Trombay/India</td>
</tr>
<tr>
<td>1962</td>
<td>The USA declare readiness to export an 5 MWe light-water reactor to Pakistan.</td>
</tr>
<tr>
<td>1963</td>
<td>Beginning operation of the first plutonium reprocessing facility at BARC</td>
</tr>
<tr>
<td>1975</td>
<td>Acquisition and purchase of components for the gas-centrifuge technology in Kahuta/Pakistan</td>
</tr>
<tr>
<td>1980</td>
<td>Launch of a 35 kg satellite into orbit with the SLV-3 by India</td>
</tr>
<tr>
<td>1983</td>
<td>Start of the “Integrated Guided Missile Development Program”, aiming at the production of five missile types (Prithvi, Nag, Agni, Trishul, Akash) of different range</td>
</tr>
<tr>
<td>1985</td>
<td>A 40 MW fast breeder reactor goes into operation at Kalpakkam/India</td>
</tr>
<tr>
<td>1988</td>
<td>First test of the Indian Prithvi short-range missile</td>
</tr>
<tr>
<td>1989</td>
<td>Rajiv Gandhi and Benazir Bhutto sign an agreement, in which India and Pakistan oblige not to attack first the nuclear facilities of the other side</td>
</tr>
<tr>
<td>1989</td>
<td>First test of the Indian Agni (1500 km) and the Nag (4 km)</td>
</tr>
<tr>
<td>1994</td>
<td>Beginning of the Prithvi production</td>
</tr>
<tr>
<td>1996</td>
<td>The Indian Prime Minister Rao declares, India would not abandon its nuclear option</td>
</tr>
<tr>
<td>1997</td>
<td>Indian scientists announce the development of super computers</td>
</tr>
<tr>
<td>1998</td>
<td>Prime Minister Nawar Sharif declares that Pakistan has the atomic bomb</td>
</tr>
<tr>
<td>1998</td>
<td>Test of Trishul short-range missile and supposedly five nuclear explosions in India</td>
</tr>
<tr>
<td>1998</td>
<td>Test of the Ghauri intermediate-range missile and supposedly six nuclear explosions in Pakistan</td>
</tr>
</tbody>
</table>

### Data Compiled by Götz Neuneck

**Milestones of the Indian and Pakistani nuclear/missile programs and arms control efforts**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>Foundation of the Indian Atomic Energy Commission to explore uranium ore</td>
</tr>
<tr>
<td>1960</td>
<td>Beginning operation of the Cirus (Canadian-Indian Reactor, U.S.) heavy-water reactor by the “Bhaba Atomic Research Center” BARC in Trombay/India</td>
</tr>
<tr>
<td>1962</td>
<td>The USA declare readiness to export an 5 MWe light-water reactor to Pakistan.</td>
</tr>
<tr>
<td>1963</td>
<td>Beginning operation of the first plutonium reprocessing facility at BARC</td>
</tr>
<tr>
<td>1975</td>
<td>Acquisition and purchase of components for the gas-centrifuge technology in Kahuta/Pakistan</td>
</tr>
<tr>
<td>1980</td>
<td>Launch of a 35 kg satellite into orbit with the SLV-3 by India</td>
</tr>
<tr>
<td>1983</td>
<td>Start of the “Integrated Guided Missile Development Program”, aiming at the production of five missile types (Prithvi, Nag, Agni, Trishul, Akash) of different range</td>
</tr>
<tr>
<td>1985</td>
<td>A 40 MW fast breeder reactor goes into operation at Kalpakkam/India</td>
</tr>
<tr>
<td>1988</td>
<td>First test of the Indian Prithvi short-range missile</td>
</tr>
<tr>
<td>1989</td>
<td>Rajiv Gandhi and Benazir Bhutto sign an agreement, in which India and Pakistan oblige not to attack first the nuclear facilities of the other side</td>
</tr>
<tr>
<td>1989</td>
<td>First test of the Indian Agni (1500 km) and the Nag (4 km)</td>
</tr>
<tr>
<td>1994</td>
<td>Beginning of the Prithvi production</td>
</tr>
<tr>
<td>1996</td>
<td>The Indian Prime Minister Rao declares, India would not abandon its nuclear option</td>
</tr>
<tr>
<td>1997</td>
<td>Indian scientists announce the development of super computers</td>
</tr>
<tr>
<td>1998</td>
<td>Prime Minister Nawar Sharif declares that Pakistan has the atomic bomb</td>
</tr>
<tr>
<td>1998</td>
<td>Test of Trishul short-range missile and supposedly five nuclear explosions in India</td>
</tr>
<tr>
<td>1998</td>
<td>Test of the Ghauri intermediate-range missile and supposedly six nuclear explosions in Pakistan</td>
</tr>
</tbody>
</table>

**Presumed foreign contributions to Indian missile programs (examples)**

- License for the production of sounding rockets
- Delivery of the Viking motors, now the Vikas motor PSLV/II
- Test of the Vikas motors, produced in India, in France
- Delivery of measurement/calibration instruments to laboratories of ISRO
- Training of personal for rocket motor tests and GFK technology
- Wind tunnel tests with the SLV-3
- Development of radio-frequency interferometers and payload calculation
- Construction of testing facilities for Vikas rockets
- Delivery of segment rings for rocket motors for the PSLV
- Delivery of ground-to-air rockets (basis for Prithvi/Agni/2nd stage)
- Selling of seven cryogenic rocket motors
- Cooperation Sagarika SLCM/SLBM
- Supplied components for Agni, magnetrons + ignition systems
- Launches of US rockets on the Thumba test range
- Training of Dr. Abdul Kalam, the designer of the Agni
- US Scout sounding rocket as basis for SLV-3/Agni design
- Selling of equipment for simulation of vibrations

**Presumed foreign contributions to Pakistani missile programs (examples)**

- No Dong missile technology to Pakistan
- M-11 missile components or complete missiles
## Estimated stocks of Indian weaponusable plutonium at the end of 1994 and 1995 (in kg)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cirrus reactor</td>
<td>240</td>
<td>250</td>
</tr>
<tr>
<td>Dhruva reactor</td>
<td>150</td>
<td>170</td>
</tr>
<tr>
<td>CANDU (first discharge)</td>
<td>0-25</td>
<td>0-30</td>
</tr>
<tr>
<td><strong>Total production</strong></td>
<td>390-415</td>
<td>420-450</td>
</tr>
</tbody>
</table>

### Consumption

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Test in 1974</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>Processing</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>Losses (3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast breeder</td>
<td>-50</td>
<td>-50</td>
</tr>
<tr>
<td>Purnima</td>
<td>-35</td>
<td>-35</td>
</tr>
</tbody>
</table>

**Total consumption:** -105 = -105

**Total stock:** 285-310 = 315-345

**Mean value:** 300 +/- 30% = 330 +/- 30%

*Source: Albright, David et al.: Plutonium and Highly Enriched Uranium, Oxford 1997, p.269*

## Estimated production of weaponusable uranium in the Pakistani centrifuge enrichment facility at Kahuta

### Weaponusable uranium

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity (SWU/year)</th>
<th>Annually produced amount* (kg)</th>
<th>Totally produced amount (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>3000-5000</td>
<td>19-31</td>
<td>19-31</td>
</tr>
<tr>
<td>1987</td>
<td>4500-7500</td>
<td>28-47</td>
<td>47-78</td>
</tr>
<tr>
<td>1988</td>
<td>6000-10000</td>
<td>38-63</td>
<td>85-141</td>
</tr>
<tr>
<td>1989</td>
<td>7500-12500</td>
<td>16-28*</td>
<td>101-169</td>
</tr>
<tr>
<td>1990</td>
<td>9000-15000</td>
<td>28-47*</td>
<td>129-216</td>
</tr>
</tbody>
</table>

*Source: Albright, David et al.: Plutonium and Highly Enriched Uranium, Oxford 1997, p. 277*

## Data on the nuclear tests and the differences between the official information and data confirmed by experts

### INDIA

<table>
<thead>
<tr>
<th>Date</th>
<th>Official information</th>
<th>International Monitoring</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. May 1974</td>
<td>“peaceful test” [15 kt]</td>
<td>[2 kt]</td>
<td>Pokharan</td>
</tr>
<tr>
<td>11. May 1998</td>
<td>3 tests total 50 kt</td>
<td>2 tests total: 20 kt (CIA)</td>
<td>Chagai Hills</td>
</tr>
<tr>
<td>10:13:52.0</td>
<td>Low yield [&lt; 1 kt]</td>
<td>-</td>
<td>Poss.artillery shell</td>
</tr>
<tr>
<td></td>
<td>Fission [12 kt]</td>
<td>2 kt</td>
<td>Poss.Prithvi/air bomb</td>
</tr>
<tr>
<td></td>
<td>Thermonuclear [43 kt]</td>
<td>10-20 kt (Agni?)</td>
<td>Poss. boosted primary</td>
</tr>
</tbody>
</table>

| 13. May 1998 | 200 to, 600 to 1 Test cancelled | Failure/bluff (?) | Pokharan (sand dunes ?) |

### PAKISTAN

<table>
<thead>
<tr>
<th>Date</th>
<th>Official information</th>
<th>International Monitoring</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:16:25.7</td>
<td>Low yield [&lt; 1 kt]</td>
<td>-</td>
<td>29.06N 64.82 E</td>
</tr>
<tr>
<td></td>
<td>Fission [12 kt]</td>
<td>2 kt</td>
<td>29.06N 64.82 E</td>
</tr>
<tr>
<td></td>
<td>Thermonuclear [43 kt]</td>
<td>15-20 kt (Agni?)</td>
<td>29.06N 64.82 E</td>
</tr>
</tbody>
</table>

| 30. May 1998 | 2 tests 18, 12 kt, 1 test 4.3 [1.5 kt] | 28.56N 63.84 E |
| 6:55:06     | Chagai Hills | Chagai Hills |

**Date**

- **Official information**
- **International Monitoring**
- **Remarks**

**INDIA**

- 11. May 1998: 3 tests total 50 kt 2 tests total: 20 kt (CIA)

**PAKISTAN**

- 30. May 1998: 2 tests 18, 12 kt, 1 test 4.3 [1.5 kt]

**Remarks**

- Pokharan (sand dunes ?)
- Chagai Hills

**Selected Literature**

- Eric Arnett: Military Capacity and the Risk of War, China, India, Pakistan and Iran, Oxford 1997.

**Notes**

- a Tails Assay 1 of 0.5% and the feed 1 from natural uranium
- b It is assumed that between May 1989 and June 1990 no weaponusable uranium has been produced because of an instruction of the former Prime Minister Benazir Bhutto.
- c It is assumed that only in the first half of 1991 weaponusable uranium has been produced.

---

**Non-Proliferation and the Nuclear Crisis in South Asia**

**Selected Literature**

- Arnett, Eric: Military Capacity and the Risk of War, China, India, Pakistan and Iran, Oxford 1997.

**Notes**

- a Tails Assay 1 of 0.5% and the feed 1 from natural uranium
- b It is assumed that between May 1989 and June 1990 no weaponusable uranium has been produced because of an instruction of the former Prime Minister Benazir Bhutto.
- c It is assumed that only in the first half of 1991 weaponusable uranium has been produced.

- Wolfgang Liebert; Jürgen Scheffran (Eds.): Against Proliferation Towards General Disarmament, Münster 1995.

Wu Chunsi

Introduction

Influenced by the disintegration of the bipolar system, the development of the global economy and the facilitation of other elements, the structure of international relations went into a period of readjustment and reorganization. Although it is hard to say whether the restructuring process has completed or when it will finish, some major powers’ significance to international peace has been more and more clearly recognized in the process. In East Asia, the US, Russia, Japan and China are the countries which have been exerting great influence on regional security since the beginning of the century. They are still the major powers in the area. Considering Russia’s economic and political chaos, however, the article will focus on the relationship among the US, Japan and China. This triangle relationship is playing a more and more important role in the security in East Asia, even in the world.

The triangle relationship between China, the US and Japan has experienced several stages in this century. Before the 1970s, the Sino-US-Japanese relationship was abnormal and unequal. It seemed that the US always had to make a choice between China and Japan during that period. With the normalization of Sino-US and Sino-Japanese relations, the three countries began a relatively benign cooperation in the cold war because of the common need against the Soviet Union. In 1989, however, the triangle relationship went down again.

Differences on the political systems, the security demand and economic levels have always been negative factors for the development of their relations. Among all those obstacles, the US-Japanese cooperation in theater missile defense (TMD) was a newcomer. Although some elements emphasize the “defensive” feature of TMD, it is obvious that TMD will further complicate the international relations in East Asia. The political implications of the TMD systems should not be underestimated even if the military effectiveness of the TMD can be left for the military to discuss. This article will discuss the implication of US-Japanese TMD cooperation to the Sino-US-Japanese relationship in the framework of East Asian security.

Sino-US-Japanese relationship is important to East Asian security

In comparison with Western Europe, the diplomatic arena of the first nation states, East Asia has two main different features. First, there are large divergences between Asian countries. Those differences can be seen not only in respect of the hard power of those countries, such as population, territorial space and economic development level, but also in respect of their soft power, including political systems, ideology, religion and culture etc. Due to the variety in East Asia, the establishing of any regional security regime will need to resolve more international frictions and to merge those differences.

The other feature of East Asia, which to some extent is related to the first one, is the lack of a regional security mechanism, which can cope with potential conflicts. Although East Asia is a peaceful area on the whole, there are a number of sensitive problems both in Northeast Asia and Southeast Asia. Considering the tension on the Korean Peninsula as an example, some problems are rather explosive. Therefore, regional cooperation is necessary to maintain peace and stability in East Asia. In recent years, the ASEAN (the Association of Southeast Asian Nations) Regional Forum did gradually exert important influence on regional security affairs. But being limited by its strength, the efforts are far from sufficient. In addition, as many Southeast Asian countries have been seriously hit by the financial crisis, it has been questioned whether the ASEAN can continue its efforts on security. Thus, the responsibility to guarantee regional peace will rest more on major powers in the region.

As a result, the US, Japan and China, major powers in East Asia, should contribute more to regional security. As the only superpower in the world, the US has various interests in the region, which at least can be seen from its military presence in East Asia. In this respect, the involvement of the US is not only the result of global economic integration or economic interdependence, but also the choice of the US itself. Without the influence in East Asia, which is almost as important as Western Europe, the so-called “global-leadership” of the US would not deserve its name. As one of the most prosperous countries in the world, Japan’s development cannot be independent from the long-term peace and stability of East Asia, although Japan once pursued a policy of “separating from Asia and entering into Europe.” On the security issue, Japan should try to do better than its performance in the Asia-Pacific financial crisis, for many Asian countries have not forgotten the history of the Pacific War, and still worry about the potential expansion of Japan’s military forces. As a permanent member of the UN Security Council, China is responsible for world peace. To realize its modernization, China also needs a peaceful and stable security environment. China has shown a more active attitude towards the regional security cooperation through its participation in the ASEAN Regional Forum. China’s efforts on the Korean issue are also positively recognized by the world. With the further development of its economy, China can do more work for world and regional peace.

Another reason for major powers to take more responsibility in regional security is that many of the hot spots in the region are directly or indirectly related to the major powers. For example, the Diaoyu Islands issue is a territorial dispute between China and Japan, and the US and China have to engage in the Korean issue because they were the belligerent states of the Korean War. So, the coordination among major powers should be given a priority. However, the intention to carry out sincere cooperation among China, the US and Japan...
always meets an obstacle — the US-Japanese military alliance, which means that the US and Japan have special ties and the triangle relationship among China, the US and Japan is unbalanced. The US-Japanese military alliance is a product of the cold war. It was designed to contain the Soviet Union and at the same time put Japan under American control. With the end of the cold war and the disintegration of the Soviet Union, the mission of the military alliance was finished and the alliance should have come to an end. Contrary to people’s wishes, the US and Japan reviewed the Guidelines of the US-Japanese Defense Cooperation and strengthened their military alliance. Since the military alliance is an exclusive arrangement in theory and always needs a real or imaginary enemy, China wonders what the real purpose of the alliance in the post-cold war era is. Considering the spreading of so-called “China threat,” China’s concerns and suspicions are not unreasonable.

Just under the background that there is a lack of confidence between China and the US and Japan, the issue of US-Japanese cooperation in theater missile defense was proposed and pushed forward step by step. Almost certainly, the cooperation will further increase the suspicion among the three major powers.

**US-Japanese TMD cooperation and China's response**

In East Asia, Japan is one of the main cooperators of the US on the TMD issue. Their cooperation at least can be traced back to as early as 1993, even if their exchange on the US Strategic Defense Initiative is excluded. In 1993, the US government conveyed its intention to cooperate with Japan on TMD. On September 22 of that year, Mr. John Deutch, who was in charge of acquisition in the Pentagon, went to Tokyo and held official talks with then Japanese Foreign Minister and director of Japan’s Defense Agency. According to Mr. Deutch, Japanese officials gave a favorable response to the US proposal. Later, the US and Japanese defense ministers reached an agreement on the joint development of an anti-missile system. In 1994, the Japanese government established an office in charge of the study on ballistic missile defense. At the first Security Consultantive Committee (SCC) meeting between the US and Japan in 1995, the ministers recognized that the study on Ballistic Missile Defense had been conducted smoothly. Since then, the ballistic missile defense issue has been a regular topic on the SCC meeting.

According to an article published in Orbis, Japan already operated six units of Patriot Advanced Capability (PAC) missiles, as well as the Hawk anti-aircraft missile systems, and is upgrading the Patriot with PAC-2 technology. Japan has procured two Aegis-class destroyers and will purchase two more, which could be upgraded with advanced US maritime TMD missiles. Also, Japan has purchased several Airborne Warning and Control System planes that could be used as sensors in a TMD system. In June 1994 the US Ballistic Missile Defense Organization director Lt. Gen. Malcolm O’Neill proposed four options for Japan to consider. Those options are:

- **Option A:** The Aegis destroyers would seek to engage all targets in the upper tier while the Patriot ground-based system dealt with missiles in the lower tier.
- **Option B:** It would use the existing Japanese Self-Defense Force inventory, but would also involve procuring eight more Aegis destroyers and a new surveillance radar system. The planned PAC-2 versions of Patriot would be upgraded as in Option A, and a new radar system would be located near Tokyo.
- **Option C:** The US BMDO would like to see Tokyo acquire six land-based Theater High Altitude Area Defense (THAAD) firing units. This option would also require the upgrading of Patriots to PAC-III standard as lower tier defense.
- **Option D:** It proposed the more realistic deployment of the Maritime Self-Defense Force’s Aegis destroyers. The land-based elements are five THAAD firing units and the fully upgraded Patriot system.

On the issue whether to join the TMD research and development, however, Japan kept an ambiguous attitude for several years because there are two different opinions among Japanese officials and scholars. The supporters said that Japan needs defense against the missile threat from the Democratic People’s Republic of Korea (DPRK). An obvious fact is that the starting of Japanese-US talks on theater missile defense were just after the test of DPRK’s Nodong missile. Generally, Japan’s Defense Agency is a driving force for the TMD cooperation with the US. In its 1998 budget, it has put 81 million yen on the survey of TMD and prepared to increase the expense to 1 billion yen in the 1999 fiscal year. However, different services have different views. The Navy is most active, because it is most possible to establish a sea-based TMD system for Japan since it basically is an island country. The introduction of a sea-based TMD system means that the Navy can acquire more warships and equipment, and increase its percentage in defense expense. On the contrary, the Army’s attitude is more negative, because the increase of the Navy’s budget means that other services will have to reduce their expense, assuming the total defense budget stays stable. Japan’s military industry takes a positive attitude towards Japanese-US cooperation on TMD. Those companies hope that the cooperation will bring more US advanced technology to them. Finally, officials and scholars, who regard the Japan-US alliance as the pillar of Japanese foreign policy, also do not want to go against US wishes on this issue.

On the other side, there are some worries in Japan about the TMD cooperation. First, are those defense systems, especially some advanced TMD systems like the THAAD system, effective? According to some scientists’ evaluation, the import and deployment of a TMD system may just be a waste of money. Secondly, many Japanese believe that the initial intention of the US to propose the TMD cooperation is to ask Japan to burden expenses on TMD development. They worry that the US will not give Japan the core technology. Thirdly, the development of TMD is not cheap at all. The burden may be too large for Japan. Finally, some Japanese officials and scholars, who attach great importance to Japanese-Chinese relations, worry that the Japanese-US cooperation on TMD will put a negative influence on the relationship with China. Therefore, for a long time, the Japanese government only expressed that they were considering the US proposal, but it did not clearly say yes or no.

However, with the nuclear tests in South Asia and the DPRK missile tests, Japan seems to make its decision, although it is a little bit fetched to use the South Asian nuclear tests as an excuse. At a US and Japanese foreign ministerial-defense authority meeting on August 27, 1998, Japan announced its decision to finance the
proposed joint research on the TMD initiative this year outside the framework of the budget for fiscal year 1999. On September 20, the Japanese and US governments reached an agreement to conduct joint research on a missile defense system, although no target date was set for the project. Thus, the US-Japanese TMD cooperation has gone onto the US-wanted track.

The active prompting of the US on the TMD cooperation has technical, political and economical considerations. Technically, TMD, different from the national missile defense, is mainly designed to deal with short- and medium-range missiles, although some of them do have the capability against strategic missiles. So, those expensive systems must be used to protect US overseas troops and allies, which are more easily to be attacked by shorter-range missiles from the countries hostile to the US. Politically, the TMD cooperation provides a new chance to consolidate the US-led alliance regime after the cold war. The political role of TMD was recognized in the 1991 Gulf War. It prevented Israel from engaging in the war and preserved the allied coalition. After the cold war, the US military alliance in East Asia also met challenges. In the early 1990s, East Asian countries asked the US to withdraw its troops and return military bases. The US influence in this area was shaken. Under this background, missile defense becomes a new way for the US to promote the union of its alliance and keep its leadership in this area. Richard D. Fisher, Jr., a senior policy analyst of the Heritage Foundation, said, “By exercising strong leadership in missile defense, Washington can regain lost political momentum and begin to reverse diplomatic damage.”

