

TABLE OF CONTENTS

Editor's Note

<i>Kerstin VIGNARD</i>	1
------------------------------	---

Special Comment

<i>François HEISBOURG</i>	3
---------------------------------	---

(R)evolution in Military Affairs

The implications of the revolution in military affairs for arms control, non-proliferation and disarmament <i>Michael CLARKE</i>	5
---	---

Is arms control soluble in the revolution in military affairs? <i>Thérèse DELPECH</i>	11
--	----

RMA and nuclear weapons—A calamitous link for arms control <i>Harald MÜLLER & Niklas SCHÖRNIG</i>	17
--	----

The revolution in military affairs and the 'capabilities race' <i>Saïda BÉDAR</i>	27
--	----

RMA Resources

<i>Compiled by Aidan HARRIS</i>	35
---------------------------------------	----

UNIDIR Activities	45
--------------------------------	----

Publications	53
---------------------------	----

EDITOR'S NOTE

Just as we were going to press the events of 11 September sent shock waves around the world. The questions raised by the contributors to this issue dedicated to RMA could not be more timely. The intersection of American military thinking, that country's fervent belief in high-tech solutions, and the reality of terrorism on its own soil will be a confusing crossroads for the American public and its government.

Experts, novices and pundits alike are debating what sort of 'war against terrorism' will be waged—will the United States stick to its belief in remotely fought wars with the assistance of technology, or will this be a conflict of an entirely different nature? What will be the costs? And what will be the longer term impact on American military strategy and thinking (and hence the perceived value of RMA)? As concisely noted by T. Delpuch, 'The ability to listen to every single telephone conversation worldwide does not mean being informed and even less being able to convert this information into knowledge of the adversary.'

Despite the fact that nearly all of our authors wrote their contributions before the attacks, each one highlights that one serious repercussion of developing high-tech weapons is that unequally matched adversaries are likely to react using asymmetrical warfare—a fact chillingly confirmed in North America. Long discussed in the arms control community, asymmetric warfare—whether through terrorism, cyber-attack or acquisition of WMD—will need to be further discussed as we try to develop appropriate and effective responses.

The Bush Administration's previous single-minded pursuit of National Missile Defence—with all its financial, political and diplomatic implications—will undoubtedly feel the impact of public and political opinion. It is too early to tell how these attacks will influence both domestic and international perceptions of NMD and the greater issue of defence spending.

This event has drawn more people than ever before into the security debate; increasing numbers are considering what it means to be secure. What will be the trade-offs in a country that prides itself on the protection of individual freedoms? This growing discussion on human security—and security in a globalized world—is long overdue.

It is somewhat paradoxical that a crescendo of increasingly unilateral moves by the United States was shattered by the terrorist attacks. Nation after nation has stepped forward to pledge their support to a unprecedented multilateral effort to bring those responsible to justice. We can only hope that this co-operative attempt at coalition-building might give pause to those promoting increasingly isolationist security perspectives.

Lastly, the fact that technological evolution permits a constantly changing array of possibilities for new weapons systems is well documented. Yet nearly all of the debate to date has covered the

implications of RMA for the current and future battlefield. By contrast, the central question to be addressed with this issue of *Disarmament Forum* is: what are the implications of RMA for arms control, non-proliferation and disarmament? Current events make this question all the more relevant. While it is evident that the terrorist attacks on the United States will influence military, security, disarmament and arms control thinking—on the part of both doves and hawks—what remains to be seen is how security, disarmament and arms control can possibly be strengthened by these events and by the serious reflection that we must do regarding global and human security in the twenty-first century.

The next issue of *Disarmament Forum* is dedicated to the role of non-governmental organizations in disarmament and non-proliferation. A combination of recent developments—from the civil society-fuelled push for a mine ban convention, to the growing alarm about small arms, to the words of the Secretary-General welcoming the participation of civil society as partners rather than spectators—beg a closer examination of the facts on the ground. What is the role played by NGOs in disarmament and arms control? Is their participation valued, and if so, by whom? What lessons can be learned from recent NGO/civil society ‘victories’? We also hope to address one of the longer term ripple effects of the 11 September attacks: how the valuable humanitarian work on arms control and disarmament undertaken by NGOs, so often dependent on philanthropic funding and grants, will be impaired in the turbulent financial period ahead. Fears are arising that funders will be shifting their emphasis away from non-proliferation and disarmament activities. This, coupled with weakened global financial markets, could have long-term effects on the NGO community and thus on global and human security.

Amidst tightened security and cancellations of General Assembly high-level debate and the CTBT Article XIV Conference, UNIDIR’s hosted an extremely successful seminar, *Time to Control Tactical Nuclear Weapons*, at United Nations Headquarters on 24 September. The seminar was the first to include non-governmental experts at the United Nations in New York since the terrorist attacks two weeks earlier. As the Under-Secretary-General for Disarmament Affairs Jayantha Dhanapala pointed out, the fact that the UNIDIR seminar proceeded as planned shows the importance that the United Nations attaches to the issue of nuclear disarmament and non-proliferation.

Official government representatives from over 50 countries, experts in the field and NGO participants discussed the relevance of TNWs in the evolving international security framework, assessed the weaknesses of the 1991 Unilateral Declarations and the ways they could be strengthened, and considered how development and testing of new nuclear weapons could affect the stability of the TNW regime. The roundtable on TNWs and terrorism was particularly appreciated. The seminar was co-sponsored by UNIDIR, the Center for Nonproliferation Studies at Monterey Institute of International Studies, Global Green Cross/Green Cross International, and Peace Research Institute Frankfurt. Please see the activities section for more information about UNIDIR’s TNW project.

Jackie Seck, UNIDIR’s Research Programme Manager, is leaving UNIDIR to become a Treaty Implementation Officer at the United Nations Mine Action Service (UNMAS) in New York. UNMAS serves as the UN focal point for co-ordination of mine-related activities. While we will miss working with her on a daily basis, we look forward to continued collaboration with Jackie in her new capacity and wish her the very best in her new endeavour.

Kerstin Vignard

SPECIAL COMMENT

Ever since the expression ‘revolution in military affairs’ (RMA) first emerged in the United States strategic literature a decade ago, something of a cottage industry has arisen offering a host of possible definitions for RMA along with contradictory views as to its significance.¹ Without attempting here to choose between conflicting definitions or to offer yet another definition, several tentative conclusions can be drawn from the implementation² of various aspects of what has become RMA.

- RMA is revolutionary in the same sense as the military consequences of the industrial revolution. RMA may appear to be evolutionary in terms of the time frame, which extends over the decades, but it is deeply transforming all aspects (social, political, cultural—and not simply technical and material) of the area of activity it covers.

What counts in the end is the impact of RMA on the nature, size and use of armed force(s)—the analogy here being the long-term implications of the industrial revolution which led during the nineteenth century to the industrialization of warfare and the militarization of society.

- RMA is not a stand-alone process. To the contrary, RMA is the daughter of the much broader revolution in information technology (IT) which itself lies at the heart of the set of process known as globalization. This is another way of saying that RMA is not emerging in a strategic void: it is not by chance that its ascendancy coincides with the surge of post-Cold War globalization, in the same way that the military consequences of the industrial revolution coincided with the age of nationalism.
- Further, RMA is indeed a process (and a wide-ranging one), meaning that different aspects of RMA will be absorbed at different rates and in differing forms from one set of armed forces to another. Some countries will rapidly incorporate some of the most advanced elements of RMA, while continuing to sustain archaic force structures; others will attempt to modernize their armed forces as a whole. From this flows a corollary.
- Today, RMA (like globalization) is strongly identified with the United States and, to a lesser extent, its allies. But, much as the industrial revolution rapidly ceased to be an essentially British phenomenon, RMA—like the broader IT and globalization processes—is no one’s permanent property: only over a period of decades will it be possible to determine who are the winners and the losers of this revolution. The ability to integrate and exploit the full potential of RMA will lead to a hierarchy of military powers, which will make the world of 2090 look as different from today’s as the international system of 1910 was vis-à-vis post-Napoleonic Europe ninety years earlier.

RMA is not going to quasi-instantaneously transform the art of war or the alignment of powers. But it would be singularly unwise to assume that RMA is just a passing acronym which may be of interest only to countries with American-style armies and strategies, and therefore of minimal relevance to all other societies. Over the decades the effect of RMA will be as radical on the use of military force as those trends which accompanied the rise of nation states and the industrial revolution some two centuries ago.

François Heisbourg

Director of the Paris-based Fondation pour la Recherche Stratégique
and Chairman of the Geneva Centre for Security Policy

Notes

- 1 One of the best overviews of the terms of this debate is to be found in Lawrence Freedman, 'The Revolution in Strategic Affairs', *Adelphi Paper n° 318*, IISS, London, 1998.
- 2 The first large-scale and militarily significant use of some of the tools of RMA occurred between the early 1970s (with precision-guided weapons during the closing stages of the Viet Nam War, and through the course of the Yom Kippur War) and the early 1980s (with Israeli C³I dominance in the Beqaa Valley clashes of 1982).

The implications of the revolution in military affairs for arms control, non-proliferation and disarmament

Michael CLARKE

We are faced with many reasons why we should think much more flexibly about arms control, non-proliferation and disarmament in the twenty-first century: the revolution in military affairs (RMA) is only one of them. We must think in new ways about the subject because the structural arms control of the Cold War period is no longer adequate to cover the current spectrum of arms control requirements, and because the nature of arms control processes in the twenty-first century is likely to be a hybrid of treaties, regime-based behaviour, unilateral initiatives and even counter-proliferation in some guise or other. This may not be the most satisfactory state of affairs but it is the reality with which we have to deal. RMA is therefore only one major driver of the changes in world politics that arms controllers have to encompass in some way. Indeed, we may have to think in quite new ways about arms control because of the trends indicated by RMA. In order to substantiate this claim, we can identify three particular relationships that should guide our thinking: RMA and warfare, RMA and arms control, and the challenges for arms control in relation to RMA.

RMA and warfare

The revolution in military affairs is not driven merely by a series of technologies. Technology is certainly a necessary, but by no means sufficient, condition in RMA. Insofar as it constitutes a 'revolution', RMA is the growing ability of major states—and particularly the United States—to integrate different technologies.¹ The integration of technologies also suggests changes in social organizations and in the skills base and other human resource aspects of developed society. What is revolutionary, therefore, about RMA is the integration of technological elements and an ability to handle some of the social and organizational changes that accompany such integration. Whether this constitutes a genuine revolution is a matter of perception, but there is a general consensus that at the very least this represents a rapid and dramatic change in the potential for war-fighting on the part of the United States and of some of its major allies. The United States sets the war-fighting trend which affects the military development policies of many other nations in the world and which comes to shape the reactions of most other military powers in one way or another.²

There are six main areas in which the revolution in military affairs has already had some effect and where its implications are beginning to be manifest in ways that arms controllers have to encompass. Firstly, RMA has created a great deal more precision in certain key elements of war-fighting. Precision guided munitions are now commonplace among the major Western allies—

Professor Michael Clarke is Director of the Centre for Defence Studies, King's College, University of London.

though not in as great numbers or capacities as is commonly thought—but now Western powers do not contemplate major military operations except where they can deliver ordnance in precise ways.

Secondly, RMA provides an ability for the major military powers to use such potential in stand-off or stealth weapons platforms. Stand-off weapons platforms such as aircraft, missiles, ships or long-range artillery of various forms allow military powers to deliver precision ordnance without taking undue risks themselves. The use of stealth technologies offers the promise of deploying weapons platforms in potentially dangerous proximity to an adversary, but reducing the risk by making the platforms near invisible to tracking radars or other sensors.