Economically, the development of a missile defense system is quite expensive, although the Clinton Administration’s TMD is much smaller than President Reagan’s “star wars.” The participation of the allies will reduce the financial burden of the US, no matter whether they purchase the whole set of defense systems or just engage in the technical development. Therefore, the US has consistent interests in carrying out TMD cooperation with Japan and introducing TMD into East Asia. As a major neighbor of Japan, China keeps vigilance on the development of the US-Japanese cooperation on TMD, because the deployment of a TMD system, especially an advanced TMD system, in Japan would directly influence China’s security.

Firstly, Japan is so close to China that the deployment of an advanced missile defense system, which may have the capability against strategic missiles, may affect China’s strategic retaliatory capability. Secondly, the US-Japanese TMD cooperation is part of strengthening their military alliance, which is regarded as an arrangement directed against China. Thirdly, the deployment of missile defense systems will add obstacles for the course of China’s reunification, because an advanced TMD system in Japan may cover the Taiwan Straits and would give a wrong hint to the separatists. Considering those negative influences, the Chinese government has repeated its concerns on the US-Japanese TMD cooperation on several occasions.

Implications to the triangle relationship and regional security

Furthermore, the US-Japanese TMD cooperation will impose a danger to East Asian peace, because it further weakens the fragile foundation of the triangle relationship among the US, Japan and China, which, as analyzed in the second part of the article, is crucial to maintain regional security but is unbalanced.

The unbalance of the triangle relationship can be seen from the strength disparity of the three powers and the status of their combination. The US is the strongest power among the three no matter being measured by political influence, economic level or military force. Between China and Japan, while Japan is an economic superpower, China has political superiority because it is a permanent member of the UN Security Council and implements an independent foreign policy. In the military field, China is a little bit stronger than Japan, because China has nuclear weapons and the People’s Liberation Army of China is one of the largest troops in the world. However, Japan’s military equipment is absolutely not less advanced than China’s. On the contrary, it may be more advanced, although the further development of Japan’s military is still restrained by its domestic laws and world opinions. On the whole, considering the combination of political, military and economic strength, the US is the strongest, China the second, and Japan the third.

But, the US and Japan are allies. That means that the political and military connexions between the US and Japan are much closer than those between China and the US or those between China and Japan, although the US and Japan sometimes have very intensive disputes on economic and trade problems and China is making efforts to improve its relationship with the US and Japan. In the triangle relations, it is China that is in an inferior position. However, the US and Japan are preparing to continuously expand their superiority in the triangle relationship regardless of the whole balance of the regional structure and China’s feeling. The TMD cooperation is just one of the steps.

The introduction of TMD into East Asia will expand the unbalance in Sino-US-Japanese relationship at least for two reasons. One is visible and the other is invisible. The visible one is that the TMD system will further increase Japan’s military strength and abate China’s military deterrence based on missiles. That means that the military balance in East Asia will continue to slop to the US-Japanese military alliance. Due to the worry that some elements will use the military superiority of the US-Japan military alliance to intervene China’s internal affairs, China may have to strengthen its own military development. Thus, the TMD cooperation between the US and Japan is possible to cause an arms race in East Asia. The invisible influence is the psychological effect brought by the TMD system. It is hard to say now whether the system will be effective in practice. However, the import and deployment of the system hint that the US is keeping a watch on China. It will increase suspicion among major powers, which will influence some possible cooperation in regional or world affairs. Therefore, the introduction of the TMD system is not a good idea to keep regional stability, which needs a balanced triangle relationship among major powers, namely the US, Japan and China.

Conclusion

Of course, defense is a right of every country. However, in the era that a country’s policy will largely affect the security of other countries, of the region or even the world, every country should be very careful to choose a right way to consolidate its security. It is very important to keep in mind that the fundamental object is security not defense. So, what is urgent to do in East Asia is not to build up a so-called “theater
An Analysis of the North Korean Missile Launch of 31 August 1998

David Wright

North Korea launched a missile around noon local time (0300 GMT) on August 31, 1998. It was originally believed to be a two-stage Taepodong-1 missile, which North Korea was known to be developing. The test caused alarm in Japan since it overflew the northern tip of the main Japanese island of Honshu. On September 4, North Korea announced that the missile actually had three stages and had placed a small satellite into orbit. After ten days of silence, US intelligence announced that it had determined that the missile did indeed have a third stage, but that it had failed to place a satellite in orbit.

In this article, I briefly describe what information is available about the launch and what the implications are.

The launch is reported to have taken place from the Hwadaegun Missile Test Facility, Musundanri, Hwadae County, North Hamgyong Province, about 100 km south of the city of Ch’ongjin.

The missile appears to use North Korea’s 1,000-1,300 km-range Rodong missile as its first stage and modified Scud as the second stage. Both use liquid fuel. Adding a second stage is the obvious next step in missile development once North Korea had a working Rodong. Modeling of this missile gives a range of 1,500-2,000 km with a one-tonne payload, depending on details like how heavy the missile casing is, what fuel it uses, etc.

Instead of a warhead, the missile carried a small third-stage booster and a small satellite. The third-stage booster was reportedly solid fueled. The mass of the satellite is probably a couple of tens of kilograms. An expert from the Russian Space Agency reportedly stated that the satellite mass was 13 kg. The mass of the first US satellite, Explorer 1, was 14 kg.

Press reports state that the first stage of the missile landed in the Sea of Japan, 400-500 km from North Korea and 300 km southeast of Vladivostok. The rest of the missile apparently passed over the northern tip of the main Japanese island of Honshu. The second stage splashed down in the Pacific Ocean at a range of 1,400 to 1,650 km from the launch site, according to various reports.

North Korea claimed the third stage burned for 27 seconds and placed a satellite in an orbit with a perigee of 218.82 km, an apogee of 6978.2 km, and a period of 165 minutes and 6 seconds. It said that the satellite, called the Bright Star 1 (Kwangmyongsong 1), was broadcasting patriotic songs at a frequency of 27 megahertz. The stated launch azimuth of 86 degrees would correspond to an orbital inclination of about 41 degrees.

From the photograph of the missile launched released by the Korean Central News Agency, the payload section appears to be roughly 4 meters long and 1 meter in diameter, based on the dimensions of the other stages. This gives a rough estimate of the size of the third stage. In addition, assuming the first two stages were a Rodong and a Scud, the range at which the second stage is reported to have traveled one can estimate that the mass of the third stage must be in the range of a tonne.

US Space Command has been unable to detect a satellite, and it is generally believed now that the attempt failed.
**Missiles, Space and Missile Defense**

<table>
<thead>
<tr>
<th>Velocity change (km/s)</th>
<th>Specific impulse (sec) (vacuum)</th>
<th>Fuel fraction (stage + satellite)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2</td>
<td>240</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>270</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>0.76</td>
</tr>
<tr>
<td>5.2</td>
<td>240</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>270</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>0.83</td>
</tr>
</tbody>
</table>

**Table 1. Specific impulse and fuel fraction required to achieve a given velocity change.**

However, the launch showed that North Korea has now successfully demonstrated staging technology, since the staging of the first two stages appears to have worked successfully. This is not particularly surprising since staging can be done in ways that is not technically demanding, although it increases the complexity of the missile and may reduce the reliability. The photograph of the launch appears to show a space between the first and second stages, which suggests that North Korea used a similar technology to Chinese and early Russian missiles, in which the upper stage engine is ignited while the lower stage is still burning.

The demonstration of staging is important because it is a necessary step for North Korea to develop longer-range missiles. In addition, one clear, verifiable possibility for implementing a limit on North Korea’s missile development was to ban the flight testing of multi-stage missiles before North Korea demonstrated staging capability. The August test removed that as a possibility.

The launch also raises a number of questions, which we address below.

**Is it credible that North Korea could have put a satellite in orbit?**

Putting a satellite into a circular, low-earth orbit requires reaching a speed of 8 km/s. The highly eccentric orbit that North Korea claimed it achieved would require accelerating the satellite to 9 km/s. By firing the missile nearly due east over Japan, North Korea gained roughly 0.3 km/s from the rotation of the earth. From the range at which the missile’s second stage fell into the Pacific Ocean, one can estimate that the missile’s speed was about 3.5 km/s when it released the third stage. Thus, the increase in speed required from the third stage in order to reach orbit would have been roughly 4.2 km/s for low-earth orbit and 5.2 km/s for the orbit claimed by North Korea.

Knowing this, one can use the rocket equation to calculate what combination of specific impulse and fuel fraction (propellant mass divided by total mass) would be required for the third stage plus payload in order to achieve these increases in speed (see Table 1). If the actual system has a fuel fraction less than that in Table 1 for a given specific impulse, it will not be able to achieve the required velocity change.

One can then look at the parameters for solid-fuel upper stages for existing space launch vehicles (considering those with a mass of roughly a tonne or less, a length of roughly 4 meters or less, and a diameter of roughly a meter or less) and ask what the corresponding figures are, assuming a satellite mass of 15 kg (Table 2).

Comparing the numbers in the two tables shows that a third stage with the capabilities of the US Taurus or Scout engines would be able to place a small satellite in low-earth orbit, but only the Taurus engine (which was developed in the 1990s) would be able to place a satellite in the orbit claimed by North Korea. Presumably North Korea did not have access to an engine of this sophistication. The other motors shown in the table would not be able to place a satellite into either orbit.

Thus, unless the estimates above of the burnout speed of the lower two stages of the Taepodong 1 are significantly low, it appears that North Korea would not have been able to put a satellite into the highly-eccentric orbit it claimed, and very likely could not have even achieved a circular low-earth orbit.

It is worth noting that there are other reasons to suspect the credibility of the North Korean claims about the launch. For example, the period of the satellite reported by KCNA during its 100th orbit was 8 minutes longer than the original period.7 However, as satellite orbits decay, their periods decrease rather than increase.

**Why did the launch fail?**

How the missile failed is unclear from press reports. Several press reports quote officials saying that the third stage broke up somewhere over the Pacific Ocean,8 and one states that it broke up “several seconds before reaching orbit.”9 Other reports have stated that debris from the missile fell in the ocean some 6000 km from North Korea, although the Pentagon has stated that it cannot confirm those reports.10 A Pentagon spokesperson stated that “the only way we have to trace the debris of this missile is through radar tapes, and there is considerable disagreement throughout our own intelligence community as to how to interpret those tapes.”11

It is perhaps interesting that the ground track of the first orbit that the North Korean satellite would have had (apparently calculated based on the information released by North Korea) shows that the track passes near Hawaii but not Alaska.12 Even if the satellite did not reach orbit, it might still have followed the early portion of this track. A malfunction of the third stage could, of course, have steered it off this track.

Another possibility for the failure of the third stage is that it simply did not ignite. This possibility is interesting because it could explain why the United States originally thought the missile had only two stages, as discussed below.

**Why did the United States not initially realize the test was three stages?**

The reports that debris was carried far into the Pacific Ocean, if true, would imply

<table>
<thead>
<tr>
<th>System</th>
<th>Specific impulse (s) (in vacuum)</th>
<th>Fuel fraction (stage + satellite)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Taurus 3rd Stage</td>
<td>289</td>
<td>0.85</td>
</tr>
<tr>
<td>US Scout 3rd stage</td>
<td>295</td>
<td>0.78</td>
</tr>
<tr>
<td>US Scout 4th stage</td>
<td>288</td>
<td>0.81</td>
</tr>
<tr>
<td>Chinese CZ-1D 3rd stage</td>
<td>275(?)</td>
<td>0.70</td>
</tr>
<tr>
<td>Indian SLV-3 3rd stage</td>
<td>277</td>
<td>0.70</td>
</tr>
<tr>
<td>Indian SLV-3 4th stage</td>
<td>283</td>
<td>0.70</td>
</tr>
</tbody>
</table>

**Table 2. Specific impulse and fuel fraction for some existing small solid engines.**
that the third stage burned for some time after the second stage burned out, which should have been observable to US intelligence. After the North Korean announcement of its launch attempt, a US official was reported as stating that the United States detected something separating from the third stage that appeared “to have some thrust behind it.”10 That same official reportedly said “If there were a device and it was very small, it wouldn’t be easily detectable.” However, while the satellite may have been small, the third stage may have been 3 to 4 meters long and perhaps a meter in diameter, as estimated above, which should have been easily observable.

The United States presumably got a very good look at the missile launch. US intelligence detected launch preparations two weeks in advance and reportedly monitored the launch with two spy planes and a reconnaissance ship, the “Observation Island,” which has Cobra Judy radars on board. Why the intelligence community appears to have initially missed the third stage is therefore puzzling.

As noted above, one possible explanation, which is supported by some off-the-record conversations, is that the third stage failed to ignite. Intelligence assets monitoring the flight may have seen an object fall into the ocean from the second stage and assumed it was a dummy warhead. Subsequent US announcements that the launch had been an attempt to launch a satellite may have come from recognizing the unusual flight path of the missile during boost phase.

**What does the launch attempt imply about North Korean missile capability?**

With the launch, North Korea successfully demonstrated staging of the first two stages. This is probably the most important aspect of the test, since this technology could be used in a more powerful missile.

The test also appeared to show that North Korea has some access to the technology for solid-fuel engines, although it is unclear what the basis is of the claim that the stage uses solid fuel. The source of this technology is not known. North Korea may have begun an effort to develop small solid-fuel rocket motors several years ago and the engine used may have been built in North Korea. It may have received assistance in this effort, or may have purchased an engine, from several sources. Iran is believed to be working on solid propellant stages, reportedly based on assistance from China, and it is possible it could have assisted North Korean development or transferred relevant technology. Some reports state that Iranian observers were present for the August missile test. North Korea is believed to have transferred Nodong technology to Pakistan for its Ghauri missile test earlier this year, and it is conceivable that it could have received some technology in return. Pakistan produced small solid-fueled rocket motors for its Hatt 1 and 2 missiles in the late 1980s, and these appear to have roughly the right size and mass for the August launch, given the above estimates. It could have supplied technical assistance or possibly motors to North Korea.14

If it is able to correct the problems with the third stage, North Korea would likely be able to deliver small payloads of several tens of kilograms to intercontinental distances. If the missile could achieve the speeds needed to put a satellite into orbit, it could in principle reach any point on earth with a payload of that mass.

One can also estimate the ability of such a missile to carry heavier payloads. To do this, I developed a computer model of a missile that was able to boost a small satellite to the speed required for orbit, and then calculated what range that missile would have if the payload were increased to 500 and 1000 kg, which is the range of masses one would expect for a first generation nuclear weapon. I looked at the same two cases considered above: missile burnout speeds of 8 and 9 km/s (taking into account the rotation of the earth). These calculations show that for the 8 km/s case, the missile would have a range of roughly 4100 km for 500 kg, and roughly 2500 km for 1000 kg. For the 9 km/s case, the missile would have a range of roughly 4600 km for 500 kg, and roughly 2600 km for 1000 kg. (As noted above, it seems unlikely that the missile North Korea fired would have been able to have achieved 9 km/s.)

This missile configuration, if it becomes operational, would therefore appear to be able to deliver a small payload of chemical or biological weapons to intercontinental range, but could deliver a nuclear warhead only to much shorter ranges.

**Notes**

1 Such a model was discussed in David Wright and Timur Kadychev, An Analysis of the North Korean Nodong Missile, Science and Global Security, Vol. 4, 1994, pp. 129-160.

2 N. Korea’s launch may have been a satellite-Russian official, Associated Press (Moscow), 9/15/98.

3 J. Anselmo, R. Wall, E. Sekigawa, Missile Test Extends North Korea’s Reach, Aviation Week and Space Technology, 9/7/98, p. 56-7; Korean Central News Agency, Successful launch of first satellite in DPRK, 9/4/98 (available at www.kcna.co.jp in the archives).

4 Korean Central News Agency, Successful launch.


7 Korean Central News Agency, Artificial satellite ‘Kwangmyongsong No. 1’ makes 100 rounds of the earth, 9/14/98 (available at www.kcna.co.jp in the archives).


10 Gertz, N. Korean missile seen posing risk to US; Pyongyang Rocket ‘Crashed Off Alaska Coast’, South China Morning Post, 9/17/98, p. 1; US is unable to confirm if North Korea rocket hit Alaskan Seas, Chosun Ilbo (Seoul), 9/21/98.


12 Sven Grahn, Ground track of North Korean satellite launch—if there was one!, www.users/wineasy.se/ svengrahm/sk.htm, 9/98.


14 Some reports state that the solid-fuel Chinese M11 missile has two stages, although many reports dispute this. If true, the upper stage might be roughly the right size for the North Korean missile. Pakistan is believed to have some tens of unassembled M11 missiles that it purchased from China.

David Wright is a Senior Staff Scientist at the Union of Concerned Scientists and a visiting scholar at the MIT Security Studies Program. Address: UCS, Two Brattle Square, Cambridge, MA 02238, USA; tel +1-617-547-5552, fax -864-9405, email dwright@ucsusa.org.
The U.S. “3+3” NMD Program and the ABM Treaty

Under the Clinton Administration’s 3+3 program the United States is in the process of developing (a process initially anticipated to take three years) a national missile defense (NMD) system that could be deployed within three years of making a decision to deploy. Development of this system is scheduled to be completed by the year 2000, and a Deployment Readiness Review will be held that year to decide whether or not to begin immediate deployment of the system. According to the Clinton Administration, the decision on deployment will depend on whether or not the anticipated missile threat justifies deployment.

The Clinton Administration’s position has been that there is no threat that currently justifies deploying a NMD system. However, the Administration has been under considerable pressure from Congressional Republicans seeking to require the deployment of a nationwide defense by the year 2003. To counter this pressure, the Administration developed its 3+3 program. This program aimed at producing a deployable system by the same year — 2003 — that the congressional Republicans were seeking a deployment by. Thus, the 3+3 program allowed the Clinton Administration to deflect much of the Congressional pressure to deploy, and indeed has so far succeeded in preventing Congress from mandating such a deployment. Most recently, Senate Republicans have twice failed (by one vote) to bring to a vote legislation that would have required the deployment of a national missile defense as soon as it was technologically feasible.

However, this Administration’s “success” comes at a price. By taking this approach, the Clinton Administration has in effect agreed that a NMD system is needed, and that it is only a question of when it should be deployed. This situation is reflected in statements such as the one made in Congressional testimony in early 1998 by Jacques Gansler, the Assistant Secretary of Defense for Acquisition and Technology, that it is only question of when, and not if, the United States will deploy a NMD system.

And this time may not be far off. Unlike the “Star Wars” program, which focused on exotic technologies that would take many years to develop, if they could ever be made to work, the 3+3 program is focused on taking existing technology and bringing it to deployment. As discussed below, the 3+3 program is rapidly evolving towards a deployable system. The first integrated system test of the system is now less than a year away, and the development of the system is scheduled to be completed in less than two years. Once development of the system has been completed, the pressure to deploy will become much greater, and it will be much more difficult for any administration to resist the pressure for immediate deployment.

NMD system development moving closer to completion

During the last year, the United States has made significant progress towards completing the development of a deployable NMD system, in particular in developing the individual elements that would comprise the 3+3 NMD system.

On April 30, 1998, the Ballistic Missile Defense Organization (BMDO) announced that Boeing had been selected as the lead system integrator (LSI) for the NMD program. Boeing will thus in effect serve as the prime contractor for the overall NMD system. It will be responsible for overseeing the development of the various components (such as radars and interceptors) of the NMD system and for assuring that these components can work together to form an integrated system. Boeing will also be responsible for testing to demonstrate the capability of the system and for preparing plans that would allow the system to be rapidly deployed once a deployment decision is made.

In July 1998, the booster to be used for the NMD interceptor missile, known as the Ground-Based Interceptor, was selected. This booster must be capable of accelerating the Exo-atmospheric Kill Vehicle (EKV), the NMD kill vehicle which will actually intercept the targets, to speeds of roughly 7 to 8 km/second in order to be able to provide coverage of the entire United States from a single interceptor basing site. The booster will consist of three commercially-available solid-fuel rocket motors stacked to form a three-stage booster, which is referred to as the commercial off-the-shelf (COTS) booster. The selection of the COTS booster represented a defeat for Air Force, which had been pushing to have modified Minuteman III missiles used as the NMD booster.

The first stage motor of the COTS GBI booster will be a slightly modified version of the Graphite Epoxy Nozzle-40 (GEM-40) motor that is currently used in strap-on rockets for Delta II space launchers. The second and third stages will both be powered by Orbus 1 boosters that are currently used in boosters for ballistic missile defense targets. The use of identical second and third stage motors in the COTS design provides a less than fully optimal design — normally each successive stage of a booster uses a smaller motor — but was chosen to hold down costs. The initial contract calls for the purchase of enough motors for five test flights.

Current plans call for the first flight of the COTS booster in fiscal year 2000, with the first test flight of an integrated GBI interceptor — the COTS booster plus the EKV — in fiscal year 2001.

Two flight tests designed to test the sensor capabilities of the two competing Exo-atmospheric Kill Vehicles have also recently been conducted. The first test, in June 1997, involved Boeing’s sensor package for its EKV design. The sensors, launched from Kwajalein test range in the Pacific were used to observe a simulated warhead accompanied by eight “decoys,” launched from Vandenberg Air Force base in California. In January 1998, the Raytheon EKV sensor was similarly tested against an identical set of targets. Both of these tests were described by officials as being successful.