Thirdly, RMA is driven by remarkable developments in communications technologies and the ability to integrate different forms of communication and sensors. It is possible—at least in principle—for the major military powers to obtain an accurate and total picture of the battlefield in which they are interested. If knowledge is power, then knowledge of the battle-space during a military engagement is war-winning power of a very high order. Traditionally, battles have been won by those who can penetrate the ‘fog of war’ most successfully and quickly and those who make the fewest mistakes. In the RMA age to come, certain powers will be capable of penetrating the fog instantly, imposing it as a one-way problem on an adversary, and dramatically cutting down on the potential for tactical (though not strategic) mistakes on their own part.³ What the military refers to as the ‘sensor-to-shooter’ relationship has entered a realm where commanders may have a high ability to see almost all that an adversary is doing and target it accurately at very short notice: this is the ‘Holy Grail’ of military command.

The fourth element of RMA rests in what might be termed suppression technologies—the ability to restrict or suppress the military capacities of an opponent without destroying them or otherwise frustrating their effectiveness. The potential of such technologies is enormous and raises the possibility that a dominant power could effectively hobble the traditional military capacities of an opponent, without large-scale civilian or even military casualties, and without risk to its own forces.

All of this, fifthly, is based on an ability to generate and absorb continuous technical innovation and to apply that innovation in a very short time. In the industrial warfare of the twentieth century our perspectives were of technological changes which took twenty to thirty years to find applicability and perhaps another ten years to be introduced and operationalized in a military sense. In the post-modern warfare of the twenty-first century, we will increasingly think of innovation over a ten-year period and operationalization over perhaps two to three years. As military technology becomes more knowledge-based and subject to software innovation, the gap will grow between industrial-age military machines and post-industrial military powers.

Finally, not least, RMA is based on the ability of modern societies to integrate many of these aspects into total systems and ‘systems of systems’—precision technologies, stand-off technologies, communications, suppression technologies and modern research and development techniques—capacities that can have, in theory, a potentially devastating war-fighting effect. The point is not only that technologies change quickly, but that they go on changing quickly in a continuous cycle of innovation. Those societies who can cope with such a demanding cycle and adjust to it, never living merely on a particular technological plateau, will be the beneficiaries of revolutionary military change that is likely to separate them from other societies more completely than the industrial age separated the imperialists from the subject peoples of the nineteenth century.⁴ Of course, the reality of RMA always falls somewhat short of the potential and even the American military machine is still, to a large extent, an industrial-age organization with corresponding equipment, organizational and personnel features. Nevertheless, the road sketched out above is one that the United States clearly intends to embark upon and in some key respects—certainly with airpower and new force structures

for deploying it—the United States has demonstrated that it has already developed some core competence in RMA and is close to making parts of it a reality.

Such developments have created a paradoxical set of pressures. Faced with the messy realities of conflict in the contemporary world, the problems of peace-support operations, interventions in complex emergencies, and the overwhelming political constraints in which military power normally has to be used, military establishments—particularly in the Western world—have been trying to get back to the concept of decisive battle. Rather than prosecute warfare in the way in which they have been trained, the military has found itself locked into situations where they have been part of ‘the process of destruction’ rather than the winning of a campaign.⁵ And the militaries of the Western world tend to think of the revolution in military affairs as a set of decisive technologies that can create battle-winning potential and produce a campaign victory and a political conclusion very quickly. From the military’s point of view, therefore, RMA promises an alternative to political attritional warfare and a shift towards decisive military action. Such aspirations are unlikely to be realized in the reality of modern peace-support operations and other sorts of low-intensity military campaigns short of war. The view of the military, of course, is that in order to undertake any type of operation, the military has to have decisive war-winning capacities from which particular abilities can be extracted to meet lesser needs. But RMA has exacerbated a central paradox here: it has been driven and fed by a military attitude that is very conservative. The American military, in particular, is keen to embrace a technical revolution in order to re-establish a traditional military order.⁶

From the military’s point of view, therefore, RMA promises an alternative to political attritional warfare and a shift towards decisive military action.

The problems RMA raises for arms control

The first problem that RMA raises for arms control arises from the very nature of civil technologies and their military applications. RMA is based on civilian-led technologies rather than specific military technologies. In fact, there are now very few technologies that are purely military or which have a purely military application. The technologies of explosives and ordnance, key technologies in rocketry and missiles, passive surveillance and passive sensors can all be regarded as almost exclusively military technologies. But these are almost the only examples: the vast majority of those technologies crucial to warfare are now, in reality, derived from the civil sector. Such technologies include communications, transport, aerospace, logistics, software—even chemical, biological and nuclear technologies—and are essentially driven by civilian breakthroughs in the application and integration of technical innovation. RMA, therefore, is driven by the imperatives of the developed post-industrial society and the globalized economy in which it exists.⁷

The second problem which RMA poses for arms control resides in its short- to medium-term effects. In the short- to medium-term, RMA is likely to create an overwhelming battlefield superiority for the United States and some of its key allies. This is not to say that the United States and some of its allies cannot lose battles or even lose wars, but they almost certainly will not lose them for reasons connected to their weaponry and supporting systems. If they lose battles and wars, it will be for political reasons. What this means, however, is that there is not natural military symmetry between potential arms control protagonists. The arms control of the 1930s, and during the Cold War, was based on a certain sense of symmetry between some of the main protagonists—the types of weapons they employed, their relative sizes, and the infrastructures which backed them up. This provided a comprehensible framework in which structural arms control could take place among certain common

categories of weapon systems. At least in pure military hardware terms, RMA will make such symmetry very hard to discern between the United States and most other powers in the world. In this situation, it will be much more difficult to devise regimes in which everyone may be regarded as having a technical stake.

Another effect of RMA in the short- to medium-term is the encouragement it is likely to provide to the proliferation of weapons of mass destruction (WMD). If countries who would compete with the United States cannot do so in conventional military terms, then it becomes even more attractive to take the WMD shortcut as a way of achieving military credibility and being taken seriously as a military power. R.A. Manning in his *Foreign Policy* article of 1997 quoted the famous—so far

There is every reason to believe that American conventional superiority, and that of its allies, may create greater motives for other states to develop WMD—particularly non-nuclear WMD such as chemical and biological devices.

unnamed—Indian general who said that the lesson he drew from the Gulf War was that, ‘you don’t go to war with the United States unless you are a nuclear power’.⁸ There is every reason to believe that American conventional superiority, and that of its allies, may create greater motives for other states to develop WMD—particularly non-nuclear WMD such as chemical and biological devices.

A further effect of RMA in the short- to medium-term might also be to encourage asymmetrical responses to Western conventional superiority. Countries or groups who become adversaries of the Western powers constantly look for unconventional ways of affecting the political equation over which they are fighting: even those powers who have some capability in WMD technologies may look for ways of using them asymmetrically in order to gain some military leverage against the dominant powers. Asymmetrical warfare involves the development of different ways of achieving military advantage by identifying new sorts of targets and attacking them in more politicized ways. This adds a further element of uncertainty to any attempts by arms controllers to restrict the effects of weapons and their use.

Finally, what is the long-term effect of RMA likely to be? In the long-term RMA is likely to become—in itself—a new category of WMD. It may well be possible over a thirty to fifty year period to develop technologies in which total societal attacks are possible without fighting a decisive battle. That, after all, is what WMD attempts to do—to hold societies at risk without defeat on the battlefield, going over the heads of defending military forces in order to hurt the population or disable society and its infrastructures. It is entirely possible that the technologies involved in RMA will in their most developed form allow for a societal attack of quite devastating proportions, in which infrastructure can be destroyed or rendered useless, information erased or corrupted and the basics of human survival—food, water, shelter, et cetera—either rendered unusable or totally controlled and made conditional. In essence, RMA in its most developed form might facilitate a physical superiority that makes it *the* greatest weapon of mass destruction known to history.

The nature of arms control challenges in RMA

The picture that RMA paints for arms controllers is, at this juncture, a fairly gloomy one. The primary requirement, however, is to understand the nature of the challenges clearly so that the responses we articulate to them offer some greater hope of success. The first challenge that RMA poses for arms controllers is that of holding on to the present global regimes which already exist in relation to WMD. Those regimes as legacies of the twentieth century are, we know, under severe pressure and it is vital that they are maintained and strengthened as RMA creates more motives to

the development of WMD. This is particularly true in the case of the threshold states in South Asia and the Gulf. The nuclear non-proliferation regime took a major hit with the crossing of the nuclear threshold by India and Pakistan during the 1990s: it may not recover if it takes another hit during the coming decade with the nuclearization of Iraq and Iran. The Western powers are faced with a choice in response to such breaches in the nuclear non-proliferation regime, either to try to strengthen the regime or to engage in more assertive counter-proliferation in ways that are partly facilitated by improvements in RMA technologies. So far, Western powers have engaged in hybrid action that encompasses both approaches, and whether or not this is a sustainable balance the fact remains that the maintenance of non-proliferation regimes must be regarded as vitally important either in their own right or as an essential leg of this dual approach.

A second challenge for arms control is that there is no obvious 'handle' on RMA as a phenomenon. As we have indicated, RMA is not about individual weapons systems or means of delivery. Rather, it is about the technical integration of a series of civil technologies that would allow relatively crude weapons to be delivered with devastating effect or new technologies to be employed in the role of effective weapons of war. In the twentieth century it was possible to gain some leverage in arms control since weapons were observable and their capabilities were finite. They could be regulated, therefore, by number, weight, range or other criteria, which allowed them to be balanced off against each other. Insofar as RMA is about the application and integration of essentially civil technical systems, however, it will be correspondingly difficult to agree on a currency of control and exchange. Not least, small numbers of weapons and delivery systems will have disproportionate effects when they are part of an integrated RMA infrastructure and as all negotiators know, arms control becomes most difficult when the numbers at issue are low. It is possible, therefore, that we might have to approach future arms control not in terms of the restrictions on weapons and instruments of war so much as what Michael Krepon has called 'red lines': the creation of certain taboos concerning the effects of weapons rather than the weapons themselves. Hypothetical examples of such taboos might be a red line drawn on 'bio-killing', or on the destruction of societal infrastructures, or on the deliberate targeting of civilians. In short, there is a good case for arms controllers to revisit the Geneva Conventions on the effects of warfare if it proves impossible to more clearly grasp control of the weapons of war themselves.⁹ Such an approach would be full of ambiguities and difficult to operationalize, but international taboos have exerted powerful effects in the past and an attempt to gain general agreement—particularly among the 'RMA states' themselves—to certain red lines which they have no plans and no intention of crossing, might constitute significant confidence-building measures within a more hybrid arms control approach.

Finally it is clear that RMA also dramatizes the choice which arms controllers face in the contemporary world. At a superficial level it may seem that we are caught between an internationalist regime approach to arms control and a more unilateralist counter-proliferation approach taken by the United States and some of its close allies. More realistically, however, we are almost certainly caught already in a hybrid of regulatory regimes and unilateral and enforcement action. Though RMA undoubtedly enhances the attraction of counter-proliferation for those who are militarily dominant, it also highlights the fact that it is clearly in the interests of the United States not to produce unintended consequences from its military development now that it is already so superior to all other potential adversaries. The powerful will only lose in a relative sense if RMA increases their superiority to such a point that it produces such unintended consequences as the rapid deployment of asymmetrical techniques of warfare, a move towards cheap and effective WMD, or the adoption of wide-scale terrorist tactics.

The powerful will only lose in a relative sense if RMA increases their superiority to such a point that it produces such unintended consequences as the rapid deployment of asymmetrical techniques of warfare, a move towards cheap and effective WMD, or the adoption of wide-scale terrorist tactics.

RMA powers, in other words, need to set their pursuit of technical excellence within the overall context of what does and does not seem likely to make them more secure. This, of course, assumes a prior need for a clear sense on the part of the major powers of their strategic interests in relation to each other and the rest of the world. In essence, RMA ought to be set in the context of a strategic dialogue between the major military actors in the world from which it might be possible to think through the implications for other powers and anticipate the ways in which RMA might be applied. Needless to say, this is not happening. The imperative, therefore, is to get the revolution in military affairs out of the hands of only military and technical thinkers and to set it in its broader political context, which should encompass expectations of war-fighting, the legitimate security concerns of the major powers, and the place of arms control within that strategic order. If war is too serious a business to be left to the generals, then the revolution in military affairs is certainly too serious to be left to the technocrats. Arms controllers must confront this concept, not only at the technical level but in the broadest political terms.

Notes

- 1 P.L. Richardson, 'The Future of Military Affairs: Revolution or Evolution?' *Strategic Review*, vol. 24, no. 2.
- 2 J. Arquilla, 1997/98, 'The Velvet Revolution in Military Affairs', *World Policy Journal*, vol. XIV, no. 4.
- 3 M. Libbiki, 1996, 'The Emerging Primacy of Information', *Orbis*, vol. 40, no. 2.
- 4 W.A. Owens, 1995, 'The Emerging System of Systems', *US Naval Institute Proceedings*, vol. 121, no. 5.
- 5 Lawrence Freedman, 1998, 'The Revolution in Strategic Affairs', *Adelphi Paper 318*, Oxford University Press/IISS, p. 45.
- 6 W. Caldwell, 1996, 'Promises, Promises', *US Naval Institute Proceedings*, vol. 122, no. 1.
- 7 Paul Bracken, 1993, 'The Military After Next', *The Washington Quarterly*, vol. 16, no. 4.
- 8 R.A. Manning, 1997–98, 'The Nuclear Age: The Next Chapter', *Foreign Policy*, vol. 109, p. 71.
- 9 François Bugnion, 2000, 'The Geneva Conventions of 12 August 1949: From the 1949 Diplomatic Conference to the Dawn of the New Millennium', *International Affairs*, vol. 76, no. 1, pp. 47–50.

Is arms control soluble in the revolution in military affairs?

Thérèse DELPECH

The revolution in military affairs (RMA) has not yet taken place. The coining of its name was supposed to convince the administration and Congress to invest enough financial resources in the new platforms, new weapons and new forms of training entailed. But according to its advocates, the revolution in military affairs has not yet received from Washington the recognition it is entitled to. This is one of the premises of the Bush Administration, which would like to make up for the 'shortcomings' attributed to President Clinton in this field. The novelty of the operational concepts covered by RMA could therefore become apparent over the next few years and decades. The literature on the subject is sufficiently abundant, however, to catch a glimpse of the new directions opened up by the predicted upheavals. The main objective of the revolution in military affairs is for the American armed forces to make the best of information sciences. They are to acquire the greatest possible battlefield transparency and to achieve an effective integration of each combatant on vast theatres of operation. Indeed, forces need to be dispersed because of the dangers incurred by troop concentrations in environments where the use of weapons of mass destruction (WMD) cannot be ruled out. Whereas the watchword had long been the concentration of forces, it is now their dispersal along with maximal flexibility. In the future, information and communication systems will be increasingly necessary for intelligence and detection, which goes without saying, as well as for the management of means of interception and for the deployment of forces during regional crises. The effects of this revolution on arms control are poorly known. They are hardly a subject of predilection for the advocates of RMA.

The philosophy behind RMA hinges on the notion of dominance. This is scarcely conducive to negotiation, which posits, if not an equal footing, at least some mutual recognition. If the ambition is to develop instruments of power, or even of supremacy, with the help of technologies in whose military applications the United States has a clear lead, then the negotiation of offensive or defensive arms limitations is not a self-evident requirement. The aim of battlefield dominance is nurtured by a part of American public opinion that is hardly favourable to arms control, portrayed as a largely 'obsolete' leftover from the Cold War. Whereas it used to be necessary in order to maintain communication channels with the main adversary, the former USSR, thus reducing that state's unpredictability and avoiding excessive military investments, arms control is claimed to have lost its *raison d'être*. It is now argued to be used mainly as a device for countries lagging behind American technology to halt its progress and prevent it from stretching its lead. Arms control is therefore often looked upon within the new administration as contrary to the defence needs of twenty-first century America. This trend is illustrated by the non-ratification of the Comprehensive Test-Ban Treaty, hostility to the verification protocol on biological weapons, as well as the intent to withdraw from the ABM Treaty. In the last case, one of the main concerns relates to the ABM Treaty's limitations not just

Thérèse Delpech is Director for Strategic Affairs at the Commissariat à l'énergie atomique (France).

on deployments, but also on testing of defensive systems, since the tests required for the development of mobile systems or of systems combining ABM and non-ABM means are prohibited. Granted, a member of the National Security Council delivered a very open-minded speech at the Carnegie International Non-Proliferation Conference in June 2001 on the importance of multilateral treaties. But this was not the expression of a consensus, nor even of a prevailing position. The difficulties of verification, the absence of agreement among the five permanent members of the Security Council on proliferation, the impossibility of bringing the most determined proliferators to heel, and the constraints imposed by treaties on promising technological developments, all of these factors tip the scales heavily away from arms control.

Besides, the instruments for controlling the technologies involved in the revolution in military affairs, notably information technologies, are practically non-existent, especially in a world bearing the hallmark of globalization. Whether in computing or in cryptography, today's civilian needs are such that they become increasingly indistinct from military applications. Export control thresholds for large computers have been raised considerably over the last ten years (by a factor of the order of twenty) and this is bound to be a continuing trend. Portable terminals requiring protected transactions now have cryptographic thresholds very close to, if not in excess of, military ones. In sum, effective controls on such technological instruments appear increasingly illusory. This fact will have to be at least taken into account, if not fully accepted, in future conflicts.

Contrary to the nuclear era, the information age would then seem to be inauspicious for arms control for a series of political and technical reasons. Reality, however, is more complex than what a superficial view would indicate. To begin with, the verification procedures for disarmament

The verification procedures for disarmament agreements do—and will continue to—benefit from advances in the information sciences.

agreements do—and will continue to—benefit from advances in the information sciences. This applies to intelligence operations as well as to remote surveillance, on the ground or from space, whether or not the verification is consensual. These operations are no substitute for on-site inspections, especially in the case of WMD programmes, even more so in the biological and chemical realms, although they can provide valuable information that can then be verified if the co-operation of states can be relied on. In such non-cooperative settings as Iraq and North Korea, however, it is even more important to make the best possible use of means that do not require state consent. After almost three years without inspections in Iraq, this has become an unavoidable issue and is all the more so in the present circumstances.

The indirect effects of the revolution in military affairs on disarmament must also be taken into account. These apply first and foremost to nuclear weapons. The growing use of information technologies and the development of accurate, long-range conventional weapons can contribute to reducing the salience of nuclear weapons in American military doctrine, and can buttress the case of those who advocate unilateral reductions. Although not ideal, since they are unverifiable and reversible, such initiatives do contribute to disarmament efforts. The prospect of an American arsenal of 2,000 nuclear warheads might be announced after the Nuclear Posture Review that concludes in late 2001, thus allowing Russia to announce comparable cuts. These reductions are deemed feasible by the Pentagon, not just because of major global changes and the disappearance of the USSR, but also as a result of prospects for the revolution in military affairs. It is indeed these prospects that allow missile defences to make constant progress and that enable the development of increasingly accurate medium- and long-range missiles. Some of the missions currently earmarked for nuclear weapons could henceforth be attributed to conventional ones. The Soviets, in fact, had quite clearly grasped the risks that such new weapons could bring to bear on their silos and on deterrence by increasing the probabilities of a victorious first strike. These conventional missiles can be seen as the logical outcome of a process that had already led the United States to shift its nuclear doctrine from a

counter-value to a counter-force strategy. The first change had contributed to downgrading the role of nuclear weapons, as rightly pointed out by George A. Keyworth, one of President Reagan's advisers. Increasingly accurate missiles with multiple warheads already escalated the possibility of a first strike, and hence the risk of a confrontation. In this respect, and contrary to conventional wisdom, the ABM Treaty has encouraged the modernization of offensive nuclear weapons, which in turn has reduced strategic stability in as much as it rested on neither side possessing an advantage allowing a first strike against the adversary's nuclear forces. The Strategic Defence Initiative (SDI) purported to draw the appropriate conclusions from such developments: since the risk of attack had increased, the time had come to give some thought to defence. At the very same time, long-range missiles became accurate enough to be equipped with conventional warheads.

Since the end of the nuclear rivalry with the USSR, long-range conventional weapons have acquired other rationales than the destruction of the adversary's silos. The quest for accuracy has long since been motivated, at least in part, by the wish to avoid resorting to nuclear weapons, which even in their most accurate versions involve very significant collateral effects. If these effects can be eliminated by using conventional warheads capable of reaching and destroying their designated targets, nuclear use could be commensurately reduced. Some even argue that accurate long-range weapons spell the demise of nuclear weapons and of deterrence. Such a radical view is unlikely to prevail in the Pentagon, but the revolution in military affairs unquestionably plays a part in American plans for unilateral nuclear cuts. In his speech in Annapolis on 25 May 2001, President Bush announced the conversion of a number of nuclear submarines into carriers of accurate conventional weapons. Even if this move remains very fragmentary (it could involve a mere four vessels), it points to a trend. In a more radical version, core nuclear missions would be tightly restricted to hardened targets immune to conventional weapons. A gradual evolution of American forces along these lines cannot be excluded in the decades to come, given the military's enduring hostility towards nuclear weapons (which are largely the preserve of political authorities), especially at a time when the American arsenal comprises fewer and fewer tactical weapons. Lastly, the American propensity to wage war in the air with as little deployment of ground forces as possible could also reinforce this trend. America dreams of the ability to hit distant targets with increasing accuracy and without 'collateral damage'. Such a sanitized version of warfare has little chance of materializing in the real world of conflict, but it holds a potent and understandable fascination in a highly developed society less and less tolerant of the pain of warfare—an illusion swept away by the tragic events of September 2001 in New York and Washington. In one of his first speeches on the war America and its allies were to wage against terrorism, President Bush made it clear that it would inevitably entail casualties.

Such a sanitized version of warfare has little chance of materializing in the real world of conflict, but it holds a potent and understandable fascination in a highly developed society less and less tolerant of the pain of warfare—an illusion swept away by the tragic events of September 2001 in New York and Washington.

In Asia, where the United States is preparing for probable confrontations in the next decades, RMA developments will play an important role given the fragility of American ground bases in the region. But information technologies and the revolution in military affairs can be expected to play an increasing part especially in regional scenarios in which the involvement of American forces would be most likely. American strategy towards regional powers will indeed rest more on considerable conventional forces and limited defences than on nuclear forces—except, perhaps, for miniaturized nuclear weapons for use against bunkers or clandestine underground installations not vulnerable to conventional explosives. There are several reasons for this: one is that the legitimacy of nuclear use in situations not involving actual state survival will be increasingly contested. Secondly, with the emergence of methods for forgoing nuclear weapons, the area of applicability of these weapons will shrink. Lastly, it is becoming increasingly accepted that nuclear weapons are to be restricted to major

conflicts, chiefly to deter their use by other nuclear powers. Nuclear use by regional powers would expose them to similar treatment, but only massive chemical or biological attacks on deployed expeditionary forces or on the populations of neighbouring allied countries could justify a nuclear response. Passive and active defences should deal with other contingencies. Already during the Gulf War, when the first actual use was made of information technologies to destroy the opponent's defences, American threats to Saddam Hussein should he have used chemical weapons against coalition forces or civilian populations were not backed by any detailed targeting plan for nuclear weapons. This does not necessarily mean that President Bush's message was pure bluff, as some have mistakenly claimed, but it was at least an indication that the planning for such a nuclear scenario had not been taken very far.

Anti-missile defences, whose capabilities are narrowly linked to satellites, powerful radars and computers, are often perceived as a challenge to deterrence for reasons easily explained by the genesis of SDI. But they would only pave part of the way towards the end of the nuclear era. Genuine military superiority, according to RMA advocates, would be attained only by those who, having understood the full use of information technologies, would be capable of denying the adversary's very ability to wage war. By nurturing the hope of a near-immediate ability to destroy the adversary's most sensitive targets, in conjunction with the protection of homeland systems, RMA would put an end to the cycle of deterrence, and even to warfare itself in international relations. By the same token, arms control would be made obsolete.