The next stage of the competition for the EKV contract is to be a fly-off involv-
The primary radar for the 3+3 system will be the NMD Ground-Based Radar (GBR), which will be located at the same site as the NMD GBI interceptors, most likely either at Grand Forks, North Dakota or in northern Alaska. This radar will be a phased-array, X-band radar and will use the same technology as is used in the THAAD theater missile defense radar. A prototype NMD GBR has recently been completed at the U.S. missile test range at the Kwajalein Atoll. This prototype has an aperture of 123 m² with 16,896 transmit/receive modules, and is said to have a detection range of 2,000-4,000 km. This prototype GBR can be upgraded to give it the same level of performance as the NMD GBR that will be deployed as part of the national missile defense system.

A centrally-based radar cannot see all missile trajectories that might threaten the United States, and thus additional sensors are needed to provide tracking data to interceptors. Under the 3+3 program, current U.S. early warning radars would be upgraded to give them the ability to track missile warheads with sufficient accuracy to guide interceptors. Demonstrations showing how these radars’ detection range, sensitivity, and accuracy can be increased have been carried out over the last several years. In addition, the deployed 3+3 system may also use a number of forward-deployed X-band phased array radars. These Forward-Based Radars (FBRs) could be deployed in Alaska, and/or on the east and west U.S. coasts. The FBRs would be similar to the main NMD GBR radar, except for the removal of any fire control capabilities. Subsequently, the task of tracking over-the-horizon targets will be assumed by the low-earth-orbit component of the Space-Based Infrared System (SBIRS-Low). SBIRS-Low satellites, currently schedule to begin deployment in 2004, are designed to track missile targets over their entire trajectory and to do so with sufficient accuracy to guide interceptors even if the target cannot be seen by the defense’s radar. SBIRS-Low will provide world-wide coverage and is intended to work both with the NMD system as well as with high-altitude theater missile defense (TMD) systems such as the U.S. Army’s THAAD and the U.S. Navy’s Theater-Wide System.

In Fiscal Year 1999, following two test flights intended to demonstrate a capability to intercept targets, an integrated system test will be conducted in order to evaluate the performance of the NMD system. Since the first test flights of the GBI booster will not be held until the year 2000, a Lockheed-Martin Payload Launch Vehicle (PLV) will be used as the booster for the EKV during this test (and during the earlier intercept tests).

**Implications of the U.S. NMD program for the ABM Treaty**

Although the Clinton Administration continues to claim that the preservation of the ABM Treaty is central to U.S. security policy, the deployment of the 3+3 NMD system that it is now developing will almost certainly doom the Treaty. Any U.S. NMD system will certainly be required to cover all fifty states: deployment of a centrally-located defense that does not cover the whole country is politically implausible. Moreover, it is physically impossible to provide coverage of the entire U.S. from a single ground-based site. The permitted ABM system under the current Treaty must have all components (then defined as interceptors, launchers and radars) — not just interceptors — at a single location. But a true single-site system cannot provide nationwide coverage.

For a country as large as the United States or Russia, the curvature of the earth prevents a single radar from providing coverage of the entire country. A missile defense radar located at Grand Forks — the current permitted U.S. ABM site — will be unable to see possible intercontinental missiles attacking large portions of the east and west coasts, and Hawaii would have no coverage at all. Thus a nationwide defense requires sensors at multiple sites to provide tracking information for guiding interceptors to their targets. These additional sensors are essential to the operation such a defense — the defense cannot cover an entire country without them. The notion of a single-site system permit under the current Treaty must address this curvature of the Earth problem by first upgrading existing early warning radars to give them the ability to track warheads accurately enough to guide interceptors (or by deploying new Forward-Based Radars) and by subsequently deploying the SBIRS-Low space-based tracking system.

All of the so-called “single-site” NMD systems under consideration are in fact multiple site systems. While most of these systems have all their interceptors at a single site, the Treaty says all the defense components, not just interceptors, must be at a single site. Thus while many NMD supporters attempt to preserve a fiction of Treaty compliance by claiming that the deployed NMD system will be a legal single-site system, in fact it will be a Treaty-violating multiple-site system.

Moreover, statements from the designers of the U.S. NMD system seem to
indicate that even the pretense that the NMD system will be a legal single-site system at the United States’ permitted site at Grand Forks, North Dakota will soon be abandoned. Even prior to winning the Lead System Integrator award, a Boeing official stated that the entire United States could not be defended with interceptors based at Grand Forks. After Boeing became the LSI, Boeing officials reiterated this statement and indicated that their preferred location for the interceptor basing site is in northern Alaska.

In fact, as part of the competition for the NMD LSI award, each competitor was required to submit a family of proposed architecture, only one of which was required to be a “Treaty compliant” system with interceptors based at Grand Forks. Each contractor was required to present architectures for three increasing levels of defense capabilities. The first level was a limited defense intended to counter only a few missiles launched by a third world nation. The second level was a higher capability system that might use about 100 interceptors against a larger or more advanced threat. These two levels span the range of what are generally thought of as a “limited” or “thin” NMD systems. However, the contractors were also required to submit plans for a third level NMD system that would have much greater capabilities, and which would almost certainly involve the deployment of interceptors at multiple locations.

Can the ABM Treaty survive?

Legally deploying a nationwide NMD system would require very significant modifications to the ABM Treaty (or withdrawing from it). At a minimum, the Treaty’s prohibition on nationwide defenses would have to be eliminated. The Treaty’s ban on establishing a base for a national defense would also almost certainly have to be eliminated, since it will be difficult or impossible to put into place a “thin” nationwide defense without putting into place the infrastructure for a much thicker defense. Finally, the Treaty’s requirement that all components be located at a single site would have to be eliminated.

However, such changes would leave little in the way of an effective, meaningful Treaty. This is particularly true in combination with the 1997 TMD Demarcation Agreements, which severely weakened the Treaty’s prohibition on giving TMD systems capabilities to intercept strategic missiles.

At present, it is extremely unlikely that Russia would agree to such changes to the Treaty. Thus in order to deploy its NMD system, the United States will have to withdraw from the Treaty or commit serious violations of it. Thus deployment of the U.S. NMD system will almost certainly mark the end of the Treaty.

The ABM Treaty has been central to U.S. security policy for over 25 years. The limits it imposes on strategic defenses are almost certainly necessary if deep reductions in nuclear forces are to be achieved. The elimination of the Treaty and the deployment of national missile defenses will likely bring responses from Russia and China that will decrease rather than increase U.S. security. The destruction of the Treaty is a very high price to pay for the deployment of defenses that are unlikely to provide a high degree of effectiveness. Given this situation, the Treaty should not be eliminated and national defenses deployed without a serious national debate over the relative merits of deploying national defenses versus preserving the Treaty. However, given current trends, it now appears likely that the Treaty will be eliminated without such a debate ever taking place.

In adopting its 3+3 program, the Clinton Administration has foregone its opportunity to present the strong case for preserving the ABM Treaty and against deploying national missile defenses. The Administration could have argued that a NMD system was not needed and would be ineffective, and that a NMD deployment could prevent deep nuclear reductions as well as lead to actions by Russia and China that would decrease U.S. security, and thus that the U.S. should continue to perform basic research on defenses, but not move towards deployment of a national missile defense. Instead, while continuing to proclaim the importance of preserving the Treaty, the Administration has essentially agreed that national defenses are needed and will be deployed once a threat appears, while at the same time developing the capability to deploy a NMD system on a short time scale. Perhaps even more importantly, debate over the relative merits of preserving the Treaty versus deploying a NMD system has been forestalled by those giving the false impression that we can do both. This group includes both many NMD supporters who portray the proposed defenses as Treaty compliant and the Clinton Administration, which refuses to discuss whether or not the deployed NMD system will be Treaty compliant.

Thus we appear to be headed towards a situation similar to that that occurred with theater missile defense in the early 1990s. Following the end of the Cold War and the Iraqi missile attacks in the 1991 Gulf War, the U.S. missile defense program was reoriented away from strategic defense to focus on TMD. Technology developed to counter Soviet strategic missiles was used to develop a pair of high-altitude TMD systems, THAAD and Navy Upper Tier. Even though these systems had technical capabilities far beyond those of any previously developed TMD systems and clearly raised serious problems regarding ABM Treaty compliance (as was acknowledged by Administration statements at that time) there was virtually no public discussion of the ABM Treaty implications of these systems while they were being developed. Not until almost the last possible moment, in late 1993, just before field testing of these systems was scheduled to begin, was the issue of the compatibility of these systems with the ABM Treaty publicly raised.

However, by this time it was too late. These systems, THAAD in particular, were well along in development and were now viewed by both the Congress and the Administration as essential defense programs. Thus the U.S. was abruptly confronted with the choice between terminating these core missile defense programs or severely weakening the ABM treaty to permit them to continue. In this situation, it is no surprise that it was the Treaty that gave way.

It now appears that there may be essentially no serious debate over the Treaty compliance of the U.S. NMD system until the actual decision to deploy is made and an actual system design is presented. At that point, it will no longer be possible to pretend that the system will be Treaty compliant. However, by the time any serious debate over the merits of the Treaty versus an NMD system deployment can take place, the NMD deployment will be well
American Control of Outer Space in the Third Millennium

Space operations are emerging as one of the distinctive attributes of the sole remaining superpower. While a few other countries conduct military, civil or commercial space programs of some significance, no country can meaningfully contest American dominance of any of these sectors, and surely no other country could rival American dominance of the full spectrum of space operations.

This full-spectrum dominance is both the hallmark and the instrumentality of the American superpower. The United States currently conducts space launches at an average rate of roughly one each week, as many as the rest of humanity combined. And space activities are central to a diverse range of American global management strategies, ranging from the expansion of international telecommunications to non-proliferation policy and regional peacemaking operations.

The Russian space program is but a pale shadow of that of the Soviet Union, with annual flight rates having declined from 125 each year in the late 1980s to no more than roughly two dozen annual launches recently. Modest success in the international commercial launch services market cannot compensate for the virtual collapse of scientific missions, and the visible weakness of the Russian piloted spaceflight effort is mirrored in substantial though less widely appreciated retraction in national security programs. And while Europe, Japan, India, and China have achieved varying degrees of success in commercial and scientific space activities, their piloted spaceflight and national security space activities are dwarfed by those of even Russia, and are entirely incomparable to those of the United States. Israel, Brazil and a few other countries remain barely on the threshold of space.

While the national security arena—inelligence and military space operations—is surely the clearest domain of American preponderance, before turning in this direction it is instructive to contemplate the other domains of space activity, as they both illuminate the context for national security operations and sources of American power, and illustrate the comprehensive scope of American dominance of outer space at the threshold of the new millennium.

The commercial space sector is both the largest and most dynamic of the three segments of American space activities. The civil space program—largely that of NASA—is currently funded at some $14 billion annually, a figure which has declined by a few billion dollars with the end of the Cold War. The precise size of the national security sector is more difficult to calculate, due to both problems of definition and security classification. By any accounting, national security space activities are surely less than $20 billion annually, some estimates would place the figure at less than the budget of NASA, and by all accounts these figures represent a substantial decrement from the Cold War peak of the mid-1980s.

The bounds of the scope of the commercial space sector are even less precise, but by almost any definition this sector is at least as large as either of the others, and by some estimates significantly larger than both combined. Having sustained average annual growth rates of roughly 10% for the past two decades, the miracle of compund interest has inexorably propelled commercial space activities to the forefront of the American space agenda.

Superpower dominance

The distinguishing attribute of superpower is determinate, if not hegemonic, presence in all major domains of activity, and commercial space operations are squarely central to American superpower. American cultural forms and institutions have achieved hegemonic presence throughout the world, sustained by the pervasive presence of “English” as the de facto world language. Though supplemented by other transmission media, global satellite communications are the carrier of the American

References

7 Statement of General Lester L. Lyles, Director of the Ballistic Missile Defense Organization, Subcommittee on Defense, Committee on Appropriations, U.S. Senate, April 22, 1998.

George Lewis is Associate Director of the MIT Security Studies Program. Address: E38-666, MIT, Cambridge, MA 02139, USA; tel +1-617-253-3846, fax +1-617-258-5750, email: gllewis@mit.edu.
way of life to the most distant corners of the globe. American media conglomerates, American telecommunications companies and American communications satellite manufacturers are both the instruments and the beneficiaries of the inexorable enlargement of the networked information society.

Illustrating the synergy of full-spectrum superpower, American dominance of the commercial satellite communications market is in no small measure a consequence of the scope of American civil and national security space operations. Despite post-Cold War downturns, these two sectors combined generate an annual cash-flow that rivals the entire military budgets of all but a handful of countries. This in turn creates an enormous captive domestic market for American space hardware companies, providing (at least potentially) unbeatable economies of scale when confronting international competitors. The persistent failure of Japan to repeat the successes in the automotive and electronics sectors has been largely due to the minuscule captive domestic market for spacecraft and launchers, a fate which Europe has only barely escaped.

In contrast, when Hughes offered the new HIS-601 communications satellite, it could start its production line with an order for ten of the spacecraft for the Navy’s UFO program (not the flying saucer, but the UHF Follow-On). Similarly, the Boeing andLockMart space launch programs have already benefitted from a billion dollar Air Force investment in the Evolved Expendable Launch Vehicle Program, and will derive future comfort from several dozen civil and military launches each year. Contrary to conventional wisdom, expendable launch vehicles are plagued by the high-fixed cost/low-variable cost structure that has been the bane of the Space Shuttle program—and that has been the secret of the success of such winner-take-all high technology companies as Intel and Microsoft. Amortizing development and startup costs over US government purchases, American space companies are uniquely privileged in the international marketplace.

One hand washes the other. American commercial space dominance in turn provides a variety of unique opportunities in the national security arena. As the Navstar Global Positioning System has become the de facto international standard for precision navigation services, the United States has been in a position to shape the worldwide availability of such services, in the absence of competing systems. The Russian Glonass system remains perpetually incomplete, and other countries appear to have abandoned thoughts of building their own navigation satellite constellations.

American policy appears set upon replicating the Navstar model in the (slowly) emerging arena of “high” resolution commercial imagery satellite systems. More properly termed “medium resolution,” these new space systems will offer near-realtime imagery with approximately one meter resolution, roughly ten times superior to that of prior low-resolution remote sensing systems such as SPOT and LANDSAT, though roughly ten times inferior to the best classified American intelligence satellite systems. As with any power tool, these long-awaited commercial spy satellites promise both opportunity and danger, in direct proportion to the power of the tool. The opportunity lies in the prospect that any financially solvent purchaser can acquire imagery of (almost) any spot on Earth for the marginal cost of the image, rather than having to pay the full cost of the satellite system as the price of getting the first image, a barrier to entry that has kept the spy-satellite club more exclusive than the nuclear weapons club. The danger, obviously, is that the commercial availability of this imagery could place this powerful military planning tool in the “wrong” hands, however that may be defined. American policy is predicated on the notion that, just as Intel and Microsoft dominate their respective information economy market segments, American commercial imagery companies will effectively preempt the emergence of competitors from other countries. This would enable the United States to define the terms under which this imagery is kept from the “wrong” hands, be those hands Iraqi at all times, or the news media in times of US military operations.

Similar cross-sectoral synergies should be evident in the civil space arena, which is largely dominated by NASA’s Space Shuttle and International Space Station activities.

Space partnership with Russia

During the Cold War the United States and the Soviet Union found the space race to be a cost effective and relatively safe companion to the arms race in the contest for international prestige. The two contending social systems each took concrete and manifest steps to bolster their claims to the Mandate of Heaven. From the first flight of Yuri Gagarin to the recovery from the Challenger accident, piloted spaceflight remained essentially a political rather than scientific enterprise, with both Washington and Moscow keenly appreciative of the extent to which a reputation for power could complement or even supplant the rather more expensive and hazardous substance of power.

With the end of the Cold War, the intimate intercourse between cosmonauts and astronauts reversed valence, with cooperation replacing competition with only slightly more incongruence than the new yet pre-existing alliance of Oceania with Eurasia in Orwell’s “1984.” Moving beyond the uncertainty of the Bush interlude, Clinton and Yeltsin quickly appreciated that cooperation in piloted spaceflight was the most visible means at hand to assert the reality of the end of the Cold War, and to substantiate the proposition that America and Russia were partners not adversaries.

From the Russian perspective, the partnership in space was a means of visibly asserting that a diminished geopolitical reach had not entirely reduced the standing of Moscow in the global pecking order. And from the American perspective, the space partnership was instrumental in obtaining initial Russian adherence to the Missile Technology Control Regime, and more generally to efforts to keep Russian rocket sci-
The military space arena

Creative development of commercial and civil space programs in the service of American national security interests has not been matched by equally creative guidance to the explicitly national security programs of the military space community. The institutional deficiencies in policy formulation at the White House and NASA extend to the military space community, which struggled to find appropriate institutional expression during the Cold War, and has yet to find appropriate post-Cold War arrangements.

Indeed, the pace of technological and programmatic innovation in the military space arena has increasingly out-paced doctrinal and institutional development. Largely unappreciated outside the confines of the military space community, the United States is on the verge of a broadly based transformation of military space assets that will provide significant enhancements to existing capabilities.

The handful of Defense Support Program early warning satellites that provided missile launch detection and warning during the Cold War, and during the Gulf War, are soon to be replaced by the Space Based Infrared System (SBIRS), which will consist of an armada of vastly more capable spacecraft in a variety of orbits around the earth.

The Global Broadcast Service will supplement existing military communications satellites, providing unprecedented wideband connectivity for the dissemination of imagery intelligence and other information products to previously under-served users.

The Discoverer-II component of the National Reconnaissance Office’s Future Imagery Architecture will replace the existing pair of imaging radar satellites with a swarm of some two dozen radar-equipped spacecraft that will provide all-weather round-the-clock world-wide imagery intelligence support to combatant military forces.

These and other upgrades will further expand upon current programs that already represent major improvements relative those fielded during the Cold War. The handful of imagery intelligence satellites in current operation is capable of generating thousands of images each day, compared to the hundreds of images provided by the pair of imagery intelligence satellites that were typically operational during the Cold War. And the military space user community has expanded multifold, with capabilities previously restricted to theater command posts now available to individual pilots and troops in the field.

Modern precision warfare is largely an artifact of the system of systems represented by the combined utilization of intelligence collection, communications, navigation, and other military space systems. Many other countries deploy tanks, ships, and aircraft that are not individually inferior to those deployed by the United States, though surely in less abundance. But no other country has the unique ability of the United States to tie all these individual platforms together, using military space systems, into a single integrated precision warfare system. While some have questioned the advent of a Revolution in Military Affairs, and many have contested its precise nature, few would doubt that American military space systems provide a broad range of military capabilities that are unmatched by any other country.

A further extension of these capabilities is envisioned through the development and deployment of a variety of “Space Control” systems, capable of damaging or destroying adversary spacecraft.

For some years now the Army has quietly worked on perfecting the anti-satellite (ASAT) capabilities of the Mid-Infrared Advanced Chemical Laser (MIRACL) deployed the High Energy Laser System Test Facility (HELSTF) in White Sands, New...
In the fall of 1997 this two-mega-watt laser was tested against a target in space, with uncertain results, and subsequently tracking tests have continued to perfect the ability of this system to track, and destroy, adversary spacecraft.

The Army has also continued work, with Congressional support prevailing over the Clinton Administration’s opposition, on a Kinetic Energy ASAT that would consist of a ground launched rocket booster that would propel a hit-to-kill kinetic energy kill vehicle capable of destroying adversary spacecraft in low earth orbit. A few dozen such interceptors may become operational within the next few years.

It is also believed that the Air Force has an unacknowledged capability to inflict lethal damage on adversary spacecraft using a high-power microwave weapon, possibly located at Kirtland Air Force Base in New Mexico. Within a few years, there is the prospect of additional ASAT capabilities entering the American arsenal.

National Missile Defense ground based interceptors, which may become operational around the year 2005, would have an ASAT capability.

The Air Force YAL-1 Airborne Laser, which would appear to have an ASAT potential comparable to that of the MIRACL laser, is also slated for operational deployment after 2005.

The Air Force Space Based Chemical Laser, with an initial launch planned soon after 2005, would seem an ideal candidate for ASAT applications, since explicit antimissile applications appear constrained by current interpretations of the Anti-Ballistic Missile Treaty.

Technical challenges at the device level should not be underestimated, as demonstrated by the dismal performance of missile defense systems over the past decade, ranging from Patriot to THAAD. But just as these failures have not dampened the political enthusiasm for missile defense, questions of effectiveness have been largely absent from discussions of the ASAT armamentarium.

It is far easier to describe these systems, or explain their genesis, than to explicate scenarios in which they would materially contribute to advancing American national security interests, however defined. In no small measure the drift towards ASAT abundance is simply an expression of the technological and programmatic inertia of systems initiated to counter the Evil Empire. Reflecting the relative ease with which satellites can be destroyed, none of these programs is so large as to induce high-level political sticker shock, but none is so small as to be devoid of a coterie of nurturing political patrons tending to their care and feeding.

The antiseptic Revolution in Military Affairs notwithstanding, the profession of arms remains the old art of killing people and breaking their things. Military institutions, and their paths of professional ad-
vancement, give pride of place to those versed in the way of combat. The deployment of ASAT systems would at last give the military space community a direct combat role in addition to the extremely valuable but distinctly subordinate combat support role they have traditionally performed. It is no accident that top military command is the province of combat veterans, rather than the console-jockeys who “drive” communications satellites, or that the United States Space Command is invariably commanded by a former fighter pilot with no prior exposure to the arcana of military space operations.

**Aerospace power and military revolution**

Doctrinal imperatives provide additional sanction to the primal desire for pride of place. In its successful attempt at the dawn of the space age to retain control of military space systems, the Air Force asserted the doctrinal construct of “Aerospace Power.” According to Aerospace Power Doctrine, air and space are a single indivisible medium for military operations, and space operations represent a direct and logical extension of air operations. This doctrinal construct served to keep most (but not all) space assets out of the hands of the other (ground, sea and shore) military services. It also served to keep space in the Air Force, which had so recently used Airpower Doctrine to legitimate its separation from the Army.

The years have not been kind to Aerospace Power Doctrine, which has failed to generate much in the way of useful guidance or direction to military space operations. The most useful military spacecraft have performed intelligence, communications, or other support functions which occupy a distinctly subordinate place in the doctrinal universe. And those military capabilities which were so prominent in the evolution of Airpower Doctrine, such as strategic bombardment, air superiority, or close air support, have yet to find physical expression in space systems.

Indeed, over time, it has become increasingly apparent that the fundamental premise of Aerospace Power Doctrine, the unity of the air and space environment, is physically flawed. The operational conditions and possibilities of air and space are radically different, and this difference finds concrete expression in the physical configuration of air and space vehicles. Indeed, the most successful space vehicles, ranging from the spheri- cal Sputnik to the ungainly module that took Neil and Buzz to Tranquility Base, have been utterly unlike aircraft. And those space vehicles that have appeared most like aircraft, such as the Space Shuttle, have been among the most disappointing.

But hope spring eternal, and the doctrinal imperatives of Aerospace Power mandate that space forces acquire combat capabilities to match those of the Air Force, such as those embodied in anti-satellite weapons. In recent years the debate over the Revolution in Military Affairs has given prominence to the widely abused construct of Information Warfare, which has been taken to encompass a diversity of activities, some of greater actual importance than others. Properly understood as the art of sustaining information superiority over an adversary through dominant battlespace awareness, Information Warfare closely approximates many of the distinguishing features of the contemporary American military advantage relative to others. This dominant battlespace awareness is largely a product of military space systems and closely kindred capabilities. Consequently, Information Warfare provides a rather more useful doctrinal point of departure for conceptualizing military space operations than the tenets of Air Power. Recognition of this fact, however, would also provide an equally useful point of departure of the military space role from the Air Force into a new separate Space Force. Freed from the sterile doctrinal imperatives of Air Power, such a Space Force would readily recognize the profound disutility of robust ASAT capabilities in sustaining American preeminence in military space operations. Proponents of American ASAT programs have had some difficulty pointing to just precisely which satellites they would wish to attack. The canonical “rogue state” threats—the Flans and Iraqs of the world—currently lack space capabilities and are unlike to develop worthwhile targets for many years to come. Even Communist China, which has recently enjoyed something of a renaissance on the threat board, has declined to deploy military space systems in any appreciable quantity. And Russia too recently departed from the enemies list to return as the baseline planning threat. These challenges would not confront an ASAT proponent in Iraq, or China. The sole remaining superpower presents an extremely target-rich environment of expensive and relatively fragile spacecraft upon which it has become entirely dependent for the conduct of the full spectrum of military operations. Rather than seeking to match American military space systems and provide targets for American ASAT weapons, it is far more likely that these and other countries would seek asymmetric responses in the form of their own ASAT capabilities. Thus it is not surprising that prior to the Gulf War Iraq was studying ASAT weapons, and that China has recently been reported to be engaged in similar inquiries.

There is, however, little prospect for the emergence of a separate Space Force, coequal with the other military services. Even the modest proposal of creating distinct budget and institutional arrangements for the military service’s space activities, along the lines of those that have worked so well for special operations forces, has fallen into obscurity. Consequently, the various institutional and doctrinal imperatives that are propelling American ASAT capabilities seem likely to remain unabated for the ponderable future.

The prospect for negotiated arms control restrictions on anti-satellite weapons would seem equally remote. The central Cold War arms control project of negotiated mutual restraint between the United States and Soviet Union has faltered with the end of the Cold War, and the collapse of the Soviet superpower. Even during the Cold War, when both parties had both ASAT capabilities and vulnerable satellite systems, only modest progress was made towards negotiated limitations on ASAT weapons. Currently, the profound disparity between the sole remaining superpower and the rest of the world increasingly defines a rather different arms control agenda. This new agenda is not unlike that defined by Thucydides in the Melian Dialog, in which “the strong do what they can, and the weak do what they must.”

The High Ground in Space
Global Network Against Weapons and Nuclear Power in Space Opposes US Plans for War in Space

Regina Hagen

A young, slim woman presented slides about her employer. “Space control can be thought of as protecting and monitoring our space resources. Space surveillance is a critical element of the space control mission and will be vitally important to support future theater military operations and assure availability of U.S. space forces.”

The young lady is a public relations officer with the U.S. Air Force. She works for the 21st Space Wing at the Peterson Air Force Base in Colorado Springs, Colorado/USA, which “is a part of the United States Space Command under Air Force Space Command”. Courageously, she followed an invitation of the Global Network Against Weapons and Nuclear Power in Space to present her unit at the annual meeting which was held in Colorado Springs on April 7-9, 1998.

Guardians of the High Frontier

One important field of activity of the 21st Space Wing is to “track, catalog and detect over 10,000 items around the Earth. ... Tracking and cataloging Earth orbiting objects is essential to prevent collisions during Space Shuttle missions. With more and more launches of military and civilian satellites, the catalog continues to grow.” This activity is closely related to the main tasks of the unit. “The 21st Space Wing has two very important space operation missions - missile warning and space control. ... The space surveillance aspect of the space control mission allows the U.S. to maintain and dominate the high ground”. ... Space control is evolving into space superiority to ensure the safe and free use of space by our forces and allies. ... The control of air and space is critical because it allows all U.S. forces freedom from attack and freedom to attack. ... We cannot allow space to be controlled by our adversaries. ... Team 21, first place in space. Dominating the high ground!”

This declaration is in full conformity with the overall space policy of the U.S. military. “Space has often been referred to as the high ground”, in the sense of giving its occupier a dominating view (and prospective control) of a potential battlefield.” “Space forces play an increasingly important role in prosecuting modern warfare. They provide global and battlefield surveillance, ballistic missile warning, precise navigation, secure communications, weather, and intelligence information. Space assets facilitate effective command and control and enhance the joint utilization of our land, sea, and air forces.”

In its glossy publication “Vision for 2020”, the US Space Command sets the stage for military engagement in space. The motto: “US Space Command - dominating the space dimension of military operations to protect US interests and investment. Integrating Space Forces into warfighting capabilities across the full spectrum of conflict.”

The Space Command draws historical parallels: “Historically, military forces have evolved to protect national interests and investments - both military and economic. During the rise of sea commerce, nations built navies to protect and enhance their commercial interests. During the westward expansion of the continental United States, military outposts and the cavalry emerged to protect our wagon trains, settlements, and railroads. As air power developed, its primary purpose was to support and enhance land and sea operations. However, over time, air power evolved into a separate and equal medium of warfare. The emergence of space power follows both of these models. Over the past several decades, space power has primarily supported land, sea, and air operations - strategically and operationally. During the early portion of the 21st century, space power will also evolve into a separate and equal medium of warfare. Likewise, space forces will emerge to protect military and commercial national interests and investments in the space medium due to their increasing importance.”

No doubt: in addition to supporting Earth-based armed forces, protecting commercial space activities - i.e. telecommunication and remote sensing satellites, industrial enterprises who want to ‘mine the sky’, visions for space-based colonies, etc. - serve as a justification to enforce U.S. dominance in space. “The political, economic, technological, and military trends hold significant implications for USPACECOM. An increased dependence upon space capabilities may lead to increased vulnerabilities. As space systems become lucrative military targets, there will be a critical need to control the space medium to ensure US dominance on the future battlefields. ... Control of Space is the ability to assure access to space, freedom of operations within the space medium, and an ability to deny others the use of space, if required. ... Global Engagement is the application of precision force from, to, and through space.”

Just a few months ago, the US Space Command finalized its Long Range Plan (LRP). The plan “captures in one place a comprehensive roadmap for achieving our vision for 2020. ... It is our roadmap to prepare ourselves to not only do today’s job in military space better, but to plan for 2020’s challenges”. The LRP repeats the importance of protecting the national assets, to counter “... the nation’s dependence on space capabilities in the 21st Century which rivals its dependence on electricity and oil in the 19th and 20th Centuries. Electricity and oil were critical parts of the industrial revolution; space capabilities (e.g. communications, positioning and timing, imaging, earth resource monitoring, and weather) are emerging as vital to the information revolution. ... US interests and investments in space must be fully protected to ensure our nation’s freedom of action in space.”

The military-industrial connection

Colorado Springs plays a major role in the preparation of military space activities. In addition to the US Space Command headquarters at Peterson Air Force Base, it also houses the United States Air Force Academy which is routinely attended by all U.S. Air Force officers. Therefore,
the town on the edge of the Rocky Mountains is the ideal setting for the annual US Space Foundation’s National Space Symposium held on April 7-10, 1998, in Colorado Springs at the Broadmoor Hotel. Traditionally, the conference is attended by representatives from space organizations, the armed forces, and commercial companies. In parallel to the conference, many companies exhibit space war technologies at an industrial fair in the hotel premises. This year’s conference motto was “The Global Relevance of Space: Civil, Commercial and Military.”

And industry responds to military demands. On its large poster “Revolutionizing Airpower for the 21st Century” Boeing presents the Airborne Laser (ABL), a joint project by the U.S. Air Force, Boeing, TRW and Lockheed Martin. In the section “The Threat is Real and Growing”, the poster lists seemingly dangerous proliferators like Romania, Bulgaria, and the Slovak Republic. The publication is not a leftover from the Cold War - it was published in 1997...

Development of a Space Based Laser (SBL) seems like a logical step ahead. At the 1998 National Space Symposium, TRW proudly announced that together with Boeing it won a $10 million study contract “to define concepts for a Space-Based Laser Readiness Demonstrator (SBLRD). Funded by the Ballistic Missile Defense Organisation, the contract follows more than 15 years of TRW work developing technologies for BMDO-sponsored space-based laser initiatives. ... SBLRD is intended to demonstrate the technical feasibility of using a space-based laser system to intercept and destroy theater ballistic missiles in their boost phase.” (The boost phase is of particular interest for any ballistic missile defense as engaging targets over enemy territory would release all debris - be it conventional, biological, chemical, or nuclear - close to the launch area, i.e. hopefully over enemy territory.)

At a press conference, TRW officials stressed the fact that the SBL will be designed to protect against theater ballistic missiles and would therefore respect the restrictions imposed by the Anti-Ballistic Missile (ABM) Treaty. However, the technical borderline to intercepting strategic ballistic missiles is very thin. Article V(1) of the ABM Treaty states: “Each party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based.” According to Article II of the ABM Treaty, an ABM system is defined as “a system to counter strategic ballistic missiles or their elements in flight trajectory.” In 1997, President Clinton and President Yeltsin affirmed that they are “recognizing the fundamental significance of the Anti-Ballistic Missile (ABM) Treaty” and “consider it their common task to preserve the ABM Treaty, prevent circumvention of it, and enhance its viability.”

The Ballistic Missile Defense Organisation (BMDO) which funds the SBLRD study is the successor of the Strategic Defense Initiative Organisation (SDIO). SDI was the result of Ronald Reagan’s now famous ‘Star Wars’ speech delivered on March 12, 1983. The program was heavily disputed during the 1980s. With the end of the Cold War, Star Wars ceased to be an issue for public debate and lost its public visibility. However, the program continued and with the election of President Clinton it shifted from National Missile Defense to Theater Missile Defense (TMD). Within one year of his taking office in 1993, the emphasis on TMD was fully implemented. The FY 1998 budget for BMDO amounted to $3,554 billion. This does not yet include funding of the armed land, sea, and air forces’ space activities. Combined, these budgets are no smaller than the SDIO budgets of the 1980s.

Demanding peaceful use of space

From all said above, it is obvious that the date - concurrent to the National Space Symposium - and location - Colorado Springs - of the annual meeting of the Global Network Against Weapons and Nuclear Power in Space were carefully chosen. Colorado Springs proved ideal to gather information as well as to voice protest.

Organized by the local Citizens for Peace in Space, the meeting was attended by members and employees of several dozen peace organizations from the US and from Europe, among them Women’s International League for Peace and Freedom, Florida Coalition for Peace & Justice, American Friends Service Committee, Menwith Hill Peace Camp, Lawyers’ Committee on Nuclear Policy, Yorkshire CND, and many more. The attendants used the meeting to discuss many aspects of militarization and nuclearization of space. Due to its technological, military, and financial dominance, US space activities were often at the center of the discussion.

Eleven workshops and many lectures covered a wide range of issues such as international law, nuclear energy for space missions, dominance of the US Space Command, surveillance and reconnoissance, NASA’s Cassini mission to planet Saturn with its payload of 32 kg plutonium, spy satellites, British protests against the U.S. spy station at Menwith Hill, and many more. The unannounced visit of some peace activists to the US Space Command...
An exciting lecture by physics professor Michio Kaku who delivered his thoughts with biting irony was certainly a meeting highlight. Ved Nanda from the University of Denver Law School acquainted the audience with space-relevant sections of the international law and the contents of the Outer Space Treaty. An evening event with British peace activist Helen Johns who has been participating in a women’s protest camp at Menwith Hill spy station for more than 1 1/2 years gave insight into European protest against US space dominance. A delightful evening of theater, satire, songs, and other (political) entertainment concluded the meeting with a lighter note.

An involuntary humorous touch was introduced by police officers who attempted to attend the meeting incognito. This came not as a surprise to the Global Network members as space policy and abuse of space technologies by intelligence agencies was a matter of concern at the meeting.

Besides workshops and lectures, the Global Network meeting offered ample time for the network’s Business Meeting. The following decisions were taken:

- The plenum elected three volunteer coordinators to lead the Global Network business until the next annual meeting.
- To assist them with their tasks, four advisors were elected, two of them from Europe. For personal reasons, two of the coordinators have meanwhile resigned. Consequently, activities are currently somewhat slower than planned.
- The Global Network will request UN recognition as a Non-Governmental Organization.
- The Global Network will apply for registration as a non-profit organization in Florida/USA so that contributions to its work would be tax free. The registration has meanwhile been approved by the State of Florida. Consequently, a preliminary Board of Directors has been appointed. Currently, the BoD is represented by the following individuals:
  - Kate Coburn Bosniiske from Asheville/USA; Bruce Gagnon from Florida/USA; Karl Grossman from New York, USA; Regina Hagen from Darmstadt/Germany; Michio Kaku from New York, USA.
- The Global Network will request recognition as a Working Group of Abolition 2000, the international network to abolish all nuclear weapons. The request has meanwhile been accepted by Abolition 2000.
- The next annual meeting, being organized by the Darmstädter Friedensforum, will take place in Darmstadt/Germany, on March 5-6, 1999, after an international scientific conference of ethical aspects of space use, hosted by IANUS (March 3-5, 1999) at the University of Technology in Darmstadt. (See separate announcement on last page of this INESAP Bulletin.)

**References**

2. ibid.
4. ibid.
5. ibid.

---

Inesap Information Bulletin No. 16

November 1998
Nuclear Hypocrisy
New Weapons Development and Anti-Disarmament Policies in the US

In 1991, as the Soviet Union was disintegrating, US General Colin Powell stated: “You’ve got to step aside from the context we’ve been using for the past 40 years, that you base military planning against a specific threat. We no longer have the luxury of having a threat to plan for. What we plan for is that we’re a super power. We are the major player on the world stage with responsibilities and interests around the world.” Seven years later, despite massive geopolitical transformations, the US continues its quest for nuclear superiority and global military dominance. Since the end of World War II, the US has fostered the myth of nuclear “deterrence,” while relying on the threat of nuclear war back on the front page, and demonstrated the fragility of the non-proliferation regime. But a deeper look reveals the global weakness of a hypocritical “do as we say, not as we do” US nuclear posture, and calls into question the basic premises of official US non-proliferation policy.

In his May 16 weekly radio address, President Clinton told the American people: “India has pursued this course at a time when most nations are working hard to leave the terror of the nuclear age behind.” This statement is completely at odds with current US policy. Contrary to its public pronouncements, the US is modernizing and upgrading its nuclear forces and renewing its commitment to reliance on nuclear weapons, a reality which threatens the long-term viability of both the Nuclear Non-Proliferation Treaty (NPT) and the Comprehensive Test Ban Treaty (CTBT).

Presidentiial Decision Directive 60 (PDD), signed last December, reaffirms the fundamental elements of US nuclear doctrine since World War II. According to newspaper accounts, the PDD re-commits the US to policies of threatened first use and threatened massive retaliation, and affirms that the US will continue to rely on nuclear arms as a cornerstone of its national security for the “indefinite future.” In addition, the PDD reportedly contemplates nuclear retaliation against the use of chemical and biological arms — a policy called “counterproliferation.”

The PDD is backed by a major new program to upgrade the US nuclear weapons infrastructure. The so-called “Stockpile Stewardship” program is intended to retain “all historical capabilities of the weapons laboratories, industrial plants and the Nevada Test Site,” without underground testing. Stockpile Stewardship will provide design capabilities potentially greater than those available during the Cold War. It encompasses a test site ready to rapidly resume full-scale underground testing and a substantial nuclear warhead production capacity, computer-integrated with new, high-tech, experimental laboratory facilities. In addition to ensuring the “safety and reliability” of the “enduring” arsenal, Stockpile Stewardship is officially and explicitly intended to maintain the capability to design and develop new weapons and to train a new generation of nuclear weapons designers. Over the next decade, the US plans to invest $45 billion in this program — an amount, in inflation-adjusted dollars, well above the Cold War annual spending average for nuclear weapons research, development, testing, and production.

Stockpile Stewardship will allow nuclear weapons development to continue without full-scale underground tests. Instead, scientists will simulate nuclear tests using the world’s fastest supercomputers and data collected from more than 1000 past tests, coupled with new diagnostic information. This information will be obtained from inertial confinement fusion facilities, pulsed power fusion experiments, above-ground hydrodynamic explosions, and subcritical “zero yield” tests conducted deep underground at the Nevada Test Site. These tests involve hundreds of pounds of high explosive material and up to several pounds of weapon-grade plutonium. They are called “subcritical” because they do not generate self-sustaining nuclear chain reactions with measurable nuclear yields. The US claims that subcritical tests don’t violate the CTBT, which does not define a nuclear test. But the CTBT obligates the US “not to carry out any nuclear weapon test explosion or any other nuclear explosion.” In view of US condemnation of India’s and Pakistan’s nuclear tests, the subcritical tests, which clearly violate the spirit of the CTBT, should be called “hypocritical” tests. Since signing the CTBT in September 1996, the US has conducted four subcritical tests. The next one, code-named “Cimarron,” is expected in November.

Some of the key Stockpile Stewardship technologies have been developed as “dual-use” scientific facilities that can be used for both high energy physics research and bomb science. The prime example is the multi-billion dollar, stadium-sized National Ignition Facility (NIF), presently under construction at the Lawrence Livermore National Laboratory in California. The NIF is designed to focus 192 powerful laser beams onto a pea-sized capsule containing deuterium and tritium, forcing the two heavy isotopes of hydrogen to combine through compression, and causing a brief thermonuclear explosion that will create extremely high temperatures approaching those found in full-scale underground nuclear tests. If it works, “ignition” will be achieved, producing a self-sustaining fusion reaction. NIF will generate sizeable explosions, central to Stockpile Stewardship. This raises serious questions about whether NIF — and the virtually identical “Projet Megajoule” under construction in France — violates the letter of the CTBT. The dangerous development and spread of these technologies is not limited to the declared nuclear weapon states, each of which has its own version of Stockpile Stewardship. Any country with an advanced inertial confinement fusion program has the capability to rapidly develop a sophisticated hydrogen bomb. Since the 1970’s, India’s weapons labs have strucuted their own “stockpile stewardship” program, complete with inertial confinement fusion, thus allowing their designers to develop sophisticated weapons prior to “proof” testing. Much like the final French tests in the Pacific, the Indian government announced that its tests served the purpose of generating sufficient data to allow scientists to design and deploy weapons in confidence, using lab experi-

Jacqueline Cabasso
ments and supercomputers, without the need for underground explosions. Not surprisingly, this capability was obtained with US assistance. Between 1994 and 1996, over 800 Indian scientists visited the US nuclear weapons laboratories. And, it was reported shortly after the May tests that IBM had sold an advanced supercomputer capable of running simulations necessary to develop nuclear weapons “codes” to a suspected Indian nuclear weapons research facility.

The South Asian tests warn of a frightening trend, in which developing nuclear powers can utilize sophisticated laboratory research and “dual-use” technologies to design and deploy nuclear weapons with a minimum number of explosions.

The US Stockpile Stewardship program is the result of a “devil’s bargain.” It is the price exacted by the nuclear weapons laboratories in exchange for their acceptance of a ban on full scale underground tests. It is being widely promoted as an essential condition for Senate ratification of the CTBT, a stated objective of official US non-proliferation policy. However, this “deal” may actually weaken prospects for stemming the spread of nuclear weapons.

When the NPT was originally negotiated, a two-part bargain was struck to induce the non-nuclear weapon states to forswear nuclear weapons. First, the nuclear weapon states promised in Article IV to assist the non-nuclear weapon states with the development of nuclear power, an unfortunate commitment that promoted the very proliferation the NPT was intended to prevent. Second, the nuclear weapon states promised in Article VI to negotiate the cessation of the nuclear arms race and the elimination of their nuclear arsenals. This bargain was reaffirmed in the 1995 decision to indefinitely extend the Treaty. Pursuant to Article VI, the nuclear weapon states agreed to conclude a CTBT by 1996 and to pursue “systematic and progressive efforts to reduce nuclear weapons globally, with the ultimate goal of eliminating those weapons.”