What credence should be given to such views? Short of postulating a war between America and an opponent with similar capabilities and equally dependent upon information technologies, this is scarcely a convincing portrayal of future conflicts, as will probably demonstrate the forthcoming events in Afghanistan. Even in the probable case that considerable improvements are made in force co-ordination, power projection and observation and surveillance operations, the 'fog of war' will persist in new and different guises. Post-Cold War conflicts often resort to conventional weapons, even rudimentary ones. It is obvious enough that the increasingly important issue of small arms is little affected by such high-tech daydreaming. In the course of one and the same conflict, as in Kosovo, new generation American weapons can be deployed in the air even as knives are used to massacre civilians on the ground. In the conflict between the Taliban and the forces in the North of Afghanistan, Bin Laden's soldiers regularly cut the throats of male villagers. The conjunction of increasingly protected American and Western soldiers and defenceless civilians, was up till now one of the

The indirect but genuine incentive to acquire weapons of mass destruction in a hyper-technological setting should not be overlooked.

characteristics of 'post-modern' conflicts. But the new campaign against terrorism could mark the end of this situation, with American soldiers incurring risks and with no guarantee for the security of civilians from threat of new attacks. The United States is fully aware of it. Anti-terrorist programmes in the United States are now backed

up by significant financial resources (10 billion dollars in 2000 and probably more in the coming years). But the protection of allied populations and of armed coalitions should also be borne in mind. All the more so if the adversaries of the United States, being unable to measure up to American power (owing, precisely, to the use of information technologies), should choose to resort to WMD to strike at what is seen as America's main weakness—its fear of human losses. The indirect but genuine incentive to acquire weapons of mass destruction in a hyper-technological setting should not be overlooked. This was actually one of the lessons that some countries drew from the Gulf War; it must have been reinforced by the Kosovo war. And now everyone fears the possible use of WMD by non-state actors. Whereas Western countries have all forgone chemical and biological weapons and although they have all downgraded the role of nuclear weapons in their military doctrines, the same does not apply to other parts of the world. This is an excellent reason to care for, and to reinforce, multilateral treaties, the verification they entail, and the rule of law in international

relations—even if this means strengthening other types of efforts to protect soldiers and civilian populations from attacks that can no longer be considered as rash hypotheses. In this respect, Europe is seriously lagging behind.

The revolution in military affairs now comes up against a revolution in violence. Victory will not necessary be achieved thanks to information technologies, which proved incapable to prevent the terrible terrorist attacks on New York and Washington. The overconfidence of the United States in its command of information sciences, especially with regard to their military and intelligence applications, brought about an entire generation of strategists who disregard the more basic techniques used by their adversaries (terrorist networks using communication means as discrete as those of spy rings, for example) as well as disinformation, which always played an essential role in conflicts. The ability to listen to every single telephone conversation worldwide does not mean being informed and even less being able to convert this information into knowledge of the adversary. This is a harsh lesson from the conflict that has started. The issue is no longer arms control, rather what will be the limits of a conflict that promises to be ruthless.

The ability to listen to every single telephone conversation worldwide does not mean being informed and even less being able to convert this information into knowledge of the adversary.

RMA and nuclear weapons—A calamitous link for arms control

Harald MÜLLER and Niklas SCHÖRNIG

The revolution in military affairs (RMA) has been largely discussed as a major innovation in conventional warfare. At the centre of interest are not the weapons themselves, but the technologies enhancing the economy and efficiency of weapons use, and umbrella concepts that pull these technologies together in a systematic way. The phrase ‘system of systems’ captures this concept nicely.

Weapons of mass destruction (WMD) have been in the forefront of security concerns and arms control, disarmament and non-proliferation throughout the nuclear age. The RMA debate has tended to push these concerns onto the ‘back burner’, though they remain an important motivation for certain RMA areas such as missile defence. The importance of WMD, however, makes it advisable to explore its relationship to RMA, and possible corollaries for arms control. This is the purpose of this article; we focus on nuclear weapons as the WMD archetype.

We start by comparing the lethality of smaller nuclear weapons with advanced conventional munitions. We then shift to mission comparison and explore whether the strategic employment of some RMA options may be comparable—and consequently substitutable—for missions so far ascribed to nuclear weapons. We inquire whether RMA might revive interest in nuclear weapons, making possible new mission concepts that were previously prevented by, for example, lack of accuracy.

We then evaluate the impact RMA may have on nuclear arms control and disarmament, and explore how to strengthen possible positive effects. Since the RMA discussion as well as RMA’s real potential are still unfolding and thus hotly contested, it is inevitable that our deliberations are speculative and thus provisional. It makes sense, however, to tackle these problems early on if the potentially destructive repercussions of RMA for arms control are to be contained.

Conventional and nuclear weapons: blurring the threshold

Before RMA, the planned use of tactical nuclear weapons was focused on stopping or slowing down a conventional superior adversary. Tactical nuclear weapons were and still are tailored for such an assignment. They are capable of destroying vast numbers of enemy units when fired into a concentration of forces. Furthermore, no high accuracy is required for this mission: the lethal radius

Dr Harald Müller is Director of Peace Research Institute Frankfurt (PRIF) and Professor of International Relations at Frankfurt University. Since 1999, he has been serving on the United Nations Secretary-General’s Advisory Board on Disarmament Matters. Niklas Schörnig is a Ph.D. candidate and research associate at PRIF. He is working on the nexus between RMA and the restructuring of the European and American arms industry.

of a nuclear explosion due to heat- and blast-wave and radiation ensures significant damage to the selected target even with a high Circular Error Probable (CEP)—the radius from the target within which statistically half of the weapons fired will fall. This explains why nuclear artillery shells constituted most of NATO's former nuclear stockpile, especially in Europe:¹ in the eyes of the military they provided a 'capability to respond to threatening "breakthrough" concentrations of Warsaw Pact armoured and mechanized forces', escalating the intensity of combat only deliberately.²

Even with the latest achievements in chemicals and kinetics, current explosive technology does not allow conventional high explosives weapons to come anywhere close to the destructive power of a nuclear device. Improvements in chemical processes are expected to raise the explosive power of conventional bombs by 25–50% but not much more, not significantly raising its lethal radius.³

In contrast, new versions of Fuel-Air Explosives (FAE) or thermobaric munitions under construction are said to achieve the same lethality as tactical nuclear devices—at least against soft targets such as humans, armoured vehicles and unsheltered aeroplanes.⁴ Given their size and weight, no other conventional weapon comes close to their destructive power. Originally build to 'clear' minefields and enemy trenches (as used during the Desert Storm campaign), these weapons are most effective in urban scenarios, as confined spaces tend to amplify the shockwave, but adding to the danger of afflicting civilian zones of exclusion.

However, even without gaining the same destructive power possessed by nuclear weapons, conventional arms can be transformed into highly lethal weapons when delivered in significantly greater amounts, as accomplished by cluster bombs. These dispensers loaded with submunition are primarily employed against soft or lightly armoured targets and have been in use since the 1960s. They have significantly improved over the last few years and now can contain hundreds of high explosive sub-units. Today, some cluster bombs possess a total lethal area twice the size of a conventional 2,000 pound bomb, equalling the area of more than 150 football fields.⁵ Given a typical scenario of a B-52 dropping forty-five CBU-58 units with 650 bomblets each, whole military units can be annihilated with just one sortie—an effect usually attributed to WMD. In vast contrast to the created image of a bloodless Gulf War, cluster bombs were the 'most common workhorse'⁶ of the allied forces, responsible for a high percentage of the fatalities among the barely sheltered Iraqi soldiers.

In addition, the United States Air Force plans to begin concept development on a new weapon design called Small Diameter Bombs. These new bombs will take up less room in a warplane's internal bays and thereby increase the weapon capacity of a B-2 Bomber by an estimated factor of twelve, enabling it to strike more than 100 targets in one sortie.⁷

None of these described weapon systems are part of RMA by definition as most of them were developed decades ago. But the description of their effects shows clearly that some weapons that have been in use for some time already tend to blur the threshold between WMD and conventional weapons.

In contrast, the latest phase of RMA is not about the development of 'revolutionary' new weapons, but the integration of already existing systems into a 'system of systems' via the latest

Given a constant data link and data intelligence between surveillance units, command headquarters and strike units, the Clausewitzian 'fog of war' is about to be lifted to a previously unknown degree.

communication and data links, which multiplies the efficiency of a weapon's effect by a tremendous factor. To understand the new dimension that RMA is promising to the military, one has to look back at the 'pre-revolution' past. Until the 1980s, interoperability and joint force activity were catchwords, but implementation had its limits due to the lack of data transmitting and processing capabilities between services. With the advance of micro-electronic equipment, the idea of C⁴I (Command, Control, Communications, Computers and Information) was transformed from a vision to a real 'war-fighting enabler'.⁸ Given a constant data link and data intelligence

between surveillance units (for example Unmanned Aerial Vehicles—UAVs—such as the Global Hawk for reconnaissance), command headquarters and strike units, the Clausewitzian ‘fog of war’ is about to be lifted to a previously unknown degree.

In addition, the precision of ‘smart bomb’ delivery systems is advancing at a rapid pace. Once a target is set, these missiles can be ‘launched and left’ due to their electro-optical/television, imaging infrared or laser guidance systems, ensuring a high probability of a ‘kill’. Already during the Gulf War several smart bombs like the AGM-65 Maverick were reported to reach an accuracy of more than 80% direct hits. Military scientists are now working on solutions to reach a similar or even higher reliability under more adverse weather conditions.

Modern laser guidance systems or, more recently, bombs controlled by Global Positioning System (GPS) dramatically enhance the capability of attacking hard sheltered or high priority enemy positions such as command posts in just one sortie⁹ and the ability to penetrate deeply buried bunkers where the hostile leadership might be hidden. The rationale is that ‘rogue’ leaders value nothing but themselves, and deterrence must thus aim at their lives in order to be effective. Special bombs like the GBU-28, called the ‘Bunker Buster’, and the Advanced Unit Penetrator (AUP) have been developed since the Gulf War to enhance deep-penetrating capability of conventional ammunition. These laser-guided systems can penetrate more than 100 feet of earth, which is the equivalent to more than twenty feet of concrete.

But technological improvement is not limited to aerial warfare. ‘Smart’ howitzer ammunition with GPS-based course-correcting fuzes has significantly improved artillery accuracy at the short-, medium- and long-ranges. Given new projectiles carrying terminally guided submunitions, hit-probability and targets killed per round have increased significantly, giving the adversary less time to react and counter-attack.¹⁰

All of the components described are integrated in RMA—overwhelming reconnaissance, extensive data link via C⁴I, small CEP and deep penetration capability—so modern conventional ammunition can handle many of the tasks which ten to twenty years ago could exclusively be done by WMD, in particular tactical nuclear weapons. Attacking and stopping whole units or highly armoured targets, or destroying most hardened bunkers with a precision hit with just a few sorties can—some exceptions remaining—already be done with conventional weaponry. This tendency is very likely to increase in the near future, reducing the need to escalate to nuclear weapon use.

Modern conventional ammunition can handle many of the tasks which ten to twenty years ago could exclusively be done by WMD, in particular tactical nuclear weapons.

Since ancient times, disrupting the adversary’s information channels has been an important objective of theatre commanders to achieve information superiority as a means to decide the battle in one’s favour. With the ongoing integration of information technology into the military as a major aspect of RMA, all units depend on *live* battlefield data to accomplish their designated objectives. Hence securing one’s data lines and disrupting the opponent’s has become even more prominent in military strategy.

As stated in the United States *Joint Vision 2020*: ‘The transformation of the joint force to reach full spectrum dominance rests upon information superiority as a key enabler and our capacity for innovation’.¹¹ At a first glance this aspect of information warfare seems not to be related to WMD. But a closer look reveals several aspects of modern information warfare worth discussing in the context of this article.