These commitments were reinforced and expanded by the historic 1996 advisory opinion of the International Court of Justice. In what is now the authoritative interpretation of Article VI, the Court held unanimously that “there exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control.”

During the Cold War, the NPT was largely ignored by the nuclear weapon states. Now, in the logic of “counterproliferation,” the US military establishment has turned the Treaty’s original logic upside down. Possible proliferation of nuclear weapons and other weapons of mass destruction has become a principal rationale for the US to maintain and upgrade its own nuclear forces. This represents an expansion, rather than a reduction, of the role of nuclear weapons and directly contradicts the Article VI disarmament obligation.

When President Clinton submitted the CTBT to the Senate for ratification over a year ago, his transmittal letter made clear that his endorsement of the Treaty was conditioned on Senate support for the Stockpile Stewardship program as a central requirement of “national security strategy” premised on maintenance of a robust nuclear “deterrent.”

The CTBT has been long-sought in the belief that it would constitute an effective disarmament measure. However, conditioning adoption of the Treaty on the establishment of the Stockpile Stewardship program in order to compensate for the loss of underground testing demonstrates a profound US disregard for global and historical expectations of the CTBT. This may serve in the long term to stimulate the spread of nuclear weapons, directly, through the development and spread of technology and information, and indirectly, by legitimizing continued possession and threatened use of nuclear weapons.

Today, US Trident submarines patrol the world’s oceans at Cold War levels. Armed with hundreds of unimaginably powerful nuclear weapons, they remain ready to strike targets around the globe in a matter of minutes. The US weapons laboratories are currently working on upgrades to the Trident warheads and missiles. These upgrades may allow improvement in accuracy for large portions of the submarine-launched ballistic missile force. During the Cold War, this kind of “upgrading” raised fears of a disabling “first strike” and was a driving force in the arms race. Russia, France, the UK and China are upgrading their strategic and tactical nuclear forces as well.

The US plans to maintain indefinitely a nuclear arsenal of more than 10,000 intact warheads in various states of readiness, with thousands of additional plutonium “pits” in reserve. The size of this arsenal is not affected by the START process, which deals only with deployed “strategic,” or long-range weapons. Even if START II is ratified by the Russian Duma in doubt due to NATO expansion, US development of a Ballistic Missile Defense system, and political instabilities in Russia — in 2007 each side will retain some 3,500 deployed strategic weapons. The START III framework agreement would allow each side to maintain 2,000 or more deployed strategic nuclear weapons. At present, there are no formal arms reduction negotiations underway.

While US officials publicly proclaim that the CTBT will severely constrain the further development of nuclear weapons, it appears that the Pentagon has sufficient confidence in near-term Stockpile Stewardship capabilities to seriously consider developing and deploying modified weapons designs without underground testing. In fact, it has already done so. Existing facilities have been used to produce and deploy the first US nuclear weapon with improved military capabilities since 1989. The B61-11 is an earth penetrating gravity bomb with a variable yield ranging from 300 tons to over 300 kilotons TNT. The US claims that the B61-11 is not a “new” weapon because the physics package has not been changed. But in fact, it is a weapon with new military capabilities. And its use has already been threatened against Libya and Iraq in connection with alleged chemical and biological weapons capabilities.

The world reeled when India and Pakistan conducted their nuclear tests. But just two months earlier, the US flight-tested the B61-11 in Alaska, using a depleted uranium warhead. Attempts by local tribes and environmental groups to focus national attention on this US nuclear test fell on deaf ears. Other nuclear weapons projects reportedly underway include upgrades to MX warheads and strategic bombs, nuclear glide bombs, and — possibly — a nuclear warhead for theater defense missiles designed to intercept and incinerate biological and chemical warheads.

In addition, contingency plans are underway to allow US nuclear weapons production to quickly increase to “cold war levels of building.” Modernized plutonium pit manufacturing capability will add to the 12,000 unused pits currently in storage and

---

Nuclear Weapons Development

Inesap Information Bulletin No. 16

38

November 1998
A German Plutonium Balance for the Past 30 Years

Martin B. Kalinowski, Wolfgang Liebert, Silke Aumann

Introduction

Up to now, there has not been a clear picture of the German plutonium stockpiles but merely singularly appearing summaries of certain activities and of the amounts originating thereof. The most comprehensive worldwide plutonium balance was presented in the spring of 1997. It is especially in the German case not detailed enough and presents figures as of 1996.

Nine plutonium-producing and employing countries presented common guidelines for the handling of plutonium at the end of 1997. The German federal government agreed in the framework of these talks with the other involved countries to annually publish the inventories of civilian plutonium. As welcome as this step towards the establishment of transparency may principally be, the chosen format for these yearly balance reports is unsatisfying. It only contains very few strongly aggregated data which do not allow for attribution to facilities or owners which only have to be precise over and above 100 kg.

The relevant data for Germany on reprocessing within the country and abroad, import and export of plutonium, processing into MOX and use of MOX as well as accounts of current plutonium inventories were collected by the authors of this paper in a study which relies on published material as well as own research and calculations. This contribution contains a summary of the results.

In a time in which Germany has discontinued the reprocessing of spent fuel as well as the production of MOX within the country, it should be at least possible to compile a concluding plutonium balance report for these sectors. A detailed survey and review of the plutonium fluxes in Germany is necessary to account for the globally discussed proliferation risk (The danger of proliferation and development of nuclear weapons.) In doing so it has to be taken into account that so-called reactor-plutonium which is obtained from power-reactors with common burn-up also enables the production of nuclear weapons. While it is true that all German plutonium is under nuclear safeguards from the IAEA (International Atomic Energy Agency) in Vienna and EURATOM in Luxembourg, an unauthorized theft can in the best case only be detected. It could generally not be prevented.

It would be beneficial to the international debate if it could be publicly proven that Germany stays above any suspicion: Exact information should be available on the whereabouts of plutonium stockpiles - especially regarding those which are relevant for weapons. In contrast to this, the first official US plutonium balance which was presented in February of 1996 cannot satisfy since it had to acknowledge inventory discrepancies (Material unaccounted for - MUF) of 2.8 t Pu, i.e. 2.5% of the total production. Only a thorough picture of the plutonium fluxes offers the basis for the development of a strategy for the long-term handling of this material.

Summary of reprocessing

Until the end of 1997, 5,437 t HM (heavy metal) in spent fuel elements were relocated from German power reactors, excluding Eastern Germany. Out of that, 5,365 t HM (98.7%) were taken to reprocessing facilities and 70 t HM (1.3%) were brought to a central interim storage facility (Away from reactor storage facilities.) Further, 2,835 t HM were stored in the fuel element storage tanks of German nuclear power reactors at the end of 1997. 4,757 t HM were transported to the French COGEMA, which is more than 83% of the total amount of the material which went to reprocessing plants. This illustrates the relevance of the German-French cooperation (see fig. 1.) 187 t HM (3.5%) were delivered to the German reprocessing facility (Wiederaufbereitungsanlage Karlsruhe - WAK), 651 t HM (12.1%) went to the British BNFL. The remaining 70 t HM (1.3%) were delivered to smaller facilities, like the Eurochemic plant in Mol, Belgium.

Figure 1 shows how much of the amount of heavy metal delivered by Ger-

Plutonium in Germany

Jacqueline Cabasso is the Executive Director of the Western States Legal Foundation in Oakland, California, a founding member of the Abolition 2000 Global Network to Eliminate Nuclear Weapons. Address: 1440 Broadway, Suite 500, Oakland, CA 94612, USA; tel +1(510)839-5877, fax: +1(510)839-5397, email wslf@igc.apc.org.

November 1998 39 Information Bulletin No. 16 Inesap
many has been reprocessed until the end of 1997 (total amount: 3,664 t HM.) A combination with figure 2 makes clear that to the end of 1997, 60% of the old contracts for reprocessing in France and the United Kingdom were fulfilled (total amount: 5,641 t HM.) An additional occurrence of about 36-45 t of separated plutonium would have to be expected upon complete fulfilment of all contracts. 30 to 35 t Pu (including Belgium and Germany) have already been separated by the reprocessing of spent fuel for German customers.

According to current planning data, the largest share of reprocessing for German customers will in the future still take place in France, yet the British contribution is supposed to increase substantially (see fig. 2.)

Reprocessing in Germany

The German reprocessing facility (WAK) was run as a pilot project between 1971 and 1991. According to the information given by the WAK, 1,189 kg plutonium were separated in 32 separation campaigns from 204 t HM, of which 17 t HM came from research reactors (see fig. 3.) Statements on the isotopic composition for all 32 campaigns could be made on the basis of more detailed information, such as fuel type and burn-up. Nine reprocessing campaigns of fuel from the MZFR - (Mehrzweckforschnsreaktor) would be of special interest regarding the proliferation relevance. There were altogether seven campaigns with a fuel burn-up below 10,000 MWD/t, which would allow to expect a high content of Pu-239 in the separated plutonium. The interesting amount of plutonium lies well above 250 kg – a theoretically sufficient amount for at least 40 nuclear weapons.

A small facility called MILLI was once run in the Karlsruhe center for nuclear research which was able to reprocess fuel elements from fast breeder reactors. Significant amounts of especially weapon relevant plutonium could have been separated here as well.

Reprocessing in France

The overall contract volume with COGEMA currently amounts to 6400 t HM of spent fuel. 4,757 t HM of spent fuel elements went from Germany to France until the end of 1997 with an overall plutonium content of 37 - 44 t HM. Until March 31st, 1998, the reprocessing contracts with UP2 (Usine de Plutonium) were fulfilled to a total amount of 1,645 t HM. The German contractors for this are known. The contracts with the UP3 facility which became operational in 1989 are fulfilled to about two-thirds (until March 31st, 1998: 1,909 t HM.) Overall 3,552 t HM German spent fuel were reprocessed in France. In a rough estimate, 27 to 34 t of plutonium were separated there. Since 19 t of separated plutonium were reimported to Germany until 1998, 17 to 24 t of separated plutonium should still be stocked in France. This amount could only be assessed with greater accuracy if it were known which fuel elements were reprocessed and which fuel composition and burn-up profiles they had. The separation efficiency also plays a role in the assessment of the separated plutonium amounts.

In the French reprocessing practice, in which civic and military facilities are not strictly separated, plutonium of different origin can be mixed or even the deliberate exchange of plutonium of a certain origin or destination for another plutonium charge can take place. The concern is well founded, that plutonium from German reactors could have found its way into the French nuclear weapons program.

The research reactor cores KNK I and II of the Karlsruhe center for nuclear research were reprocessed in the French nu-
clear center of Marcoule in the years 1976 and 1993/94. There is no clarity on the amount of about 100 kg of plutonium separated during the second campaign regarding its isotope composition and its whereabouts. The whereabouts of the plutonium which was separated during the reprocessing of fuel elements of the KKN (Niederaichbach) are also unknown to the authors. This material is of special proliferation relevance since the reactor only achieved 18 days of full operation and the amount of Pu-239 should therefore be unusually high.

Reprocessing in Great Britain

German nuclear power reactor managers have made reprocessing contracts with the British Nuclear Fuel plc (BNFL) over 2,250 t HM of spent fuel. Two new contracts over a total of 545 t HM were cancelled by the German energy utilities HEW and RWE in 1994 and for some time it looked like more cancellations were coming up.

From 1969 to 1973, only 12 t of German spent fuel were reprocessed in Sellafield with the facility B204. The separated amount of plutonium should be about 100 kg.

Until the end of 1997, the compared with France small amount of a little more than 650 t HM were transferred from Germany to the BNFL. The plutonium content can be estimated at about 5-6 t. The new reprocessing plant for light water reactor fuel, THORP, only became operational in Sellafield in March of 1994. It can therefore be expected that only a part of the German fuel has been reprocessed up to now. Until the end of 1997 this was the case for 56 t with a plutonium separation of about 0.5 t.

Between 1969 and 1982, a total of 351 kg non-irradiated plutonium was imported from England. This is more than what was separated by German clients in England at the beginning of the 70s. There were no more plutonium deliveries until 1995. It remains unsettled how much plutonium which was separated for German power plant operators has been brought back since 1994 to Germany. Probably nothing.

Reprocessing in Belgium

More than 28 t HM from two German power reactors as well as from various research reactors were reprocessed in the reprocessing plant Eurochemic in Mol, Belgium, which was able to reprocess spent fuel from 1966 to 1974. About 110-150 kg of plutonium have been separated. Germany has imported non-irradiated plutonium from Belgium in larger amounts and in the form of MOX.

Imports and exports

Data from the German Federal Export Office (Bundesausfuhramt BAFA) is available on the exported and imported amounts of plutonium in the time between 1968 and 1994 (see figs. 4 and 5.) The import of altogether 10.65 t of non-irradiated plutonium consists in large part of the return of plutonium which was separated in foreign reprocessing plants. The export of 2.57 t finds its explanation in the production of mixed oxide fuel elements for foreign customers in the Siemens facility (formerly Alkem.) In addition to that, 2,186 kg of irradiated plutonium were exported. The first half ton consisted of the transfer of more than 100 MOX fuel elements of the VAK facility (total mass 6.4 t HM) for direct final storage in Sweden.

The Federal Office of Statistics in Wiesbaden has since 1981 compiled an export and import balance sorted by sending and receiving states and based on customs declarations. A convincing comparison of the two statistics is not easily possible, partly because the statistical office considered the given amounts of all fissile isotopes, not only those for plutonium. However, special differences between the balances can still be discovered.

A series of inconsistencies can be traced back to the fact, that plutonium appears in the trade balance for which no export or import license had been issued by the export authority (BAFA). One example involves the export of 2 kg of fissile plutonium to Pakistan in the year of 1993 appearing in the export statistics of the statistical office.

The BAFA denies knowledge of such a large transfer and speaks of a mistake in the statistics of the Wiesbaden office. It asserts that the amount of the real transfer of plutonium was six orders of magnitude smaller.

MOX production in Germany

The processing of plutonium to mixed oxide (MOX) fuel began in Germany in June of 1965 with the production of fuel pellets for SNEAK (Schnelle Nullenergie Anordnung Karlsruhe.) The company responsible for the project, Alkem GmbH, moved in the early 70s from the nuclear research center in Karlsruhe to Hanau. Alkem was taken over in 1988 by the company Siemens AG.

For SNEAK, 600 kg of plutonium were processed which in largest part were made available by the USA. This material has probably been completely processed in Karlsruhe before 1972. The literature for the number of fuel elements produced in Hanau only yields a histogram representation of the yearly processed amounts of heavy metal, where the FBR-fuel is presented in LWR equivalents. The histogram presented in figure 6 of the same values shows the actual heavy metal content.
In the years 1972 to 1992, the company Alkem, later called Siemens fuel element plant Hanau, processed a total of 8,553 kg of plutonium into 164 tons of heavy metal. The old facility was then shut down. The almost completed new facility never became operational. 77% of the plutonium has been processed for LWR fuel elements. Foreign customers had a share of 13% on that. The company Siemens still acts as contractor of MOX fuel elements for German power supply companies by outsourcing orders to other European production facilities.

MOX employment in Germany

Only 12 German nuclear power stations had a license for MOX fuel elements in 1994, of which 5 had not made use by that time. Other nuclear power stations had requested a license. The Gundremmingen power station has since also employed MOX in its blocks B and C in the meantime. The content of fissile plutonium in the first seven MOX employing power stations is typically limited to less than 3.5% and only a quarter or a third of the core is allowed to be run with MOX elements. One single reactor (Isar 2) has an authorisation for 50% MOX in its core.

How much plutonium in MOX was employed in which reactor has not been comprehensively published to the present day. However, the amount of heavy metal in MOX which was employed in German reactors until the end of 1997 has been published in detail. They were 37.5 t HM for 1997 alone and altogether 238.3 t HM until the end of 1997. The therein contained mass of non-irradiated plutonium is not explicitly published. Since less than 3.5% plutonium content can be assumed on the average, a maximum of 8.3 t of Pu could have been employed in LWR-MOX. According to Siemens, about 5.7 tons of plutonium were reused in the production of MOX elements for German light water reactors and 0.85 tons for foreign reactors. Further MOX fuel elements for German customers were produced in Cardarache in France and in Mol in Belgium.

About 1.3 t of plutonium were employed for LWR-MOX in the year 1997. The consumption of the other already separated amounts of plutonium (18-25 t) would therefore take 14-20 years at a constant rate.

Current inventories

Table 1 summarizes the current German plutonium inventories. Almost 80-100 tons of plutonium are currently under German responsibility. The largest part, some 60 to 73 tons, of this fissile material originating from German reactors is still enclosed in spent fuel elements. About half of this (36-43 t) can still be found in the storage pools of the nuclear power plants, while 9 to 11 t are in France and 5 to 6 t are in England ready to be separated from fuel elements.

About 20 to 27 tons of plutonium were present in separated form at the end of 1997. The largest part of it (about 17-24 t) still is in France. If all reprocessing contracts were fulfilled, about 45 t of plutonium would be added to that.

Most of the non-irradiated plutonium which is stocked within the German borders lies in the so-called plutonium bunker in Hanau. A part of the room is at the disposition of Siemens which had a handling license for 460 kg of plutonium. Stockpiles beyond that were handed by Siemens to the Federal Office for Radiation Protection for federal storage. This amount is stored in the part of the bunker which is called federal storage space. The operator company SBK for the fast breeder in Kalkar SNR 300 has usage rights for plutonium which is stored in Hanau.

Because of the secrecy policy, no detailed information was given on the Hanau plutonium inventory in the past. The standard reply for according questions to the federal government was that more than 2 tons of plutonium were stored in Hanau.

In the request for the phase-out and shut-down program for the Siemens MOX fuel element facility more detailed data were made publicly available in the beginning of 1996. According to it, a total of 2,268 tons of plutonium were then still in the Hanau bunker. The largest part of it consisted of 123 fuel elements which were produced in Hanau for the SNR 300. They contain 1,093 tons of plutonium. A good half-ton (554 kg) is stored as MOX fuel (i.e. oxidated and mixed with uranium-oxide) and almost a half-ton (455 kg) is stored as plutonium-oxide powder. Of the latter, 140 kg were al-
<table>
<thead>
<tr>
<th>site</th>
<th>amount</th>
<th>form</th>
<th>date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanau (Siemens or Bundeslager)</td>
<td>1,093 t</td>
<td>fuel elements for the Kalkar fast breeder reactor (SNR 300)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.554 t</td>
<td>MOX-material, oxidized and mixed with uranium oxide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.455 t</td>
<td>plutonium dioxide in form of powder (140 kg of which returned to COGEMA in mid-1997)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.105 t</td>
<td>complete fuel rods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.070 t</td>
<td>plutonium in nitrate solution (delivered by the WAK)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,268 t</td>
<td>sum</td>
<td></td>
</tr>
<tr>
<td>Karlsruhe (WAK)</td>
<td>15 kg</td>
<td>in 70 m³ liquid waste</td>
<td>Sept. 1998</td>
</tr>
<tr>
<td>nuclear research plant MILLI</td>
<td>Not reported</td>
<td>plutonium from fast breeder reactors, reprocessed according to the PUREX method</td>
<td></td>
</tr>
<tr>
<td>Cadarache (COGEMA)</td>
<td>varying</td>
<td>plutonium dioxide and MOX-fuel-rods</td>
<td></td>
</tr>
<tr>
<td>Dessel (Belgonucleaire)</td>
<td>varying</td>
<td>MOX-fuel-rods and MOX-fuel assemblies</td>
<td></td>
</tr>
<tr>
<td>La Hague (COGEMA)</td>
<td>17 - 24 t</td>
<td>reprocessed plutonium</td>
<td>end of 1997</td>
</tr>
<tr>
<td></td>
<td>9 - 11 t Pu</td>
<td>spent fuel elements</td>
<td>end of 1997</td>
</tr>
<tr>
<td></td>
<td>(in 1.081 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marcoule</td>
<td>About 100 kg</td>
<td>reprocessed plutonium</td>
<td>1994</td>
</tr>
<tr>
<td></td>
<td>5 - 10 kg Pu</td>
<td>reprocessed plutonium (with only 18 days of full-time operation at KKN)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(aus 46,3 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sellafield (BNFL)</td>
<td>0.3 t Pu</td>
<td>reprocessed plutonium</td>
<td>end of 1997</td>
</tr>
<tr>
<td></td>
<td>5 - 6 t Pu</td>
<td>spent fuel elements</td>
<td>end of 1997</td>
</tr>
<tr>
<td></td>
<td>(in 594 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nuclear plants west (store)</td>
<td>36 - 43 t Pu</td>
<td>spent fuel elements</td>
<td>end of 1997</td>
</tr>
<tr>
<td></td>
<td>(in 4,309 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nuclear plants east (store)</td>
<td>4 - 5 t Pu</td>
<td>spent fuel elements</td>
<td>Sept. 1998</td>
</tr>
<tr>
<td></td>
<td>(in 609 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gorleben + Ahaus</td>
<td>0.34 - 0.44 t Pu</td>
<td>spent LWR fuel elements</td>
<td>end of 1997</td>
</tr>
<tr>
<td></td>
<td>(in 46.8 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ahaus</td>
<td>&lt; 10 kg Pu</td>
<td>spent fuel elements</td>
<td>Sept. 1998</td>
</tr>
<tr>
<td></td>
<td>(in 6.9 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden (CLAB)</td>
<td>0.17 - 0.21 t Pu</td>
<td>spent fuel elements</td>
<td>Sept. 1998</td>
</tr>
<tr>
<td></td>
<td>(in 23.8 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>1.8 - 2.3 t Pu</td>
<td>spent fuel elements</td>
<td>Sept. 1998</td>
</tr>
<tr>
<td></td>
<td>(in 293 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>0.17 - 0.23 t Pu</td>
<td>spent fuel elements</td>
<td>Sept. 1998</td>
</tr>
<tr>
<td></td>
<td>(in 28.2 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greifswald and Rheinsberg</td>
<td>3.3 - 4.4 t Pu</td>
<td>spent fuel elements</td>
<td>Sept. 1998</td>
</tr>
<tr>
<td></td>
<td>(in 545 t SM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum</td>
<td>80 - 100 t Pu</td>
<td>total</td>
<td>end of 1997</td>
</tr>
<tr>
<td>of which</td>
<td></td>
<td>in spent fuel elements</td>
<td>end of 1997</td>
</tr>
<tr>
<td>and</td>
<td>60 - 73 t Pu</td>
<td>non-irradiated</td>
<td>end of 1997</td>
</tr>
<tr>
<td></td>
<td>20 - 27 t Pu</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Inventory of German Plutonium (as of: 1998)
Plutonium in Germany

ready delivered back to the COGEMA reprocessing plant. 105 kg plutonium lie in complete fuel rods and 70 kg are in a nitrate solution which was delivered from the WAK in Karlsruhe and was not allowed to be processed any more. The plutonium in this solution has to be precipitated since it cannot in the long term be safely stored in this form and requires maintenance. Especially sensitive under the perspective of proliferation are the 277 kg of plutonium which were separated from Magnox fuel elements, because the burning in Magnox reactors typically reaches only about 3000 MWd/t and therefore the Pu-239 content can be very high. It is unknown to the authors whether this plutonium still is stored in Hanau or whether it has completely been transported back abroad. It is also unknown to the authors, whether further plutonium with a high Pu-239 content is stored in Hanau (e.g. from MZFR, KKN and HDR.)