The ‘old-fashioned’ way to suppress enemy communication was a physical attack with all its disadvantages. During the Gulf War, Iraqi communication systems and transmission nodes were destroyed by conventional air power, ‘binding a substantial proportion of available air assets in the early phase of the air campaign’.¹²

An alternative way to disrupt the opponent's communication is the use of an Electro-Magnetic Pulse (EMP) weapon, which produces a short wave of an intense electromagnetic pulse, ruining basic electronic components in communication gear (and of course all electronically based equipment). Until recently, a high altitude nuclear explosion was the only means to generate an EMP strong enough to seriously harm electronic devices in enemy territory. Tests performed in the early 1960s confirmed that a detonation of a 1.4 megaton bomb 400 kilometres in orbit resulted in failures of electronic systems 1,300 kilometres away.¹³ The effects would be even more severe today as low-powered electronic equipment tends to be more sensitive to voltage swings.

Up to now, these scenarios based on nuclear weapons were banned by the Outer Space Treaty (OST) of 1967, signed by virtually all nations with certain and potential nuclear capabilities (with the exception of North Korea). However, according to unconfirmed sources, recent scientific progress in the United States has led to the design of workable, conventional EMP weapons generating a less far-reaching, but similar shockwave.¹⁴ With this development, severe consequences for the OST are inevitable, as nuclear-capable countries may feel the need to deploy nuclear EMP weapons in space as a counter-deterrent.

In addition to classical means to disrupt enemy communication, the topic of cyberwar has come into military focus during the last years. In contrast to other means of information warfare, cyber attacks are aimed at the civilian 'backbone' of the opponent—the Internet. Despite the fact that cyber attacks cannot kill humans, they can range from annoying but harmless propaganda to a crippling of the economic infrastructure of a nation or region with severe secondary affects. In his remarks to the North Atlantic Council in Brussels this year, President Bush addressed cyber-terrorism in the same sentence as nuclear, biological and chemical weapons.¹⁵ During the Kosovo campaign, the American military was considering a cyber attack against Serbia but decided against it, fearing a breach of the Geneva Convention.¹⁶

However, some countries, especially the United States, are striving intensively for an offensive cyber attack capability—justifying their efforts with the classical argument of deterrence.¹⁷ But one important flaw is often overlooked by military planers: given the complexity of the Internet, an offensive cyber attack might backfire on those states most dependant on Internet transactions: Western democracies. So by developing (and maybe even testing) offensive cyber weapons, Pandora's box might be opened.

In an ironic twist, some selected RMA options and technologies may help to reinvigorate interest in a specific category of nuclear weapons. To understand how and why one has to note the recent discussion within the American nuclear weapons establishment about possible new missions for nuclear weapons that would require new designs. Leading staff at Los Alamos and Sandia National Laboratories in the United States have suggested for a long time the development of new, very small nuclear warheads. This idea recently found some resonance among Senate Republicans who allocated research money for this project in the Fiscal Year 2001 Defense Authorization Bill.¹⁸ Only nukes, the argument goes, provide the necessary yield-to-weight ratio to destroy the deepest bunkers that conventional ammunition cannot penetrate. In such a situation, the option to use low-yield nuclear devices would not impose the self-deterrent effect entailed in horrible collateral damage as caused by larger yield weapons—thereby making use more appealing.¹⁹

This proposition is contestable, since the armed forces are busy developing even more forceful conventional warheads for penetration bombs, the speculation about the deterrence rationality of 'rogue' leaders is highly doubtful,²⁰ and, after all, 'decapitation', as known from the respective Cold War debate, has the distinct disadvantage to eliminate the one with whom to negotiate an end to the war.²¹

The second argument in favour of nuclear weapons is to deter the use of and, if possible, destroy WMD, notably biological weapons (and respective facilities).²² Here the argument is that

only nuclear weapons achieve the very high temperatures needed to reliably destroy biological agents.²³ Again, the argument is contested.

What do these plans have in common with RMA? First, the notion of very small, collateral damage-limiting nuclear devices rests on knowing the precise location of targets and on the pinpoint accuracy afforded by RMA electronic guidance. Secondly, enormous advances in electronics make much more precise triggers available, which avoid even the minuscule asymmetries in trigger synchronicity that may have detracted from achieving the optimum planned yield of a given warhead. Thirdly—and indirectly—the achievements of numerically operated machine tools enable the flawless shaping of both the conventional explosive lenses and the physics package of the fissile material, excluding a source of possible (very small) asymmetries in a weapon. Lastly, very advanced munitions achieve higher compression of the fissile material, resulting in a yield for much smaller quantities than was possible fifteen or twenty years ago.

The prospects are worrisome, for these plans show some of the disturbing features that go with RMA: for example, the counter-force strategy against biological weapons offers the most promise for success—notably through damage limitation—if it is implemented before biological weapons are used, that is, pre-emptively. This opens the spectre of ‘first use’ before anything has happened that would render a nuclear strike a proportional response. And the low yield may encourage policy-makers to take the decision on the grounds that the expected damage would be limited enough to justify nuclear use. If small nuclear weapons would become the instrument of choice to prevent follow-on use, or would be integrated in a ‘system of systems’ for mobile warfare, for example chasing the mobile biological weapon assets of an enemy, they would have to be reintegrated into deployed general purpose forces as well as the general purpose navy, thereby undoing the considerable advances in restricting deployment (and numbers) of tactical nuclear weapons that Presidents Bush and Gorbachev initiated in 1991.²⁴

Evaluation: impact of RMA on nuclear arms control and disarmament

On the one hand, the further development of RMA may have quite positive effects on nuclear disarmament. As Paul Nitze remarked in the early 1990s, the increasing possibilities to fulfil strategic missions presently assigned to nuclear weapons by high-precision conventional means makes nuclear weapons, in the end, obsolete.²⁵ Not only would conventional weapons be usable to implement specific war-fighting missions such as counter-force and bunker-busting, the whole deterrent mission could be taken over by ‘smart’ conventional weapons capable of devastating the whole civilian infrastructure of an adversary, ostensibly with few civilian casualties from collateral damage (EMP weapons, cyberwar, etc.). Nuclear-weapon states taking this path might thus be willing to consider de-alerting, de-emphasizing, dismantling or even, in the longer term, completely eliminating their nuclear arsenals simply because they no longer need them for national defence or for coercive diplomacy.

In this scenario, the first ‘casualties’ of the unfolding RMA would certainly be those nuclear weapons closest to actual war-fighting and whose tasks could most easily be taken over by advanced conventional assets, i.e. tactical nuclear weapons. As it is this type of nuclear weapon that creates the most concern in terms of unauthorized or premature use or theft, RMA could contribute, from very early on, not only to disarmament but simultaneously to enhanced stability while the disarmament process is advancing.²⁶

There are three serious drawbacks that would tend to neutralize the positive effects of RMA on arms control, non-proliferation and disarmament.

However, there are three serious drawbacks that would tend to neutralize the positive effects of RMA on arms control, non-proliferation and disarmament.

- First, RMA is not cheap. It requires heavy, up-front investment, relies on well-educated and skilled soldiers and is contingent upon a highly sophisticated and well-developed technical infrastructure.²⁷ Therefore, the vastly asymmetrical opportunities of countries to introduce RMA into their armed forces will likely exacerbate imbalances of forces and increase the insecurity of those countries left behind. The prospect of facing an opponent capable of conducting pinpoint offensive strikes 'over the horizon', with complete knowledge of targets and the moving battlefield, will engender fear of surprise attacks comparable to, if not worse than, the nuclear confrontation in the Cold War. Countries with the worst security fears (complemented to a certain degree by worst-case paranoia) might seek an equalizer in the time-honoured, old-fashioned technology of nuclear armament.²⁸
- Second, in order to insure against a disarming conventional first strike by an RMA-enabled opponent, their postures would likely be closer to hair-trigger alert and 'launch on warning' than the more relaxed, de-alerted status that nuclear-weapon states possessing RMA might consider compatible with their security. High-risk postures with huge inherent instability would thus ensue.²⁹
- Thirdly, the fact that certain military objectives that were previously only possible for nuclear weapons might in the future be achieved by conventional means entails the serious possibility that the threshold before a decision to go to war might be lowered. The prospect of hitting strategic targets in a decisive way early in a conflict and with little risk to one's forces might be tempting in a crisis and might make those governments in command of RMA assets more prone to take the fateful decision to use force to resolve a conflict.³⁰ The opponents, conscious of this effect of RMA on their adversaries' motivations, might feel even more compelled to seek security in nuclear weapons deployed in an unstable, high-alert mode.

Of course, the fusing of RMA and nuclear warfare in the form of very small nuclear warheads meant to counter hostile WMD assets would neutralize the healthiest effect of RMA—a de-emphasis on nuclear weapons. In addition, this development would further devalue the negative assurances given to non-nuclear-weapon states—in general and in connection to nuclear-weapon-free zones³¹—and would prevent any move in the direction of a no-first-use policy,³² as these weapons would be deployed explicitly to counter non-nuclear weapons, and at least with the option to use them pre-emptively. If small nuclear weapons become more prominent in American counter-proliferation strategy, the pressure to resume testing of new designs would grow stronger.³³ To put it modestly, the nuclear non-proliferation regime would not be strengthened by this development.

On balance then, the effects of RMA on nuclear disarmament might not be entirely negative. De-emphasis, de-alerting, deep reductions or even complete elimination is not beyond possibility for those countries capable of integrating RMA into their armed forces, as long as the concept of very small nuclear weapons is not adopted. For others who feel threatened by exactly that development, the opposite options offer themselves: acquiring nuclear weapons and/or putting them on high alert.

States not capable of developing those conventional solutions are likely to aim at the weak points of the conventionally superior opponent and conduct asymmetric warfare.

In other words, in terms of both proliferation and posture, the negative effects of RMA may well undo, and probably overtake, its positive impact on nuclear arms control and disarmament.

Given the distribution of world wealth, RMA is only an option for highly developed countries—especially Western democracies. States not capable of developing those conventional solutions are likely to aim at the weak points of the conventionally superior opponent and conduct asymmetric warfare. In effect, this could mean weakening or abandoning already implemented treaties and

building up cheap and reliable nuclear, biological or chemical capabilities to keep up with the conventional development, e.g. a state might counter a conventional EMP attack with a nuclear EMP shock, which would be a breach of the OST. Additionally, cyber attacks against the economic structures of the Internet are a highly likely counter-strategy against conventional aggressions, with the potential disastrous effects already described. Compared to other conventional weaponry, cyber weapons are relatively cheap to develop, not hard to conceal and can easily be used from the territory of a third state—thereby obscuring the ‘tracks’ of the attacker and giving the attacked no target to strike with his superior conventional arsenal.

All in all, asymmetric warfare is the likely answer to the conventional superiority of some states. As described in *Joint Vision 2020*: ‘The potential of such asymmetric approaches is perhaps the most serious danger the United States faces in the immediate future’.³⁴

But another negative effect has to be considered as well. Some states might try to ‘catch up’ with the conventional potential of the ‘innovator’ states that already have implemented RMA systems. States in transition might be in danger of spending resources on RMA development that would be better allocated to civilian use and to stabilize democracy. One striking example here is the Russian Federation. Its current plans are to intensify exports of fairly modern weapons and introduce a special tax on them to gain the necessary funds to upgrade its conventional forces—as it still compares its capabilities with those of NATO.³⁵ As China is an important customer for Russian arms, Western progress in RMA is directly and indirectly leading to a re-armament of states that are considered potential opponents.

Possibilities for arms control

Discussing the possibilities of arms control in the context of RMA seems rather difficult, as states advocating RMA, the United States in particular, have several stern arguments against any form of control over conventional arms.