15 kg of plutonium are still stored in two containers with 70 cubic meters of liquid HLW-waste in the former Karlsruhe reprocessing plant WAK. Plutonium stored there earlier has been completely transported away according to the WAK management.

Conclusions for the handling of separated plutonium

Gaps and inconsistencies arise from this attempt to compile a comprehensive plutonium balance. These could only be closed and clarified by the operators or official authorities which (should) have first-hand data. It becomes evident, after all, that amounts of plutonium are concerned here which in their quantity and quality are so proliferation relevant that a special responsibility arises from it for Germany. A complete clarification of the relevant stockpiles can make the proliferation relevance more evident and can lead to a sensible handling strategy for it.

A proliferation problem arises from the surplus of separated plutonium. As long as the plutonium stored abroad is not brought back to Germany, no direct German access will be possible. There are speculations on the use of German plutonium in the French nuclear weapons program. In addition to that there is the risk of unauthorized subnational groups which would try to gain ownership on weapons material. 2.1 tons of non-irradiated plutonium are still stored in Germany which represents a proliferation concern even while standing under safeguards.

The re-employment of surplus plutonium in MOX fuel elements in light water reactors is not able to reduce the surplus which grows faster by reprocessing than it can be reduced. About 20 t of separated plutonium are stored in France alone, altogether about 20-27 t of plutonium, while the yearly employment of MOX in German reactors currently amounts to only 1.3 t. Opposing this is a yearly discharge of about 600 t HM from all German reactors with a plutonium content of about 5-6 t of plutonium. Even with a theoretically feasible doubling of MOX usage in LWRs would the plutonium consumption rate only match the separation rate in the long term if drastically less fuel elements were reprocessed every year. The reduction of stockpiles is impossible under the current circumstances. A progression of the current trends would imply that the plutonium surplus heap would grow further.

Alternatives to LWR-MOX for plutonium use do not exist. The return in breeders has become obsolete in Germany since the end of the Kalkar project. The acquisition of plutonium by foreign customers is also not unproblematic. There are plans to sell the largest part of plutonium in fuel elements which was intended for the Kalkar fast breeder to the US-American company Advanced Nuclear Medical Services (ANMS). The serious danger exists that ANMS would use this plutonium to produce tritium for American nuclear weapons.

Since the 1994 article law for the modification of the German nuclear energy act, the direct disposal of spent fuel elements is officially recognized as a proof of taking care of spent fuel. In spite of that, the German energy supply companies have declared in the spring of 1997 that they will in the future bring 60% of the spent fuel abroad for reprocessing and that only 40% are designated for direct final disposal.

It has always been indicated that the separation of plutonium is not reasonable even from the radioecological standpoint and for technical reasons of safety. Many nuclear power station operators also increasingly recognize that the usage of plutonium has revealed itself to be uneconomical for them. After the election of the new red-green government in Germany it is expected that the reprocessing of spent fuel from Germany will soon be discontinued.

The surplus of separated plutonium raises the question of how this material can reasonably be processed and safely long-term stored. It should be investigated, whether alternatively to the utilisation as fuel in nuclear reactors this material can be conditioned to radioactive waste for final disposal. Various feasible options are being internationally discussed, e.g. the immobilisation in conjunction with liquid highly radioactive waste or storage rods in bundles mixed with spent fuel rods. But since none of the presented suggestions for the disposal of plutonium are completely unproblematic and since the plutonium itself remains existing, technical ideas for the far reaching elimination of plutonium should also be evaluated.

In March of 1995, the mandate to negotiate a ban on the production of fissile materials for nuclear weapons was agreed upon at the Geneva disarmament conference. Only in August of 1998 was an ad-hoc committee established for these negotiations on the grounds of the 1995 mandate. The mandate will possibly be handled flexibly and extended to further areas. Various states and non-governmental organisations had proposed to involve the civilian nuclear weapons usable materials and past production into the negotiations. This would underline the importance of a possibly complete plutonium balancing and a sensible handling of existing stockpiles.

References

1. Interdisciplinary Research Group in Science, Technology and Security (IANUS) of the Darmstadt University of Technology.
3. This article is a summary of a much more detailed study of the authors. This study will be published by the Vereinigung Deutscher Wissenschaftler (VDW, German Federation of Scientists), Schopenhauersstr. 26, D-14129 Berlin, Germany (fax +49-30-8030/8888). We gratefully acknowledge support by the VDW and Greenpeace Germany.
4. The comprehensive study deals in much more detail with the identified inconsistencies.

Martin Kalinowski and Wolfgang Liebert are senior researchers at IANUS, Silke Aumann worked as assistant to the project. Address: see Impressum
Nuclear Weapons Free Darmstadt: A Chronology

Regina Hagen

On July 14, 1998, a local initiative to declare Darmstadt, Germany, a nuclear weapons-free zone bore fruit: the City Council Meeting (Stadtverordnetenversammlung) of the medium-sized German university town adopted the following resolution:

- The Town Government (Magistrat) is requested to declare Darmstadt a Nuclear Weapons Free Zone,
- The City Council Meeting (Stadtverordnetenversammlung) signs the German translation of the Abolition 2000 Resolution for Municipalities, and
- Darmstadt joins the “World Conference of Mayors for Peace Through Inter-City Solidarity”. This chronology gives background information and a list of the events which made the grassroots initiative a success.

Locally active for a nuclear weapons free world

In spring 1997, the nuclear physicist Dr. Martin Kalinowski, Senior Researcher at the Interdisciplinary Research Group Science, Technology and Security (IANUS) at the Darmstadt University of Technology and member of INESAP, issued a call of the German translation of the Abolition 2000 Resolution for Municipalities. Kalinowski and the Darmstaedter Friedensforum were invited to attend a meeting of the Green City Council members to support the initiative and to submit an application on behalf of the City Council Meeting which was also sent to the IANUS scientists, to the local Green party (Bündnis 90/Die Grünen) and to the local media.

In early February 1998, Martin Kalinowski and the Darmstaedter Friedensforum were invited to attend a meeting of the Green City Council members to provide background information about the plan to establish a nuclear weapons-free zone. It became soon clear that they were willing to support the initiative and to submit an application on behalf of the City Council Meeting. They did, however, stress that they wanted to do so together with the SPD party members with whom they formed a coalition.

In mid February 1998, the Darmstädtler Friedensforum contacted the leaders of all parties represented in the Darmstadt City Council. They received a comprehensive information pack and were asked to include the
nuclear weapons free zone on the agenda of one of their next party meetings.

While the Free Democrats (FDP) did not bother to react, the leader of the Christian Democrats (CDU) send a short letter. He explained that "establishing nuclear weapons free zones or releasing appropriate support declarations, respectively, might be good public relations but an ineffective means to solve a globally relevant problem. In general, diplomats, the Ministry of Foreign Affairs, and the German Parliament are the appropriate and competent contacts – not local politicians in Darmstadt." The leader of the SPD called to let us know that nuclear weapons are currently not an issue of public discussion and are therefore not useful to lead a campaing (at that time, the parliamentary election campaign was started).

The Darmstädtler Friedensforum offered both, CDU and SPD, to send a representative to one of their party meetings and give more background information.

**Going public**

At the end of February 1998, the Darmstädtler Friedensforum produced a radio show about their initiative. In December, shortly after receiving the group’s letter, Peter Benz, the Mayor of Darmstadt, had agreed to discuss the issue with the head of the environmental department of the Town Government, Daniela Wagner (from the Green party) and with Martin Kalinowski and a member of the peace group. Due to conflicting schedules, the discussion was recorded and aired in full length two days later on Radio Darmstadt, a local, non-commercial, and non-professional radio station.

During the discussion, Martin Kalinowski and the Friedensforum gave detailed information about the current nuclear weapons status. The Mayor stressed the importance of solidarity (especially with Hiroshima and Nagasaki) without promising any activities. Daniela Wagner mentioned her political roots – the peace movement – and promised to support the initiative. She made it a point, however, that she expected the peace activists to bring the topic to the citizens, not just to the parliamentarian representatives. Declaring a municipality nuclear weapons free should be combined with broad public discussions. (She was right, of course. However, getting the attention of media and citizens is really hard!) In parallel with the radio show, the Darmstaedter Friedensforum released a leaflet with the appeal on one side and information about the initiative for a nuclear weapons free Darmstadt on the other. The citizens were encouraged to contact the political parties and representatives and ask them to support the initiative. The leaflet was distributed in shops, culture centers, youth centers, church communities, etc.

At the end of April 1998, IANUS and the Darmstaedter Friedensforum organized a public panel discussion at the Darmstadt University of Technology. The panel was made up by the City Council representatives Michael Siebert (Greens) and Markus Hoschek (SPD), by Martin Kalinowski from IANUS and two Friedensforum members. (The CDU was invited but refused to participate.) Although less than 50 people attended the discussion (in a town of appr. 145,000), the evening brought two positive outcomes:

Markus Hoschek, who had been rather reluctant to get involved, prepared very carefully for the event. He read the information provided by us, worked through historical documents issued by his party, and searched the party archives to learn more about the historical attitude of his party with respect to weapons of mass destruction. In particular, he quoted the SPD election manifesto of December 1997 which confirms the party’s intention to work towards a world free of weapons of mass destruction and focuses on nuclear weapons. Very openly, he admitted that while preparing for the panel discussion he had changed his mind – and was now vigorously advocating the attempt to declare Darmstadt a nuclear weapons free municipality.

The second outcome was local media coverage. In addition to Radio Darmstadt, the local newspaper as well as the supraregional daily Frankfurter Rundschau reported about the panel discussion and provided their readers with background information about nuclear weapons.

**International reality knocks at the door**

Two weeks later, on May 11, 1998, the initiative was invited to present their case at a meeting of SPD City Council members. At the beginning, the majority of the audience disapproved of the topic, many clearly showed their lack of interest. Several speakers stated they believed that nuclear weapons are currently not an issue for public debate in Germany. When, however, their party member Markus Hoschek told about his investigations and the resulting change of his mind, most of them listened carefully.

Then, completely unexpected, proliferation crept into the assembly: Peter Benz, the Mayor of Darmstadt, entered the room. He told his party colleagues that so far he had not been really convinced about the usefulness of the initiative. But he had just listened to the radio news and heard about three Indian nuclear test detonations. He was quite emotional and said that in the view of this event he would appreciate a clear sign from the Darmstadt City Council that total nuclear abolition was required. International reality had caught the local citizens’ representatives unexpectedly...

At the end of this agenda topic, the majority agreed to take up consultations with the Green City Council members about a common resolution. As Darmstadt is governed by an SPD/Green majority, this was the major breakthrough.

During May and June, the Darmstädter Friedensforum continued to lobby for the nuclear weapons free zone. Occasionally, the group organized an information stand on a busy plaza at the center of the town. They wrote letters to the editor of daily papers and pointed out that nuclear proliferation like in India and Pakistan could only be checked by complete abolition. Martin Kalinowski was asked to assist the City Council coalition with the wording of the resolution. SPD and the Greens issued a joint motion to the City Council which was accepted with their majority on July 14, 1998.

- The motion requests the Town Government to declare Darmstadt a Nuclear Weapons Free Zone, to indicate this clearly (whatever that means), and to demand that nuclear weapons are neither deployed on nor transported through municipal territory.
- The City Council declares their solidarity with similar efforts throughout the world. By declaring the town a “nuclear weapons free zone” they underline their will to become locally active towards complete abolition of all nuclear weapons. Accordingly, they sign the German translation of the Abolition 2000 Resolution for Municipalities. Thus they call “for all nuclear weapons to be taken off alert status, for all nuclear warheads to be separated from their delivery vehicles, and for the nuclear weapons states to agree to unconditional no first use of these

---

**Inesap** Information Bulletin No. 16

46

November 1998
They also call “upon the governments of all nuclear weapons states to begin negotiations immediately on a Nuclear Weapons Convention to prohibit and eliminate all nuclear weapons early in the next century, and to complete these negotiations by the year 2000”.

Darmstadt applies for membership in the “World Conference of Mayors for Peace Through Inter-City Solidarity”. The purpose of that organization, which is presided by the Mayor of Hiroshima, is “the promotion of peace with a focus on nuclear disarmament and the abolition of nuclear weapons.”

Darmstadt is nuclear weapons free: and what next?

Media coverage of the City Council resolution was negligible. Therefore, the Darmstaedter Friedensforum continued their publicity campaign. Another radio show on August 6 focused on the 53rd Hiroshima anniversary. Prior to this show and an information stand in town on August 8, the group launched a new attempt to attract media attention - this time with more success (it was made sure that media photographers got motives for their pictures) In parallel, other German and international peace groups where informed about the City Council resolution. Quite a few groups in Germany, Austria, and Switzerland responded by (re-)starting their own local initiatives.

Particularly the decision to become member of the Word Conference of Mayors for Peace holds a good potential to continue local grassroots activities. The program of this organizations requires each member city to “exert its efforts in introducing the idea to as many other cities as possible”. The city is also asked to “hold gatherings and events devoted to the cause of disarmament and peace, and/or to the solution of such problems as starvation, poverty, the plight of refugees, human rights abuses, and environmental degradation”, to “send a message regarding the total abolition of nuclear weapons and general and complete disarmament to the U.N. Secretary-General during the U.N. Disarmament Week”, and to “hold photographic exhibitions which describe and depict to citizens around the world the actual nature of the devastations wreaked by the atomic bombs on Hiroshima and Nagasaki.”

For the time being, the Environmental Department of the town administration took over responsibility to track the activities which result from the resolution. They do so in co-operation with the Darmstädter Friedensforum.

There is no doubt that the City Council, the Town Government, as well as the municipal administration might tend to neglect the duties into which they entered with this program in the course of time. However, local grassroots as well as scientifically working groups will have a good argument for requesting municipal support for activities along this line. In addition, official inquiries to the administration and the City Council might prove useful means to bring the topic of nuclear weapons, disarmament, justice, and sustainability into the public occasionally. (Darmstadt has just started a local Agenda 21 initiative.) Not to mention the outreach to 14 twin towns of Darmstadt throughout all of Europe – from Turkey to the United Kingdom, from the Baltic states to Spain. It seems like there is a lot of work ahead for the Darmstaedter Friedensforum.

By the way: cooperation with IANUS was very helpful for us activists. We profited from the co-operation and we enjoyed it. Scientists’ and other experts’ support for grassroots activities is invaluable, especially as media and politicians jump on official titles like “Ph.D. in Nuclear Physics.” INESAP members should plan a little time every now and then for contacts with and support of grassroots activists. Where this is not possible, however, activists should not hesitate to rely on their own strength. You need not become nuclear physicists or experts in political science to be persuasive – the nuclear reality is clear enough!

Regina Hagen is a freelance technical translator and member of the German grassroots group Darmstaedter Friedensforum. Address: Regina Hagen, Teichhausstrasse 46, D-64287 Darmstadt; phone [49] (6151) 47114, fax 47105. regina.hagen@jugendshil.de.shuttle.de

10th Anniversary of IANUS

The Interdisciplinary Research Group Science, Technology and Security (IANUS) at the Darmstadt University of Technology (TUD) celebrated the 10th Anniversary of its foundation on July 8, 1998. The official start of IANUS was in April 1988 with the financial support by the Volkswagen Foundation. Since then IANUS members have worked on a wide range of science and policy related problems and projects in the field of arms control, non-proliferation, disarmament, conversion, the civil-military ambivalence of science and technology, on mathematical modeling in security and the environment, the responsible use of energy, technology assessment, ethics in science. Besides scientific projects, IANUS has given advice to politicians and the public, and has made interdisciplinary teaching a regular part of the university’s program. IANUS also hosts the INESAP office and edits the INESAP Information Bulletin. A number of speakers at the anniversary symposium emphasized the important role of IANUS in linking science, politics and teaching, among them the President of the TUD, politicians from the State of Hesse and the German Parliament and well-known scientific colleagues. Reports on the activities and publications of IANUS are available.

IANUS Expert Meeting “Ways Towards a Nuclear-Weapon-Free World”

On July 1-3, 1998 IANUS invited a number of German experts and activists to Heppenheim, close to Darmstadt, to discuss the chances, challenges and problems of a nuclear-weapon-free world. The meeting was an opportunity to frankly raise a number of critical questions and exchange controversial views. Topics included the political history of nuclear weapons (Wolfgang Krüger); recent studies on complete nuclear disarmament (Jürgen Scheffran); the international debate on nuclear disarmament (Katja Frank); problems of contemporary peace ethics (Wolfgang Bender, Klaus Ebeling); debate among party representatives of the Bundestag (Markus Lackamp, Uta Zapf, Götz Neuneck as moderator); role of the peace movement (Kristian Golla, Joachim Gerstecki); the judgment of international arms control by the VW foundation (Annette Schaper, Martin Kalinowski); the political goal of a NWFW (Rüdiger Hartmann, Thomas Nielebock); removal of dual-use nuclear-weapons materials (Erich Merz, Alexander Glaser, Christoph Pistner); verification in a NWFW (Annette Schaper, Martin Kalinowski); the political goal of a NWFW (Rüdiger Hartmann, Thomas Nielebock); future of the nuclear reality is clear enough!
Towards a Nuclear Weapon Free World: The Need For a New Agenda


Cosponsors: Benin, Botswana, Brazil, Cameroon, Chile, Colombia, Costa Rica, Ecuador, Egypt, El Salvador, Guatemala, Ireland, Lesotho, Liberia, Malaysia, Mali, Mexico, New Zealand-Aotearoa, Nigeria, Peru, Samoa, Slovenia, Solomon Islands, South Africa, Swaziland, Sweden, Thailand, Togo, Uruguay, Venezuela.