Up to now, there is hardly any international regime or agreement which addresses the development of conventional weaponry and military R&D; the Ottawa Convention and the ABM Treaty are notable exceptions. This is because RMA is basically about improvement and co-ordination of already existing and not banned technology: the ‘system of systems’. In this field, Western democracies have got a technological edge against their potential adversaries, and the military and conservative forces are unwilling to give it up.³⁶

But this reluctance must not stop innovative thinking about possible arms control concepts. On the contrary, with the described dangers lurking, arms control seems more necessary than it has been for years, even decades.

So, taking into consideration RMA, what should a working arms control regime look like?

- Due to rapid technological change and innovation, a regime should deal with the harm caused by new conventional weapons rather than the kind of technology used or developed. This is to prevent any regime or treaty becoming obsolete in the short-term or getting stuck in endless follow-on negotiations. This reasoning applies to all conventional weapons with the effect of mass destruction—for example, the use of anti-personnel cluster bombs, FAE or offensive cyberwar³⁷ could be effectively banned by focusing on the *effect* of the weapon. The key is not to resign before the fact that RMA is largely about intangible technology. In the long run this means banning all weapons which can be turned into WMD, whatever efficiency multiplier might be behind them.

- Such an international regime has no realistic chance to be implemented without pressure and advocacy from non-governmental organizations, inter-governmental organizations and the scientific community. Therefore, public awareness has to be focused on the topic of current conventional military R&D. To achieve this, more transparency in the field is needed. The establishment of a United Nations register for military R&D analogous to the United Nations Register for Conventional Arms would be a helpful step.³⁸ In addition, measures at the national level can be implemented. Most European governments already publish arms sales reports, which are discussed in parliament and therefore bring the topic into the national news. In a similar fashion, national military R&D reports could be published, explaining the desired effect of newly developed weaponry and thereby inserting transparency into the closed nexus between WMD and new conventional weapon designs.
- One well-known counter-argument prominent in arms control discussions since the Cold War is the aspect of verification. Due to the dual-use character of military technology (or at least important components), the argument goes, verification of compliance with a future RMA regime is even more difficult to achieve than in 'classical' regimes concerning WMD—especially in the field of cyberwar, where, given the required knowledge, an average personal computer could be turned into a war machine. Consequently, 'self-help' (as described by K. Waltz) is believed to be a better strategy than dealing with 'rogue' states without verification—as the United States recently reasoned in its position on the Biological and Toxin Weapons Convention. This argument should be considered and addressed, but not overvalued. Verification regimes in arms control are never perfect, and they always have to rely on forensic procedure based on available evidence in order to identify and isolate defectors.

Starting negotiations on a RMA regime—with the aim of setting clear boundaries to current military R&D and a ban on those weapons whose effect is enhanced by RMA into WMD equivalence or close to it—might be the right signal at a time when arms control has dropped from the international agenda.

Conclusion

Given the tremendous effects already inherent in conventional weapons, the international community has not given enough attention to this type of new threat. As these highly sophisticated weapons can be understood as workable substitutes for classic WMD, arms control agreements

Arms control agreements concerning nuclear, chemical and biological weapons are in danger of having their cores whittled away as states which possess these capabilities are no longer bound to these international regimes, while states which lack the resources to keep up with conventional progress virtually have to breach these agreements in order to have counter-capabilities.

concerning nuclear, chemical and biological weapons are in danger of having their cores whittled away as states which possess these capabilities are no longer bound to these international regimes, while states which lack the resources to keep up with conventional progress virtually have to breach these agreements in order to have counter-capabilities.

Given the technological 'head start' of the United States in combination with its current uncooperative attitude, it is merely a matter of time until other states start to question the value of existing arms control regimes concerning WMD.

To counter this development, new norms and regimes have to be established as soon as possible, banning a weapon's effect rather than the technology by which the effect—mass destruction—

is achieved. Certainly this will be a very bumpy road but it remains a way that the international community could avoid a renaissance of unregulated Cold War-like conditions.

Notes

- 1 Thomas E. Halverson, 1995, *The Last Great Nuclear Debate*, London, Houndsmills, p. 14.
- 2 Gen. John R. Galvin, 1989, *Statement in 101/1 U.S. Congress, Senate, Subcommittee of the Committee on Appropriations, Hearing: Part 3, Commanders in Chief*, Washington, DC, 21 February, p. 9.
- 3 Michael O'Hanlon, 2000, *Technological Change and the Future of Warfare*, Washington, DC, Brookings.
- 4 http://news6.thdo.bbc.co.uk/hi/english/uk/newsid_1100000/1100069.stm
- 5 <http://www.fas.org/man/dod-101/sys/dumb/cbu-75.htm>
- 6 Paul F. Walker with Eric Stambler, 1991, '... and the dirty little weapons', *Bulletin of the Atomic Scientists*, May vol. 47, no. 4, pp. 20–24.
- 7 Gail Kaufman, 2001, 'Smaller Bombs Could Quadruple Strike Capability', *DefenseNews*, 2–8 July, p. 5.
- 8 Robert M. Shea, *C4 Campaign Plan*, Headquarters U.S. Marines Corps, p. i. <http://www.cio.usmc.mil/c4>
- 9 Chris Gaudet, 2001, 'Upgraded Cruise Missile Shows Greater Accuracy in Flight Test', *DefenseNews*, 28 May–3 June, p. 24.
- 10 Rupert Pengeley, 2001, 'Fuzes seeking more power', *Jane's International Defense Review*, May, pp. 39–45.
- 11 United States, Director for Strategic Plans and Policy, *Joint Vision 2020*, p. 7. <http://www.dtic.mil/jv2020/jvpub2.htm>
- 12 Carlo Kopp, 1996, *The E-Bomb—a Weapon of Electrical Mass Destruction*, http://www.infowar.com/mil_c4i/mil_c4i8.html-ssi
- 13 Dr George W. Ullrich, 1997, *Statement in 105/1 U.S. Congress, House of Representatives, Committee on National Security, Military Research and Development Subcommittee, Hearing: Threat Posed by Electromagnetic Pulse (EMP) to U.S. Military Systems and Civil Infrastructure*, Washington, DC, 16 July, pp. 7–11.
- 14 Scott W. Merkle, *Non-Nuclear EMP: Automating the Military May Prove a Real Threat*, <http://www.fas.org/irp/agency/army/tradoc/usaic/mipb/1997-1/merkle.htm>; C.N. Ghosh, *EMP Weapons*, <http://www.idsa-india.org/an-oct-00-8.html>
- 15 George W. Bush, 2001, Excerpted remarks to the North Atlantic Council, Brussels, 13 June, <http://www.nato.int/docu/speech/2001/s010613g.htm>
- 16 BBC News, 2000, *When states go to cyber-war*, 16 February, <http://news6.thdo.bbc.co.uk/hi/english/sci/tech/newsid%5F642000/642867.stm>
- 17 For a detailed overview containing major units of the United States military dealing with offensive cyber attacks see Ralf Bendrath, 2001, *Informationskriegsabteilungen der US Streitkräfte: Eine Zusammenstellung der mit offensiven Cyberattacken befassten Einheiten der US-Streitkräfte*, FoG:IS Arbeitspaier Nr. 3, Berlin, June. <http://www.fogis.de/fogis-ap3.pdf>
- 18 *PPNN Newsbrief*, no. 52, 4th Quarter 2000, p. 11; for a broader discussion see Greg Mello, 1997, 'New Bomb, No Mission', *The Bulletin of the Atomic Scientists*, vol. 53, no. 3, May/June, pp. 28–32; Stephen I. Schwartz, 2001, 'The New-Nuke Chorus Tunes Up', *Bulletin of the Atomic Scientists*, vol. 57, no. 4, July/August, pp. 30–35.
- 19 Paul C. Robinson, 2001, 'Pursuing a New Nuclear Weapons Policy for the 21st Century: A White Paper', *Disarmament Diplomacy*, April, pp. 43–48.
- 20 On the deterrence issue Peter R. Lavoy, ed., 2000, *Planning the unthinkable: how new powers will use nuclear, biological, and chemical weapons*, Ithaca (NY), Cornell University Press; Michael Moodie, 1998, *Chemical and biological weapons: will deterrence work?*, Alexandria (VA), Chemical and Biological Arms Control Institute.
- 21 John D. Steinbruner, 1981/82, 'Nuclear Decapitation', *Foreign Policy*, vol. 45, Winter, pp. 18–28.
- 22 Kathleen Bailey, 1995, 'Responding to the Threat of Biological Weapons', *Security Dialogue*, vol. 26, no. 4, pp. 383–397; Kathleen Bailey and Paul C. Robinson, 1997, 'To Zero or Not to Zero: A US Perspective on Nuclear Disarmament', *Security Dialogue*, vol. 28, no. 2, pp. 149–58.
- 23 William M. Arkin, 2000, 'No nukes, or new nukes?', *Bulletin of the Atomic Scientists*, vol. 56, no. 6, Nov/Dec, p. 84.
- 24 Richard Fieldhouse, 1992, 'Nuclear Weapons Developments and Unilateral Reduction Initiatives', *SIPRI Yearbook 1992*, Oxford, Oxford University Press, pp. 65–92.
- 25 Paul H. Nitze, 1994, 'A Conventional Approach', *Proceedings*, vol. 120, no. 1, May, pp. 46–51.
- 26 William C. Potter et al., 2000, *Tactical Nuclear Weapons, Options for Control*, Geneva, UNIDIR.
- 27 Lawrence Freedman, 1998, 'The Revolution in Strategic Affairs', *Adelphi Paper no. 318*, London, IISS.
- 28 Mike Moore, 2000, 'Unintended Consequences', *Bulletin of the Atomic Scientists*, vol. 56, no. 1, Jan/Feb, pp. 58–64.

- 29 Scott D. Sagan, 1993, *The Limits of Safety: Organizations, Accidents and Nuclear Weapons*, Princeton, Princeton University Press; Bruce C. Blair, 1993, *The Logic of Accidental Nuclear War*, Washington, DC, Brookings.
- 30 Niklas Schörnig, 2001, *Demokratischer Friede durch überlegene Feuerkraft*, Frankfurt, HSFK-Report 3/2001.
- 31 Thomas Graham and Leonor Tomero, 2000, 'Obligations For Us All, NATO and Negative Security Assurances', *Disarmament Diplomacy*, no. 49, August, pp. 3–8; Jozef Goldblat, 1995, 'How Secure Are States Without Nuclear Weapons?', *Security Dialogue*, vol. 26, no. 3, September, pp. 247–56.
- 32 Jozef Goldblat, 1997, 'No-First-Use. A Prerequisite for Nuclear Disarmament', *Security Dialogue*, vol. 28, no. 3, pp. 265–70.
- 33 Chuck Hansen, 2001, 'Beware the Old Story', *Bulletin of the Nuclear Scientists*, vol. 57, no. 2, March/April, pp. 52–54.
- 34 United States, *Joint Vision 2020*, op. cit., p. 5.
- 35 Simon Saradzhyan, 2000, 'Russia Delays New Buys To Focus On Upgrades', *DefenseNews*, 8 May, p. 12.
- 36 David A. Fulghum and Robert Wall, 2001, 'Information Warfare Isn't What You Think', *Aviation Week & Space Technology*, 26 February, p. 52.
- 37 Concerning a treaty on cyber-terrorism see Richard W. Aldrich, 2000, *Cyberterrorism and Computer Crimes: Issues Surrounding The Establishment of an International Regime*, INSS Occasional Paper 32, April, p. 61.
- 38 Harald Müller, 2000, *Früherkennung von Rüstungsrisiken in der Ära der „militärisch-technischen Revolution“*. Ein Register für militärische Forschung und Entwicklung, Frankfurt, HSFK-Standpunkt 7/2000.