The General Assembly,

PP1 Alarmed by the threat to the very survival of mankind posed by the existence of nuclear weapons,

PP2 Concerned at the prospect of the indefinite possession of nuclear weapons,

PP3 Concerned at the continued retention of the nuclear-weapons option by those three States that are nuclear-weapons capable and that have not acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT),

PP4 Believing that the proposition that nuclear weapons can be retained and never used - accidentally or by decision - defies credibility, and that the only complete defence is the elimination of nuclear weapons and the assurance that they will never be produced again,

PP5 Concerned that the Nuclear-Weapon States have not fulfilled speedily and totally their commitment to the elimination of their nuclear weapons,

PP6 Concerned also that those three States that are nuclear-weapons capable and that have not acceded to the NPT have failed to renounce their nuclear-weapons option,

PP7 Bearing in mind that the overwhelming majority of States entered into legally-binding commitments not to receive, manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, and that these undertakings have been made in the context of the corresponding legally-binding commitments by the nuclear-weapons States to the pursuit of nuclear disarmament,

PP8 Recalling the unanimous conclusion of the International Court of Justice (ICJ) in its 1996 Advisory Opinion that there exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control,

PP9 Stressing that the international community must not enter the third millennium with the prospect that the possession of nuclear weapons will be considered legitimate for the indefinite future and convinced that the present juncture provides a unique opportunity to proceed to prohibit and eradicate them for all time,

PP10 Recognizing that the total elimination of nuclear weapons will require measures to be taken firstly by those nuclear-weapons States that have the largest arsenals, and Stressing that these States must be joined in a seamless process by those nuclear-weapons States with lesser arsenals in the near future,

PP11 Welcoming the achievements to date and the future promise of the START process and the possibility it offers for development as a plurilateral mechanism including all the nuclear-weapons States, for the practical dismantling and destruction of nuclear armaments undertaken in pursuit of the elimination of nuclear weapons,

PP12 Believing that there are a number of practical steps that the nuclear-weapon States can and should take immediately before the actual elimination of nuclear arsenals and the development of requisite verification regimes take place, and in this connection noting certain recent unilateral and other steps,

PP13 Welcoming the agreement recently reached in the Conference on Disarmament (CD) on the establishment of an Ad hoc Committee under Item 1 of its agenda entitled “Cessation of the nuclear arms race and nuclear disarmament”, to negotiate, on the basis of the report of the Special Coordinator (CD/1299) and the mandate contained therein, a non-discriminatory, multilateral and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices and considering that such a treaty must further underpin the process towards the total elimination of nuclear weapons,

PP14 Emphasising that for the elimination of nuclear weapons to be achieved, effective international cooperation to prevent the proliferation of nuclear weapons is vital and must be enhanced through, inter alia, the extension of international controls over all fissile material,

PP15 Emphasising the importance of existing Nuclear-Weapon-Free Zone treaties and of the signature and ratification of the relevant protocols to these treaties,

PP16 Noting the Joint Ministerial Declaration of 9 June 1998 and its call for a new international agenda to achieve a nuclear-weapon-free world, through the pursuit, in parallel, of a series of mutually reinforcing measures at the bilateral, plurilateral and multilateral levels,

OP1 Calls upon the Nuclear-Weapon States to demonstrate an unequivocal commitment to the speedy and total elimination of their respective nuclear weapons and without delay to pursue in good faith and bring to a conclusion negotiations leading to the elimination of these weapons, thereby fulfilling their obligations under Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT);

OP2 Calls upon the United States and the Russian Federation to bring START II into force without further delay and immediately thereafter to proceed with negotiations on START III with a view to its early conclusion;

OP3 Calls upon the Nuclear-Weapon States to undertake the necessary steps towards the seamless integration of all five Nuclear-Weapon States into the process leading to the total elimination of nuclear weapons;

OP4 Calls upon the Nuclear-Weapon States to pursue vigorously the reduction of reliance on non-strategic nuclear weapons and negotiations on their elimination as an integral part of their overall nuclear disarmament activities;

OP5 Calls upon the Nuclear-Weapon States, as an interim measure, to proceed to the de-alerting of their nuclear weapons and in turn to the removal of nuclear warheads from delivery vehicles;

OP6 Urges the Nuclear-Weapon States to examine further interim measures, including the exploration by them of an undertaking not to be the first to use nuclear weapons;

OP7 Calls upon those three States that are nuclear-weapons capable and that have not yet acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) to clearly and urgently reverse the pursuit of all nuclear weapons development or deployment and to refrain from any actions which could undermine regional and international peace and security and the efforts of the international community towards nuclear disarmament and the prevention of nuclear weapons proliferation;

OP8 Calls upon those States that have not yet done so to adhere unconditionally and without delay to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and to take all the necessary measures which flow from adherence to this instrument;

OP9 Calls upon those States that have not yet done so to conclude full-scope safeguards agreements with the International Atomic Energy Agency (IAEA) and to conclude additional protocols to their safeguards agreements on the basis of the Model Protocol approved by the IAEA Board of Governors on 15 May 1997;

OP10 Calls upon those States that have not yet done so to sign and ratify, unconditionally and without delay, the Comprehensive Nuclear Test-Ban Treaty (CTBT) and, pending the Treaty’s entry into force, to observe a moratorium on nuclear tests;

OP11 Calls upon those States that have not yet done so to adhere to the Convention on the Physical Protection of Nuclear Material and to work towards its further strengthening;

OP12 Calls upon the Conference on Disarmament (CD) to pursue its negotiations in the Ad hoc Committee established under Item 1 of its agenda entitled “Cessation of the nuclear arms race and nuclear disarmament”, on the basis of

News

Inesap Information Bulletin No. 16

48

November 1998
the report of the Special Coordinator (CD/1299) and the mandate contained therein, of a non-discriminatory, multilateral and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices, taking into consideration both nuclear non-proliferation and nuclear disarmament objectives, and to conclude these negotiations without delay; and pending the entry into force of the treaty, Urges all States to observe a moratorium on the production of fissile materials for nuclear weapons or other nuclear explosive devices;

OP 13 Calls upon the Conference on Disarmament to establish an appropriate subsidiary body to deal with nuclear disarmament and, to that end, to pursue as a matter of priority its intensive consultations on appropriate methods and approaches with a view to reaching such a decision without delay;

OP 14 Considers that an international conference on nuclear disarmament and nuclear non-proliferation, which would effectively complement efforts being undertaken in other settings, could facilitate the consolidation of a new agenda for a nuclear-weapon-free world.

OP 15 Recalls the importance of the Decisions and Resolution adopted at the 1995 NPT Review and Extension Conference, and Underlines the importance of implementing fully the “Strengthening the Review Process for the Treaty” Decision;

OP 16 Affirms that the development of verification arrangements will be necessary for the maintenance of a world free from nuclear weapons and requests the International Atomic Energy Agency (IAEA), together with any other relevant international organisations and bodies, to explore the elements of such a system;

OP 17 Calls for the conclusion of an internationally legally-binding instrument to effectively assure non-nuclear-weapon States Party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) against the use or threat of use of nuclear weapons;

OP 18 Stresses that the pursuit, extension and establishment of Nuclear-Weapon-Free Zones, on the basis of arrangements freely arrived at, especially in regions of tension, such as the Middle East and South Asia, represent a significant contribution to the goal of a nuclear-weapon-free world;

OP 19 Affirms that a nuclear-weapon-free world will ultimately require the underpinnings of a universal and multilaterally negotiated legally binding instrument or a framework encompassing a mutually reinforcing set of instruments;

OP 20 Requests the Secretary General, within existing resources, to compile a report on the implementation of this resolution;

OP 21 Decides to include in the provisional agenda of its fifty-fourth session the item entitled “Towards a Nuclear Weapons Free-World: The Need for a New Agenda”, and to review the implementation of this resolution.

New Agenda Resolution Adopted

The UN First Committee adopted resolution A/C.1/53/L.48 by a vote of 97 in favour, 19 against and 32 abstaining. NATO states abstaining include Germany, Netherlands, Norway, Canada, Greece, Spain, Belgium, Luxemburg, Iceland, Portugal, Italy and Denmark. Other abstentions include China, Finland, Japan, Kazakhstan, Kyrgyzstan, Georgia, Slovenia, Ukraine, Andorra, Australia, Argentina, Bhutan, Marshall Islands, Federated States of Micronesia, Myanmar, Moldova, Republic of Korea, Croatia, Macedonia and Algeria. Opposed to the resolution were Bulgaria, Estonia, Monaco, Lithuania, Latvia, Poland, Romania, Pakistan, India, Israel, Armenia, Russia, Slovakia, Czech Republic, Turkey, UK, US, France and Hungary. Immediately prior to the vote Slovenia withdrew its cosponsorship of the resolution. Supporters included the remainder of the cosponsors, most non-aligned states and others including Austria, San Marino, Azerbaijan and Liechtenstein.

Contact: Lawyers Committee on Nuclear Policy lcnp@aol.com or phone +1 212 818 1861

Crucial Role of New German Government for Nuclear Disarmament

After the election of the German Parliament, the new Green - Social Democrat government raised considerable hopes among peace and disarmament groups around the world. The Green Party, which in the early eighties emerged from the anti-nuclear protest movement against civil and military use of nuclear power, had for a long time attacked nuclear weapons as a major symbol of a dangerous technical development, which threatens both peace and the environment. Therefore, it was natural that the new German Foreign Ministry, headed by the Green Party leader Joschka Fischer, was contacted by disarmament groups to demand a more active role in the cause for a nuclear-weapon-free world. A delegation of the Middle Powers Initiative met with political figures and officials in Bonn in early November to promote the New Agenda Coalition (NAC) Resolution L.48. While the previous German government had voted “No” on all UN resolutions demanding practical steps towards a nuclear-weapon-free world, often with the argument that it would conflict with NATO interests, this time the anti-abolition attitude became weakened for the first time. On November 12, one day before the vote on the L.48 Resolution at the U.N. Disarmament Committee, the daily nation-wide newspaper Frankfurter Rundschau reported on its title page that the Foreign Ministry would tend to change its voting towards abstention and consider the offer of NATO member Canada to do the same jointly. This happened the following day, and like in a domino game 12 NATO members abstained. With this important shift a debate on the future role of nuclear weapons in NATO is unavoidable. For the future, the obvious demand is a “Yes” vote on this and other UN disarmament resolutions.

Jürgen Scheffran, November 13, 1998

Vote on the ICJ Resolution in UN First Committee

The United Nations First Committee (Disarmament and International Security), by a vote of 100 in favour, 25 against and 23 abstentions, on November 11 adopted resolution A/C.1/53/L.45, entitled “Follow-up to the advisory opinion of the International Court of Justice on the Legality of the Threat or Use of Nuclear Weapons.”

The resolution welcomes the conclusion of the ICJ “that there exists an obligation to pursue in good faith and bring to a conclusion negotiations on nuclear disarmament in all its aspects” and calls for “all states to immediately fulfill that obligation by commencing multilateral negotiations in 1999 leading to an early conclusion of a nuclear weapons convention.”

A separate vote on operative paragraph one, which welcomes the ICJ’s conclusion, was supported by 133 states, with 5 opposing and 5 abstaining.

Among the nuclear weapons states, China, India and Pakistan supported the resolution, while the others opposed. The UK did however abstain on operative paragraph 1.

Explanations of vote were given by Luxembourg (on behalf of themselves, Netherlands and Belgium), Chile, the UK, USA, Japan, Aotearoa-New Zealand, South Korea and Germany.

Germany’s statement explaining its opposition, emphasised that it could only move forward on nuclear disarmament initiatives in cooperation with its NATO partners. There was thus no indication that the new government, a Green - Social Democrat coalition, would implement its agreed policy on disarmament which supports unilateral disarmament initiatives including a reduction of alert status and renunciation of the first-use policy. Unlike Germany, the NATO states of Norway, Denmark and Iceland abstained.

Statements of Japan, USA, UK, and Luxembourg were similar to those they made when the resolution was the first United Nations last year.

Aotearoa-New Zealand noted that while they supported the call for the complete elimination of nuclear weapons, and that a nuclear weapons convention could be the instrument to complete the task, they also believed that the final goal may be a different agreement or framework of agreements. Thus resolution L.48 (Towards a nuclear-weapon-free world: the need for a new agenda) more accurately reflected their position. [...]
Abolition 2000 Progress Report Card
United Nations Day: October 24, 1998

Janet Bloomfield, Pamela S. Meidell

For the last two years, we have issued an Abolition 2000 report card in October, assessing progress toward a nuclear weapons free world. For the third year, we pause again to take stock of the state of the Nuclear World, and of efforts to abolish nuclear weapons. Looking at this year’s events in the context of the Abolition 2000 Statement offers a simple way to make such an evaluation. This Report Card offers a brief assessment of progress in the past year in the implementation of the 11 points of the Abolition Statement, and compliance with the letter and spirit of the Moorer Declaration. We offer it on United Nations Day, October 24, to recall the initial promise of the UN Charter: “to save succeeding generations from the scourge of war,” keeping in mind our future descendants, knowing that the elimination of nuclear weapons will go far in fulfilling our promise to them.

1. Immediately initiate and conclude by the year 2000 negotiations on a nuclear weapons abolition convention that requires the phased elimination of all nuclear weapons within a timebound framework, with provisions for effective verification and enforcement.

Report: In November 1997, Costa Rica submitted to the United Nations a draft Nuclear Weapons Convention (treaty) to abolish nuclear weapons, which was originally crafted by an Abolition 2000 working group of lawyers, scientists and activists. In February of this year, over 100 former or current heads of state, and civilian leaders from around the world, released a statement calling for de-alerting nuclear weapons and other measures aimed at nuclear abolition. In Dublin, on June 9, eight nations (Brazil, Egypt, Ireland, Mexico, New Zealand, Slovenia, South Africa and Sweden), calling themselves the “New Agenda Coalition,” launched a joint declaration on nuclear disarmament. The eighteen points of the declaration “A Nuclear Weapons-Free World: The Need For A New Agenda,” outline the need for action for the abolition of nuclear weapons, and concludes with the statement: “We, on our part, will spare no efforts to pursue the objectives outlined above. We are jointly resolved to achieve the goal of a world free from nuclear weapons. We firmly hold that the determined and rapid preparation for the post-nuclear era must start now.” The Coalition will be presenting a resolution based on these ideas at the 1998 General Assembly of the United Nations.

Despite the welcome establishment of the UN Department for Disarmament Affairs last year, meaningful progress toward nuclear disarmament, let alone abolition, has virtually come to a halt. Noting this impasse, UN Secretary General, Kofi Annan, has asked for reports from all UN member countries detailing their efforts toward nuclear abolition. These reports are due by the end of the year.

A growing, world-wide, consensus for proliferation. The response of the “de- nuclear weapons states was to criticise tests, conducted in May, underlined in dramatic fashion the failure of the current approach to nuclear proliferation. The response of the “declared” nuclear weapons states was to criticise and to impose sanctions. Although both countries have recently indicated they would sign both the CTBT (and the NPT), the US, Russia and China have yet to ratify the treaty. (So far, 21 countries have ratified the treaty; 44 are necessary before it enters into force.) A strong factor in the mix continues to be the manner in which the US blatantly ignores the stated purpose of the CTBT: it bans the bang but keeps the bomb unto itself, developing it further. This attitude only damages any good faith between countries and incites them to follow suit. (See also no. 7)

Grade: -2 out of 10.

4. Cease to produce and deploy new and additional nuclear weapons systems, and commence to withdraw and disable deployed nuclear weapons systems.

Report: The question of whether India and Pakistan will put nuclear warheads on missile delivery systems looms large. Israel and India are both reportedly considering deployment of nuclear submarines. The US continues with plans to replace the remaining C4 missiles with the D5 model on its fleet of 18 Trident submarines, for a total cost of $23.9 billion. The new government in the UK has made much of its reduction in warheads but there are question marks over this. In September, Britain rolled out its fourth Trident submarine, the HMS Vengeance. However, the UK Trident’s alert status has been reduced from minutes to three days.

The need for urgency in efforts toward abolition grows in light of the deteriorating situation in Russia. Russia’s current economic problems are compounding the discontent already growing in its nuclear establishment. There have been staff walk outs in the closed nuclear cities of Arzamas-16 and Chelyabinsk-70 because of the non-payment of salaries. There are serious question marks over the continued safety of Russia’s nuclear complex and the potential spread of its nuclear expertise around the world. In October, Communist Deputy Prime Minister, Yuri Maslyukov, said that Russia could only afford several hundred nuclear warheads at most and, with Soviet-era weaponry fast becoming obsolete, must press on with START-II, START-III and other arms limitation treaties with the United States to preserve the nuclear balance. Why not just move directly to abolishing them?

While the situation is unstable, we note with alarm that Russia is continuing to modernize its nuclear weapons as is China (Russia went operational last Christmas with a new ICBM missile that is now coming off the assembly line; both Russia and China have each just laid a keel this year for a new ballistic missile submarine. The Russian sub is called Arctic Winds, and a new ballistic missile is also being developed for it).

Grade: 2 out of 10.
5. Prohibit the military and commercial production and reprocessing of all weapons-
usable radioactive materials.

Report: Talks on a Fissile Material Cut-Off Treaty got off to a faltering start in Geneva this summer but look like they will take a long time. The plutonium economy faces increasing opposition, exemplified by the massive protests at Gorleben in Germany earlier this year. France’s La Hague facility was temporarily closed when it was revealed that its transport casks have been in violation of safety standards for years. The UK must decide this year whether to start up Mixed Oxide Fuel (MOX) production. Most experts agree that this process could produce materials that could be used in a crude nuclear bomb. Despite a worldwide glut of uranium, the re-election of the Howard government in Australia has reopened the issue of uranium mining in that country. As a result, mining leases have been excised out of the world heritage site of Kakadu National Park at Jabaluka in Northern Australia, and the site is in grave danger (see also Moorea Declaration).

On the positive side the new coalition Social Democratic/Green government in Germany is committed to the end of nuclear power in that country and will cease sending nuclear material out of the country for reprocessing.

Grade: 4 out of 10.

6. Subject all weapons-usable radioactive materials and nuclear facilities in all states to international accounting, monitoring, and safeguards, and establish a public international registry of all weapons-usable radioactive materials.

Report: The UK made progress on transparency this year when it published, for the first time, details of its stocks of plutonium. It currently has 7.6 tonnes of plutonium and will cease to withdraw fissile material from safeguarded stocks for nuclear weapons. No other progress.

Grade: 2 out of 10.

7. Prohibit nuclear weapons research, design, development, and testing through laboratory experiments including but not limited to non-nuclear hydrodynamic explosions and computer simulations, subject all nuclear weapons laboratories to international monitoring, and close all nuclear test sites.

Report: President Clinton responded to the news of Pakistan’s nuclear tests on 28 May 1998 by stating: “I cannot believe that we are about to start the twenty-first century having the sub-continent repeat the worst mistakes of the twentieth, when we know it is not necessary to peace, to security, to prosperity, to national greatness or national fulfillment…” His statement may have carried more conviction if the US were not simultaneously conducting sub-critical nuclear tests. The latest, codenamed Bagpipe, took place at the Nevada Test Site on September 25. Far from being closed, test sites are still actively being used.

Meanwhile, at Lawrence Livermore National Laboratory in California, construction continues on the $5 billion National Ignition Facility (NIF)—the centerpiece of the $60 billion US “Stockpile Stewardship” program. A new report from the Institute of Energy and Environmental Research cites the NIF (and its evil twin facility, the Laser Megajoule in Bordeaux, France) as illegal under the CTBT. The US is guaranteeing the future of nuclear weapons development by extending its reach into US universities to train the next generation of nuclear weapons designers via the supercomputing initiative at the heart of the Stockpile Stewardship Program. (see also no. 3)

Grade: -3 out of 10.

8. Create additional nuclear weapons free zones such as those established by the treaties of Tlatelolco and Rarotonga.

Report: Very little progress in the area of the creation of nuclear weapon free zones. Prospects in South Asia have taken a negative course and the Central European zone concept is stalled because of NATO expansion.

Grade: 0 out of 10.

9. Recognize and declare the illegality of threat or use of nuclear weapons, publicly and before the World Court.

Report: In Rome this summer, intense negotiations took place on the International Criminal Court’s expressed authority over the threat and use of nuclear weapons, but produced no conclusions. Again NATO resisted any mention of nuclear weapons. But the historic International Court of Justice (ICJ) opinion of July, 1996 continued to inspire more and more imaginative non-violent civil obedience actions from citizen’s groups around the world. Taking the ICJ decision directly to the world’s nuclear weapons facilities, “Citizen Inspection Teams” attempted to or succeeded in inspecting NATO Headquarters in Belgium, Trident homeports in the US and UK, Livermore and Los Alamos National Laboratories in the US, Dimona in Israel, and sites in France and Germany. At the UK Trident base in Scotland this summer, over 100 people were arrested for upholding the law.

Grade: 3 out of 10.

10. Establish an international energy agency to promote and support the development of sustainable and environmentally safe energy sources.

Report: The Kyoto conference at the end of 1997 did very little to promote renewable energy. We applaud, however, the fledging legal initiative to draft a model statute to create an international sustainable energy agency. The myth of nuclear power as the answer to global warming continues to be promoted by those with a vested interest in the nuclear industry. The serious implications of the Y2K computer crisis argues for the world wide shutdown of all nuclear power stations, and thus highlights the ever more urgent need for safe energy sources. The potential for solar, wind and wave energy is growing with the price of photo-voltaic cells dropping rapidly, and with deregulation of the utility industry in the US and other northern countries.

Grade: 3 out of 10.

11. Create mechanisms to ensure the participation of citizens and NGOs in planning and monitoring the process of nuclear weapons abolition.

Report: Despite the fact that the Abolition 2000 network has grown to over 1100 groups in 75 plus countries, NGOs still do not have a seat at the table. At the NPT Preparatory Committee meetings held in Geneva this spring, under the guise of the “enhanced review process,” the Non-Aligned Movement applauded the NGO presentations heard during a formal session of the meeting. However, citizen groups were barred from all but the opening and closing plenary sessions. So much for openness.

Despite these setbacks, NGOs are forging new efforts to ensure that the voices of the people are heard. In this respect, we welcome the launch of the Middle Powers Initiative, which has been acknowledged by the countries of the New Agenda Coalition, and will be pursuing similar and parallel goals. The international conference on nuclear disarmament, proposed by the Non-Aligned Movement at their meeting in South Africa, offers another opportunity for future work in this area. An incipient US Campaign for abolition is mustering support after an initial meeting in Chicago this fall. (see also no. 9)

Grade: 2 out of 10
In Australia, Energy Resources of Australia is currently attempting to construct a controversial new uranium mine at Jabiluka, on a mining lease carved out of the heart of Kakadu National Park, a UNESCO World Heritage Site. The region’s traditional owners, the Mirrar People, are fighting the Jabiluka approvals process in the Federal Court, and environmental groups have mounted a strong campaign against the mine. As we go to press with this report, we await the outcome of a high level inspection team from the World Heritage Committee of UNESCO on October 25 to determine whether it should be listed as a “World Heritage Site in Danger.” Both natural and cultural criteria determined its World Heritage status: 196 sacred art sites dating back to at least 10,000 BC are being adversely affected by the mining, which also makes the sites less accessible to the Mirrar People, who continue to practice their culture there.

Meanwhile, the Western Shoshone continue to assert their sovereignty despite the US subcritical tests at the Nevada Test Site, and the siting of a high level nuclear waste dump at Yucca Mountain, both within the boundaries of their traditional lands. They have appealed to the European Parliament to acknowledge their sovereignty.

Grade: 1 out of 10

Total grade on progress toward abolition: 16 out of 120

For comparison, the 1996 report card scored 31/110, the 1997 card, 27/120. This year’s report has plummeted to a record low of 16/120. (The discrepancy in total points is due to the inclusion since 1997 of the Moorea Declaration.)