The revolution in military affairs and the ‘capabilities race’

Saïda BÉDAR

The American concept of revolution in military affairs (RMA) arose in a strategic setting characterized by a dual revolution, of information and of globalization. The United States needs to adjust its strategy to a new environment in which the American-system/world-system duality is growing more complex, implying a closer relationship between the maintenance of hegemony and the preservation of internal balances. RMA is not, therefore, just an item for discussion in strictly technical and military terms; it is viewed in the light of the great social upheavals caused by the dual revolution. More and more strategic players are emerging, as relays of hegemony (American and world-system) or as systemic threats or risks. Transnational corporations, NGOs and the media can be used to project power, for example, while ‘rogue’ players (mafias, terrorists, weapons proliferators, ethnic cleansers and so forth) represent ‘asymmetric’ threats.

RMA as the integration of war capabilities through information technology (IT)

The information revolution and globalization challenge two basic paradigms that used to lie at the heart of modern state security and strategic thought and practice: national sanctuarization and global ‘pan-optic’ surveillance, through the use of spatially organized power for social control. Transnationalization and interconnection (of players, vulnerabilities, risks and conflicts) are making the idea of a national sanctuary pointless, while global surveillance can do little to counter the virtuality and ubiquity of cyberspace, the invisibility allowed by new means of camouflage and deception, or the difficulty of identifying adversaries in ‘grey areas’ (Civil or military? Warrior or criminal? Combatant or non-combatant? Political group or mafia?).

Hence the strategic approach of monitoring violence from fixed points in space and time is giving way to one based on fluidity and spatio-temporal ubiquity or virtuality. Total unilateral informational domination (‘info dominance’) is becoming a central stake in the maintenance of hegemony. It is becoming a strategic metaparadigm, using ‘real time’ to neutralize the adversary’s spatial strategic depth (‘asynchrony’) making for superiority in decision-making. At a global strategic level—military, geopolitical and geo-economic—info dominance permits systemic control—‘shaping the world’.¹ In military terms, it is info dominance that makes RMA possible—the integration of battlefield operatives and the rapidity in decision-taking and the conduct of operations, but also full-spectrum integration of weapon systems, agencies and allies, civilianization² and industrial-military synergies: in short, the construction of a ‘system of systems’.³ RMA encompasses three levels:

Saïda Bédar is a researcher at CIRPES, Ecole des Hautes Etudes en Sciences Sociales, Paris.

- Technology: the integration of new IT into existing weapons systems and integrated C⁴ISR (command, control, communications, computers, intelligence, surveillance, reconnaissance);
- Doctrine and operations: experimenting with technology to create new types of warfare; and
- Organization: there can be no RMA without far-reaching institutional change ('jointness', the business-style revolution in Pentagon management, civilian-military integration).

It is the synergy between these three levels that will, according to Pentagon forecasts, bring about RMA by 2025. The military revolution consists in the fact that information technologies allow all systems (weapons, sensors, command-and-control, and eventually the 'system of systems') to be networked and integrated. There is also talk of a revolution in warfare, inasmuch as IT-based integration implies a shift in the balance between attack and defence, firing and manoeuvring, space and time. From the RMA viewpoint, the side with superiority in IT has the advantage in attack: it can disperse its lightly armoured, highly manoeuvrable forces, integrated into sensor-to-shooter networks, while concentrating their fire on sensitive enemy targets (centres of gravity); it can also act more swiftly than the adversary, thus denying it the initiative on the battlefield. RMA-style IT-based integration should make it possible to maintain ubiquity, offering situational awareness on the battlefield and the necessary speed and synchronization to 'preclude' (i.e. rapidly neutralize) crises and conflicts. Preclusion, which depends on digitized armed forces and the organization of combat around synergetic, integrated information networks ('network-centric warfare'), hinges on the parameter of time compression.

Transformation according to the RMA model will need to overcome a number of obstacles: organizational (reluctance among services to embark on radical reform, poor jointness), political (local economic and electoral stakes) and industrial (vested interests in the continued mass production of traditional systems).⁴ Above all, it will need to be redesigned in the globalization context to dispense with the Cold War-era pattern of conflict between states.⁵

Globalization, asymmetry and the proliferation of security capabilities

RMA AND THE 'GRAY AREAS' OF GLOBALIZATION

Globalization is shattering the strategic field beyond the framework of inter-state relations. Not just a geo-economic fact—the globalization of the world economy—it is a social upheaval brought about by the spread of the capitalist system into more and more areas of social life by the growing commoditization of services, science and culture and by the development of non-state, non-territorial socio-spatial centres of power unburdened by differing political jurisdictions.

By creating or aggravating 'grey areas' (erasing the systemic boundaries between public and private, domestic and foreign, civilian and military, war and crime, etc.), globalization has weakened the poorest countries and collective security systems. Mafia predation, large-scale corruption, social disintegration in certain states and spreading insecurity and poverty today feed conflicts that are no longer just contained at the periphery but transnationalized and globalized. Combined with the spread of IT, globalization gives systemic adversaries (of American interests and/or the world system) asymmetric capabilities to counteract RMA-style technological superiority.

Combined with the spread of IT, globalization gives systemic adversaries (of American interests and/or the world system) asymmetric capabilities to counteract RMA-style technological superiority.

RMA-style technological superiority. As Steven Metz, one of the founders of the American concept of RMA, puts it, Pentagon strategists have realized that 'since the global distribution of power was asymmetric, it followed that asymmetric strategies would be a natural evolution.'⁶

RMA RESTRUCTURED BY THE ASYMMETRY PARADIGM

The emergence of the asymmetry paradigm in the American strategic debate is due to the realization that there are doctrinal and ethical or political possibilities and techniques to side-step or annul the power effects of RMA. The dissemination of technologies, including C³D² (Cover, Concealment, Camouflage, Denial and Deception),⁷ NBC (Nuclear, Biological and Chemical) and information, makes possible the asymmetrical strategies of access denial and avoidance.

Asymmetry is not a specifically American concept but a social criterion for evaluating balances of social, including military, forces. In terms of social struggle, dissymmetry and asymmetry can be said to be two moments in balances of forces. Dissymmetry is the moment of domination, the maintenance of the unequal dominee/dominator relationship by coercion. Asymmetry is the moment of hegemony, the maintenance of the unequal dominee/dominator relationship by social consensus in which the dominee is induced to limit his struggle to survive, reproduce or improve his standing (trade union activity, political and civil participation, etc.). If the dominee starts to fight for power, not just for survival or betterment, the result is revolution. The dominee breaks the consensus and exploits his comparative advantages vis-à-vis the ruling elites and the state apparatus they control: numbers, socio-spatial reach (rural and urban guerrillas, etc.) and ideological, ethnic/cultural or religion-based global transnational reach. Social control of asymmetry, preventing it from turning into insurrection, is thus vital to the maintenance of hegemony.

In the military strategy domain, dissymmetry and asymmetry refer to two of the three levels of balance of military forces: symmetry is equally-armed warfare, dissymmetry is the use of quantitative and/or qualitative superiority, and asymmetry involves seeking the advantage by exploiting the adversary's weaknesses and vulnerabilities and avoiding the strong points. Asymmetry may consist of innovative tactics with decisive strategic effects (e.g. *Blitzkrieg*), turning the geophysical and social environment to one's advantage (e.g. General Kutuzov's strategy of dispersal, withdrawal and scorched earth in response to Napoleon's strategy of massification) or avoidance of combat by, for example, threatening to resort to weapons of mass destruction (e.g. nuclear deterrence). At the military-political level, it extends beyond the military domain to encompass ideology, politics, ethics and culture, as in the case of wars of national liberation, guerrillas, and all conflicts that are notably protracted or involve a large proportion of the population. This is the unwinnable war syndrome (an army pitted against the mobilized human resources of an entire society, with every social segment planning its actions as part of the common effort). The United States has some military-political experience of insurrectionist asymmetry, from proto-colonial 'small wars', to Viet Nam, to current peace-keeping operations. This experience has enabled it to codify the doctrine of *low intensity conflict* or *operations other than war* which is itself becoming a central paradigm of the anti-asymmetry strategy of global social control, both at the periphery and at the centre.

The asymmetrical threats to the United States most commonly cited in official speeches are terrorism, cyberwars, transnational organized crime, the proliferation of nuclear, chemical and biological weapons and ballistic missiles, C³D² and the spread of technology. The emergence of asymmetry in the American strategic field has given rise to full-spectrum capability and a multiplication of scenarios to take in all possible eventualities, from a nuclear Armageddon to criminal or terrorist subversion to a space and cyberspace 'Pearl Harbor'. This multiplication of virtual threats and the risk

of 'strategic surprise' apparently constrain the United States to adopt the strategic posture of a vulnerable state. Power is now as much a matter of rapid projection and coercive capacities as of intelligence and protection capabilities. Deterrence by threat of nuclear annihilation has been replaced by a multidimensional deterrent capacity—nuclear/conventional, offensive/defensive and IT-based—that can only lead to an inflation of capabilities and provide further arguments for an arms race.

The anti-asymmetry RMA option and the resulting 'capabilities race'

NEW NUCLEAR, ANTI-MISSILE AND SPACE CAPABILITIES ALLOW STRATEGIC DOMINANCE

The review of the strategic doctrine of nuclear deterrence initially led, in 1993–1994, to a Nuclear Posture Review (NPR) that advocated the abandonment of Mutual Assured Destruction in favour of Mutual Assured Safety with Russia. This would entail arms reductions, preservation of the security of Russian infrastructure and systems, and assistance to 'hedge against the reversal of reform'.⁸ Force reductions under START II would lead to cuts of Trident submarines from 18 to 14 and the retention of 500 Minuteman ICBMs. By 2003 only 3,500 strategic nuclear warheads should remain.

This nuclear posture review led to the announcement of a strategic doctrine retaining the principle of using nuclear force as a deterrent against a nuclear or major conventional attack by a nuclear state: 'We will retain strategic nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests and to convince it that seeking a nuclear advantage would be futile.'⁹

The doctrine included reductions in nuclear weapons (strategic weapon systems cut by 59% between 1988 and 1995, and by 79% by 2003, tactical weapons cut by 90% between 1988 and 1995, bombers taken 'off alert', ICBMs and SLBMs 'de-targeted')¹⁰ and a weapons of mass destruction (WMD) Counter-proliferation Initiative based on conventional responses to the threat or use of WMD. The Presidential Directive PDD/NSC 60 of November 1997, *Nuclear Weapons Employment Policy Guidance*, echoes the NPR and endorses the force level of 2,000–2,500 strategic warheads called for in the START III accords.¹¹

Since 2000, however, the traditional stance of using nuclear weapons against nuclear states but opting for conventional weapons in response to the threat or use of WMD has changed.¹² Strategically,

The emergence of asymmetry, limiting the opportunities for a decisive strategic attack, is leading the Americans to the full-spectrum capabilities option, drawing on all means at the disposal of the state (bureaucracy, agency, civil, military, public and private integration) and nation (enhanced role for civil society in conflict prevention and resolution).

nuclear weapons are becoming a means of combating asymmetric access-denial tools such as WMD that might hamper force projection. The emergence of asymmetry, limiting the opportunities for a decisive strategic attack, is leading the Americans to the full-spectrum capabilities option, drawing on all means at the disposal of the state (bureaucracy, agency, civil, military, public and private integration) and nation (enhanced role for civil society in conflict prevention and resolution). Official doctrine now states that deterrent options available to the United States include 'diplomatic, economic, informational, and military actions'.¹³ Military deterrent options are the capacity for rapid deployment and use of forces, crisis deployment, and limited, demonstrative uses of force to 'deter ... adventurism'.¹⁴ Nuclear weapons serve to deter nuclear, chemical or biological attacks but also to 'hedge against defeat of American conventional forces in defense of vital interests'.¹⁵ Deterrence is extending across the spectrum of conflict and into the social realm. It is turning 'grey'.