Conclusions: President Nelson Mandela reminded the world in his recent speech that the very first resolution of the General Assembly, adopted in January 1946, sought to address the challenge of “the elimination from national armaments of atomic weapons and all other major weapons adaptable to mass destruction.” He went on to say: “We must face the fact that after countless initiatives and resolutions, we still do not have concrete and generally accepted proposals supported by a clear commitment by the nuclear-weapons States to the speedy, final and total elimination of nuclear weapons and nuclear weapons capabilities... We must ask the question, which might sound naive to those who have elaborated sophisticated arguments to justify their refusal to eliminate these terrible and terrifying weapons of mass destruction - why do they need them anyway? In reality, no rational answer can be advanced to explain in a satisfactory manner what, in the end, is the consequence of Cold War inertia and an attachment to the use of the threat of brute force, to assert the primacy of some States over others.”

Mandela put his finger on the heart of the problem. The nuclear weapon states may be committed on paper to nuclear elimination but in reality they still find an advantage in possessing the means to destroy the world. Little wonder that other states want to join the club!

1998 was a bad year for nuclear abolition. Next year will be the last year of this century, and ten years since the Berlin Wall came tumbling down. Some historians claim that the 20th century really began in 1914 and ended in 1989...if that is the case, maybe the new century really started in May this year when the deserts in India and Pakistan were wrenched by nuclear explosions.

We conclude this year’s report card with the words of Indian writer Arundhati Roy, from her recent essay “The End of Imagination.” They are a challenge to us all.

“All I can say to every man, woman and sentient child in India, and over there, just a little way away in Pakistan, is: take it personally. Whoever you are - Hindu, Muslim, urban, agrarian - it doesn’t matter. The only good thing about nuclear war is that it is the single most egalitarian idea that man has ever had. On the day of reckoning, you will not be asked to present your credentials. The devastation will be indiscriminate. The bomb isn’t in your backyard. It’s in your body. And mine. Nobody, no nation, no government, no man, no god has the right to put it there. We’re radioactive already, and the war hasn’t even begun. So stand up and say something. Never mind if it’s been said before. Speak up on your own behalf. Take it very personally.”

Note

* With thanks to abolition colleagues for comments and suggestions

1. US General Accounting Office estimate for 13 years of Stockpile Stewardship.

Janet Bloomfield (jbloomfield@gn.apc.org) is a consultant to the Oxford Research Group in Oxford, England; Pamela S. Meidell (pmeidell@igc.org) is the founder/director of the Atomic Mirror in Port Hueneme, California. Both have been involved with Abolition 2000 since its conception.
The Morality of Nuclear Deterrence
An Evaluation by Pax Christi Bishops in the United States
May 1998 (Excerpts)

Dear Sisters and Brothers,

We, the undersigned Catholic bishops of the United States and members of Pax Christi USA, write to you on a matter of grave moral concern: the continued possession, development and plans for the use of nuclear weapons by our country. For the past fifteen years, and particularly in the context of the Cold War, we, the Catholic bishops of the United States, have reluctantly acknowledged the possibility that nuclear weapons could have some moral legitimacy, but only if the goal was nuclear disarmament. It is our present, prayerful judgment that this legitimacy is now lacking.

In 1983 the National Conference of Catholic Bishops, in our Pastoral Letter The Challenge of Peace: God’s Promise and Our Response, grappled with the unique moral challenge posed by nuclear weapons. Fifteen years ago we stated that, because of the massive and indiscriminate destruction that nuclear weapons would inflict, their use would not be morally justified. We spoke in harmony with the conscience of the world in that judgment. We reaffirm that judgment now. Nuclear weapons must never be used, no matter what the provocation, no matter what the military objective.

Deterrence

Fifteen years ago we concurred with Pope John Paul II in acknowledging that, given the context of that time, possession of these weapons as a deterrent against the use of nuclear weapons by others could be morally acceptable, but acceptable only as an interim measure and only if deterrence were combined with clear steps toward progressive disarmament.

Ours was a strictly conditioned moral acceptance of nuclear deterrence. It depended on three criteria:
a) a reliance on deterrent strategies must be an interim policy only. As we stated then, “We cannot consider it adequate as a long-term basis for peace;”
b) the purpose of maintaining nuclear weapons in the interim was only “to prevent the use of nuclear weapons by others;” and
c) a reliance on deterrence must be used “not as an end in itself but as a step on the way toward a progressive disarmament.”

In our 10th Anniversary Statement, The Harvest of Justice is Sown in Peace, we further specified that “progressive disarmament” must mean a commitment to the elimination of nuclear weapons, not simply as an ideal, but as a concrete policy goal.

A New Moment

In 1998 the global context is significantly different from what it was a few years ago. Throughout the Cold War the nuclear arsenal was developed and maintained as the ultimate defense in an ideological conflict that pitted what were considered two historical forces against each other — capitalism in the West and communism in the East. The magnitude of that conflict was defined by the mutual exclusivity of each other’s ideology. Nuclear weapons and the policy of Mutually Assured Destruction were accepted as the inescapable context of that particular struggle. Today the Soviet Union no longer exists. The United States is now aiding its democratic successor, the Russian Federation, in dismantling the very nuclear weapons that a short time ago were poised to destroy us. Yet, the Cold War weapons amassed throughout that struggle have survived the struggle itself and are today in search of new justifications and new missions to fulfill.

But, with the end of the Cold War came new hope. World opinion has coalesced around the concrete effort to outlaw nuclear weapons, as it has with biological and chemical weapons and most recently with anti-personnel landmines. As examples of this opinion we note the dramatic public statement of December 1996 in which 61 retired Generals and Admirals, many of whom held the highest level positions in the nuclear establishment of this country, said that these weapons are unnecessary, destabilizing and must be outlawed. We also note the historic International Court of Justice opinion of July 1996 that, “The threat or use of nuclear weapons would generally be contrary to the rules of international law applicable to armed conflict, and in particular the principles and rules of humanitarian law.” The Court went on to say, “There exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control.”

Additionally, the Holy See has become more explicit in its condemnation of nuclear weapons and has urged their abolition. We recognize this new moment and are in accord with the Holy See, which has stated, “If biological weapons, chemical weapons and now landmines can be done away with, so too can nuclear weapons. No weapon so threatens the longed-for peace of the 21st century as the nuclear [weapon]. Let not the immensity of this task dissuade us from the efforts needed to free humanity from such a scourge.”

Unfortunately the monumental political changes that have occurred in the wake of the Cold War have not been accompanied by similar far reaching changes in the military planning for development and deployment of nuclear weapons. It is absolutely clear to us that the present US policy does not include a decisive commitment to progressive nuclear disarmament. Rather, nuclear weapons policy has been expanded in the post-Cold War period to include new missions well beyond their previous role as a deterrent to nuclear attack. The United States today maintains a commitment to use nuclear weapons first, including preemptive nuclear attacks on nations that do not possess nuclear weapons. “Flexible targeting strategies” are aimed at Third World nations, and a new commitment exists to use nuclear weapons either preemptively or in response to chemical and biological weapons or other threats to US national interests. This expanded role of the US nuclear deterrent is unacceptable.

A New Arms Race

In order to maintain the necessary credibility required by a continued reliance on nuclear deterrence, the United States is today embarking on an expansion of its nuclear weapons complex. The Department of Energy, in conjunction with the Department of Defense, has developed the Stockpile Stewardship and Management Program, a vast and multi-faceted effort at modernizing the nu-
clear weapons complex to provide for the continued research, development and testing of nuclear weapons well into the next century. The program will eventually lead to creating computer-simulated nuclear weapons tests that will allow the United States to continue to test nuclear weapons in the event that the Comprehensive Test Ban Treaty, (which will ban full-scale underground nuclear testing) enters into force. The cost of this Stockpile Stewardship program is currently estimated at $60 billion over the next dozen years. Such an investment in a program to upgrade the ability to design, develop, test and maintain nuclear weapons signals quite clearly that the United States, (as well as the other nuclear weapons states that are similarly developing these new testing and design capabilities) shows no intention of moving forward with "progressive disarmament" and certainly no commitment to eliminating these weapons entirely.

Instead of progressive nuclear disarmament, we are witnessing the institutionalization of nuclear deterrence. The recent Presidential Decision Directive on nuclear weapons policy, partially made known to the public in December 1997, makes this point clear. The Directive indicates that the United States will continue to rely on nuclear weapons as the cornerstone of the nation’s strategic defense, that the role of these weapons has been increased to include deterring Third World non-nuclear weapons states and deterring chemical and biological weapons, as well as other undefined vital US interests abroad. Does not this policy, coupled with the huge investments under the Stockpile Stewardship Program, represent a renewed commitment to nuclear deterrence that will affect generations to come? The Department of Energy’s own timetable for the Stockpile Stewardship Program indicates that the United States will continue to develop, test and rely upon a nuclear deterrent through the year 2065. This is clearly not the interim policy to which we grudgingly gave our moral approval in 1983. Rather, it is the manifestation of the very reliance on nuclear deterrence “as a long-term basis for peace” that we rejected in The Challenge of Peace. Does not this policy, implemented with very little public discussion or debate, move our nation far away from the goal of elimination at the very time when the aspirations of the world community are gaining momentum toward this very elimination?

Clearly the present course of US policy threatens to ignite a new arms race both among the existing nuclear weapons states as they collaborate and compete in the development of computer-simulated design and testing programs and among those non-nuclear armed nations that perceive the institutionalization of nuclear deterrence as a threat to their societies. The vast majority of the world’s nations have forsown the development of nuclear weapons under the Nonproliferation Treaty. In exchange, the nuclear weapons states agreed to eliminate their nuclear arsenals. As the nuclear weapons states embark on their current modernization programs, they send a clear message to the rest of the Treaty’s signatories that not only do they not intend to uphold the agreement, they believe that nuclear weapons are indispensable to their national security. We must confess our fear that it may not be long before other nations who feel threatened renounce their pledge not to develop nuclear weapons and embark along the very path that the nuclear states have shown by their example and decrees they judge to be in the interest of a nation’s security.

New Nuclear Missions

The shift in US strategic planning – from that of deterring the use of nuclear weapons by other nuclear weapons states to globally targeting all nations that may develop any weapons of mass destruction – is a relatively new development. This development raises serious concerns. Such an expansion of the role of nuclear weapons runs in stark contradiction to our own stated assessments of the morality of nuclear deterrence and the role of nuclear weapons as well as commitments that the United States has made under the nuclear Nonproliferation Treaty. In Harvest of Justice is Sown in Peace we addressed the growing concerns that nuclear weapons might be used against other than nuclear threats: “The United States should command itself never to use nuclear weapons first, should unequivocally reject proposals to use nuclear weapons to deter non-nuclear threats, and should reinforce the fragile barrier against the use of these weapons.” Nuclear deterrence policy, as developed over the past decade, stands in clear contradiction to these goals.

Inherent Dangers

The policy of nuclear deterrence has always included the intention to use the weapons if deterrence should fail. Since the end of the Cold War this deterrent has been expanded to include any number of potential aggressors, proliferators and so-called “rogue nations.” The inherent instability in a world unconstrained by the great-power standoff present throughout the Cold War leads us to conclude that the danger of deterrence failing has been increased. That danger can become manifest if but one so-called “rogue state” calls the deterrent bluff. In such a case the requirements of deterrence policy would be the actual use of nuclear weapons. This must not be allowed. Because of the horrendous results if these weapons should be used, and what we see as a greater likelihood of their use, we now feel it is imperative to raise a clear, unambiguous voice in opposition to the continued reliance on nuclear deterrence.

Moral Conclusions

Sadly, it is clear to us that our strict conditions for the moral acceptance of nuclear deterrence are not being met. Specifically, a) the policy of nuclear deterrence is being institutionalized. It is no longer considered an interim policy but rather has become the very “long-term basis for peace” that we rejected in 1983. b) the role of nuclear deterrence has been expanded in the post Cold War era well beyond the narrow role of deterring the use of nuclear weapons by others. The role to be played now by nuclear weapons includes a whole range of contingencies on a global scale including countering biological and chemical weapons and the protection of vital national interests abroad. c) although the United States and the republics that made up the former Soviet Union have in recent years eliminated some of their huge, superfluous stockpiles of nuclear weapons, our country, at least, has no intention, or policy position of eliminating these weapons entirely. Rather, the US intends to retain its nuclear deterrent into the indefinite future. (...)
The 10th International Summer Symposium on Science and World Affairs was held at MIT in Boston, Massachusetts, USA this past July 13-21. This series of annual meetings is intended to encourage and assist young scientists around the world to begin conducting policy-related research on arms control and security issues, and to help create an international community of such researchers. These meetings are co-organized by the Union of Concerned Scientists and a local host, in this case the MIT Security Studies Program. Funding for the meeting was provided by the W. Alton Jones Foundation and the Ploughshares Fund, both of which have supported these meetings for a number of years.

The Symposium originated in 1989 with a meeting at the Moscow Institute of Physics and Technology and led to the establishment of the Center for Arms Control, Energy, and Environmental Studies. While the meetings now include scientists from a number of countries, there has been a special focus on attracting scientists from China, India, and Pakistan.

This year’s meeting included 37 participants from 11 countries, including for the first time Iran and South Korea. For the second year the meeting included scientists from the Russian nuclear weapons labs, which are in the process of setting up centers at which experts will work on these issues. The largest group at the meeting was from China. The increasing emphasis in China on training arms control experts has been obvious in recent years, and has resulted in a very strong group of researchers. The organizers were again unable to find appropriate participants from France.

The Symposia are structured around presentations by the participants. Each person is given 45 minutes to talk about work they have performed or are planning to perform, and to answer questions and receive feedback on the project. The talks are intended not only to describe the participant’s research but to discuss the policy issues that motivate the project and the policy-relevant conclusions that result from the work. In addition, time is set aside at the meeting for discussions of particular topics of interest, as well as issues such as jobs and funding possibilities.

One of the key topics of this year’s meeting was the nuclear situation in South Asia, and a day was devoted to discussing a range of topics by speakers from the region. This included technical analyses of what is known about the Indian and Pakistani nuclear tests.

Several participants gave presentations on using thorium in nuclear reactors, especially in connection with subcritical designs that have been proposed. In addition, talks were given on fissile material controls and disposition, on missile defense issues, and on a range of other issues.

Two senior guests also participated in the meeting: Frank von Hippel of Princeton talked about the “Growing Stockpile of Civil Plutonium” and Ted Postol of MIT talked about the “Danger from Shortfalls in Russian Early Warning”.

Preparations are already under way for next year’s Symposium, which will be co-hosted by the Center for American Studies at Fudan University in Shanghai, China. For more information, contact Lisbeth Gronlund, lgronlund@ucsusa.org, George Lewis, gilewis@mit.edu or David Wright, dwright@ucsusa.org.

Description of the 1998 Summer Symposium

David Wright

This year’s meeting included 37 participants from 11 countries, including for the first time Iran and South Korea. For the second year the meeting included scientists from the Russian nuclear weapons labs, which are in the process of setting up centers at which experts will work on these issues. The largest group at the meeting was from China. The increasing emphasis in China on training arms control experts has been obvious in recent years, and has resulted in a very strong group of researchers. The organizers were again unable to find appropriate participants from France.

The Symposia are structured around presentations by the participants. Each person is given 45 minutes to talk about work they have performed or are planning to perform, and to answer questions and receive feedback on the project. The talks are intended not only to describe the participant’s research but to discuss the policy issues that motivate the project and the policy-relevant conclusions that result from the work. In addition, time is set aside at the meeting for discussions of particular topics of interest, as well as issues such as jobs and funding possibilities.

One of the key topics of this year’s meeting was the nuclear situation in South Asia, and a day was devoted to discussing a range of topics by speakers from the region. This included technical analyses of what is known about the Indian and Pakistani nuclear tests.

Several participants gave presentations on using thorium in nuclear reactors, especially in connection with subcritical designs that have been proposed. In addition, talks were given on fissile material controls and disposition, on missile defense issues, and on a range of other issues.

Two senior guests also participated in the meeting: Frank von Hippel of Princeton talked about the “Growing Stockpile of Civil Plutonium” and Ted Postol of MIT talked about the “Danger from Shortfalls in Russian Early Warning”.

Preparations are already under way for next year’s Symposium, which will be hosted by the Center for American Studies at Fudan University in Shanghai, China. For more information, contact Lisbeth Gronlund, lgronlund@ucsusa.org, George Lewis, gilewis@mit.edu or David Wright, dwright@ucsusa.org.
Martin Kalinowski Moves to Vienna

Dr. Martin B. Kalinowski has left IANUS and INESAP effective September 30. He accepted an offer for a three years contract, extendible up to 7 years, from the Provisional Technical Secretariat of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) in Vienna. He now has the position of Fusion and Review Officer in the International Data Center Division. His responsibility is final review and integration of all products from the seismic, radionuclide, hydro-acoustic and infrasound measurements. Currently the procedures are developed, implemented and tested to be ready once the CTBTO comes into full operation.

He is happy to have the opportunity to continue his work for nuclear disarmament and non-proliferation. He will gain a quite different experience from working in an international organisation where he can apply his knowledge of physics and international relations to verify compliance with a treaty. He looks forward to the challenging work of building up a new institution and establishing new procedures. Especially in the first years, research work will dominate and it can be expected that routine work will increase with time.

Martin Kalinowski has worked with INESAP since its foundation in 1993. He was Scientific Coordinator for the study "Beyond the NPT" which was published in April 1995 in New York. Since 1996 he is in the Coordinating Committee. Since then he was the main driving force for many of the activities of INESAP. He managed together with his colleagues at IANUS INESAP conferences and workshops at Mülheim, Geneva, New York, Gothenborg and Shanghai. His special interests were international tritium control, a comprehensive cut-off convention, technical aspects of the Model Nuclear Weapons Convention, remote detection of clandestine plutonium production, and a really comprehensive test ban treaty. One of his last studies was the German plutonium balance of the past 30 years in Germany (see summarizing paper in this issue of the IIB as well as forthcoming INESAP Technical Report No. 2).

Martin Kalinowski will remain a member of the INESAP Coordinating Committee for the time being and keeps up a working relationship as Associate with IANUS.

New Address: Provisional Technical Secretariat of the Preparatory Commission for the CTBTO, P.O. Box 1250, A-1400 Vienna, Austria, tel.: +43-1-26030-6283, fax:-5923

Scientific Meeting “Space Use and Ethics”
March 3-5, 1999, at the Darmstadt University of Technology

Organizer: Interdisziplinäre Arbeitsgruppe Naturwissenschaft, Technik und Sicherheit (IANUS, Interdisciplinary Research Group Science, Technology and Security) at the Darmstadt University of Technology (TUD) in cooperation with: Institut für Theologie und Sozialethik of the TUD, NaturwissenchaftlerInnen-Initiative, International Network of Engineers and Scientists Against Proliferation (INESAP), Darmstädter Friedensforum, Friedens- und Begegnungsstätte Mutlangen, Global Network Against Weapons and Nuclear Power in Space. Additional groups are being invited to join.

Space activities are increasing. Who is doing what? Who is watching? Who sets the standards? Who benefits? What are the consequences? These questions were addressed at the conference "The Ambivalence of Space Technology" which took place in March 1997 and was organized by IANUS and several other groups.

The conference on March 3-5, 1999, will focus on ethical criteria for the assessment of space research and use. Goal is the critical dialogue between representatives of space organizations, science, politics, military, industry, and peace and ecological groups.

On the first evening, ethical criteria for space use and research will be presented by professors of social ethics, a physicist, and representatives of a space organization.

On the second day, these criteria will be used to assess several concrete space projects:
- use of nuclear power in space
- remote sensing satellites (civil/military use)
- manned space missions

The national and international control of space is the topic of an open panel discussion on the second evening.

The third day is planned for the discussion of consequences originating from the ethical criteria for space use. Political recommendations, a catalogue of challenges, and implementation possibilities are to be worked out.

Contact: IANUS, Zintl Institut, Hochschulstraße 10, 64289 Darmstadt, Germany; tel 06151 -164468 fax -6039, email ianus@hrzpub.tu-darmstadt.de

Draft Program

Proposal: Short sessions with questions and answers after each speaker. Discussion and critical comments to be saved for the plenary discussions. Conference language mainly English as international participants are expected.

Note: All proposed speakers listed in the program have been invited. All topic titles are working titles and will be finally agreed upon with the speakers. Unless otherwise stated, IANUS members will convene the individual sessions.

Wednesday, 3.3.99
18:00 to 18:15 Welcome address conference organizers
18:15 to 21:00 Ethical Criteria for Space Research and Use
- Philosophical and Ethical Aspects of Manned Space Missions (Ulf Merbold)
- Peaceful and Sustainable Use of Space (Wolfgang Bender, Jürgen Scheffran)
- Ethical Criteria for Space Use - an ESA Perspective (Karl-Egon Reuter)
- On the Justifiability of Space Missions (N.N.)

Thursday, 4.3.99
Assessment of Concrete Space Projects
9:00 to 12:00 Use of Nuclear Power in Space
- German Participation in the NASA 'Mars Surveyor' Program - Aspects of Power Supply (Gösta Klingelhofer)
- Are Plutonium Generators for the Cassini Mission Justifiable? (Walter Flury, Michio Kaku)
- Plutonium Use in Space - Problems and Alternatives (N.N.)
13:30 to 15:30 Remote Sensing Satellites
- On the Current Political Debate (Bernd Kübbig)
- Dual Use of Satellite Remote Sensing (Wulf von Kries, Dieter Engels)
16:00 to 18:00 International Space Station (ISS)
- Manned Space Missions - Useless or Key to the Future? (Johannes Weyer, Wolfgang Engelhardt)
20:00 to 22:00 Public Panel Discussion: Who Controls Space? (Götz Neuneck, Brad Duty, Klaus Amthold, Karl Grossman, R. Balasubramaniam)

Friday, 5.3.99
9:00 to 13:00 Consequences of the Ethical Criteria for Space Use
- The Development of Space Law (Horst Fischer)
- The Future of Space Policy (Edelgard Bulmahn, Simone Probst, Heinz Alfred Sauerwald, Regina Hagen)