Because of asymmetry the United States wishes to maintain a quantitative and qualitative nuclear threshold. Quantitatively, 2,000 warheads seems to be the 'magic' number: 1,000 might prompt France, China and, eventually, the states at or below the threshold of nuclear capability ('rogues') to try to match the 'big boys'. Besides, there must be enough warheads for targeting, which is no longer 'Russia-centred'. Qualitatively, non-ratification of the CTBT is justified by the need to combat C³D² capabilities with precision, penetration and miniaturization. In a speech on anti-missile defence to the National Defense University last May, President Bush announced:

'We can, and will, change the size, the composition, the character of our nuclear forces in a way that reflects the reality that the Cold War is over. I am committed to achieving a credible deterrent with the lowest possible number of nuclear weapons consistent with our national security needs, including our obligations to our allies.'¹⁶

Anti-missile defences, too, are regarded as a means of countering proliferation and of protection, but also as a means of resisting access denial on land, at sea (and on the littoral), and potentially in space: national missile defence (NMD) is also a space programme. The ambiguities and deliberate silences surrounding it leave scope for it to be expanded into a 'Star Wars' scheme. Research and development on orbital vehicle and space-based anti-missile and anti-satellite weapons programmes is already taking place. The United States Air Force is planning the first tests of a space-based laser system between 2006 and 2012 (first on the ground, then in space).¹⁷ The anti-satellite capabilities of anti-missile systems make NMD a space power and information dominance programme.

EXPANSION OF CONVENTIONAL CAPABILITIES TO SAFEGUARD 'FREE ACCESS' FOR EXPEDITIONARY FORCES

In the domain of conventional weapons, RMA means experiments with, the development of and, ultimately, the production of new generations of weapons systems based on IT, nanotechnology and biotechnology. During the transitional period it will be necessary to maintain traditional platforms (aircraft carriers, manned warplanes, tanks) and the associated levels of forces (twelve aircraft carriers, twenty airborne squadrons, ten divisions) while testing and developing future systems. But for budgetary and organizational reasons keeping both options (RMA and legacy forces) open is a gamble for the Bush Administration. The debate on how to proceed appears so heated¹⁸ that the eventual outcome is likely to be a considerable increase in the defence budget.

The Bush Administration has already embarked on a fairly ambitious programme to expand capabilities. The next Quadrennial Defense Review, as outlined by Defense Secretary Donald Rumsfeld, will endorse the principle of ramping up capabilities as a means of deterring any potential adversary from developing sophisticated or access-denial capabilities. What Rumsfeld calls 'portfolios of capabilities' for development comprises a long list:

- People—smart weapons require smart soldiers;
- Experimentation, including the creation of innovative military units;
- Intelligence, to provide insight about the intentions of potential adversaries and warning of impending attacks and emerging capabilities;
- Space intelligence, observation and monitoring capabilities to protect American space systems;
- Anti-missile defences;
- Information operations;
- Pre-conflict management to deter conflict and influence the choices of decision-makers;

- Precision strike capability;
- Rapidly Deployable Standing Joint Forces to forestall attempts to deny access;
- Unmanned systems, including robotic ground, air, sea and space sensors and vehicles;
- Command, Control, Communications and Information Management;
- Strategic mobility to project American power rapidly;
- A research and development base, to ensure an asymmetric advantage and hedge against the potential for surprise ('Pearl Harbor effects'); and
- Modernized infrastructure and logistics.

Dissuading aggression by demonstrating full-spectrum capabilities without a political scale for manipulating the risks of war (dissuasion versus deterrence) is a product of changes in American strategic thinking from that of a bipolar world (the strategic otherness of 'peer competition', the collective security framework and the system of alliances) to one of unilateral dominance. Globalization and the end of the Cold War are making possible a strategic adjustment in the American-system/world-system duality allowing hegemony to be maintained by developing superior technical, military and economic capabilities and by spreading American standards ('shaping the world').

CONVENTIONAL ARMS CONTROL AND EXPEDITIONARY REQUIREMENTS

The adaptation of the Treaty on Conventional Armed Forces in Europe in November 1999 was symptomatic of the American tendency to prefer the retention of a rapid force-projection capability over confidence-building. Against the setting of the recent war in Kosovo (and the continuing one in Chechnya) the final negotiations resulted in cuts in conventional weapons systems (11,000 tanks, artillery pieces and combat aircraft to be dismantled) but also the maintenance of NATO's right to deploy unlimited numbers of attack helicopters and combat aircraft in the territory of the new NATO members for the sake of 'operational flexibility in temporary deployments'.

The reduction in conventional weapons in Europe is the outcome of a strategic and geopolitical wrangle just as important as during the era of bipolar confrontation: the negotiations revealed a divide between the United States and its European allies. The United States favoured a temporary deployment level of two divisions, which it insisted would require no United Nations or OSCE mandate in order to ensure the rapidity of response required for conflict prevention and deterrence. The Europeans argued that two divisions was too high a level and potentially destabilizing, and that any collective-security or peace-keeping operation by NATO would require a mandate from the United Nations or OSCE. The Europeans were worried not only about American unilateralism but also that the notion of operational flexibility might encourage the Russians to intervene freely and violently in their own peripheral zone, notably in the Northern Caucasus. They eventually accepted the American position, partly because the Americans had already held bilateral negotiations with Russia and were able to impose a *fait accompli*, and partly because the agreements tended to enfold the new members more comfortably within the transatlantic collective-security structure.

It is easy to see that the new arms control process is, for the United States, becoming a means of spreading its standards and entrenching its military and geopolitical power. Combined with the criterion of interoperability (the Defense Capabilities Initiative,¹⁹ for example), arms control is serving to codify adequate levels and types of forces for American/NATO expeditionary practice and the

political framework within which that practice may take place. Operational flexibility, indeed, is becoming the justification for not seeking a United Nations or OSCE mandate, since the short duration of a RMA warfare-type intervention is inevitably at odds with the long time-frame of political negotiations.

Conclusion

As a model for modern warfare and a reflection of unilateral American power—dominance—RMA rests on a capabilities-based strategic framework that leads to overarmament. The arms race is no longer being run against that backdrop of a bipolar balance of forces that implied the 'moderating' influence of possible countermeasures by the peer competitor. The new 'capabilities race' allows for all possible scenarios and outcomes and abandons the classic options of arms control and confidence-building in view of the irrationality and/or asymmetry of potential adversaries. Nuclear force is no longer held in check by the political and military assumptions of deterrence but included within a doctrine of use of force (to combat access denial). Conventional (non-nuclear) power is growing quantitatively thanks to the incorporation of information, precision and discrimination; but so is the nature and quantity of that power, extending into new areas—orbital space and cyberspace.

The new 'capabilities race' allows for all possible scenarios and outcomes and abandons the classic options of arms control and confidence-building in view of the irrationality and/or asymmetry of potential adversaries.

Will the lonely race of the United States to capabilities-based 'ultra power' have a deterrent effect, or will it give rise to localized regional races or races within technological niches? The latter seems the more likely upshot, propelled by systemic industrial (new missile-defence, space-weaponization and information-security markets) and geopolitical (confrontations between Asian and Middle Eastern states) effects.

Notes

- 1 Since 1997 'shaping the world' has been the official term for post-Cold War American strategy. The idea is to shape the world by aligning international practice and regulations on the American model—economic and information technology standards and networks, military systems—and thus to spread the vulnerabilities of the American system to the entire world system.
- 2 Broadly speaking, civilianization refers to the Revolution in Business Affairs—the business-style *reform of management* at the Pentagon drawing on private entities and models, and *civilian-military integration* to avoid duplicating infrastructure systems and networks.
- 3 The 'system of systems' refers to the integration of C⁴ISR (command, control, communications, computer and intelligence, surveillance and reconnaissance) systems and subsystems affecting their operation (R&D, production and procurement of weapons) but also force structures, logistics, infrastructure and human factors, i.e. doctrine, strategic culture and political and legal systems.
- 4 For a more detailed discussion of the institutional and industrial obstacles to RMA see Saïda Bédar, 'La réforme stratégique américaine : vers une Révolution militaire ?' in Saïda Bédar and Maurice Ronai, 1999, *Défis asymétriques et projection de puissance*, Cahier d'études stratégiques 25, CIRPES.
- 5 For a detailed discussion of the RMA/globalization debate, see Saïda Bédar, 'La globalisation comme paradigme de la stratégie américaine', in Saïda Bédar (ed.), 2000, *La globalisation : « nouvelle frontière » du leadership américain ?*, Cahier d'études stratégiques 28, CIRPES, octobre.
- 6 Steven Metz and Douglas V. Johnson II, 2001, *Asymmetry and US Military Strategy: Definition, Background, and Strategic Concepts*, US Army War College, Strategic Studies Institute, January, p. 2.
- 7 C³D² refers to means of concealing activities, facilities and capabilities: decoys and underground construction, for example, but also early-warning satellites, fibre optics and encryption.

- 8 Bruce Carey, 1994, *US Adopting New Nuclear Weapons Policy*, USIA, 23 September, www.fas.org/news/usa/1994/77054321-77059383.htm
- 9 United States, *1995 Annual Defense Report to the President and Congress*, 31 January 1995.
- 10 *Ibid.*
- 11 See the summary of PDD/NSC 60 (classified) at www.fas.org.ird.offdocs.pdd60.htm
- 12 The Pentagon's January 2000 report to the President and Congress states: 'Accordingly, the United States must maintain survivable strategic nuclear forces of sufficient size and diversity—as well as the deployment of theater nuclear weapons to NATO and the ability to deploy cruise missiles on submarines—to deter or dissuade potentially hostile foreign leaders with access to nuclear weapons.' The January 2001 report reproduces the paragraph with a different end: '... with access to weapons of mass destruction.' William S. Cohen, Secretary of Defense, 2000, *Annual Report to the President and Congress*, January, p. 69; William S. Cohen, Secretary of Defense, 2001, *Annual Report to the President and Congress*, January, p. 89.
- 13 William S. Cohen, Secretary of Defense, 2001, *Annual Report to the President and Congress*, January, p. 8.
- 14 *Ibid.*
- 15 *Ibid.*, p. 21.
- 16 *Remarks by the President to the Students and Faculty at National Defense University*, Washington DC, 1 May 2001.
- 17 Christian Lardier, 2001, 'La guerre des étoiles est relancée', *Air et Cosmos*, no. 1795, 11 mai.
- 18 See Thomas E. Ricks, 2001, 'Review Fractures Pentagon', *Washington Post*, 13 July.
- 19 The Defense Capabilities Initiative is a transatlantic standardization and multinationalization scheme based on the RMA model, which entails a reshaping of European forces in terms of mobility, deployability, manoeuvrability and strike precision. It will eventually entail the integration of all transatlantic capabilities (system of systems): armaments (R&D, production, procurement), force structures, communications and information systems, logistics, infrastructure and human factors.

RMA resources

Compiled by Aidan HARRIS

Online resources

Federation of American Scientists <http://www.fas.org/index.html>
The FAS conducts analysis and advocacy on science, technology and public policy. Several aspects of their research programme touch RMA and related developments.

InforWar.com <http://www.infowar.com/>
A commercial site hosting a number of articles on information espionage, terrorism and C⁴I. Also includes an excellent resource and links page.

National Security Studies Quarterly <http://www.georgetown.edu/sfs/programs/nssp/nssq/back.html>
The NSSQ is a publication of the Center for Peace and Security Studies, Georgetown University, Washington, DC. Many issues of NSSQ include articles relating to RMA.

Preventive Defense Project Homepage <http://ksgnotes1.harvard.edu/BCSIA/PDP.nsf/www/Home>
The PDP is a research collaboration of Stanford University and Harvard University's Kennedy School of Government. The project focuses on forging productive security partnerships with Russia and its neighbours, engaging an emerging China, addressing the lethal legacy of Cold War WMD, and countering WMD proliferation and potential acts of catastrophic terrorism.

The RMA Debate <http://www.comw.org/rma/index.html>
Hosted by the Commonwealth Institute and sponsored by the Project on Defense Alternatives, this site has many full-text resources and online publications on different aspects of RMA.

Strategic Studies Institute <http://carlisle-www.army.mil/usassi/ssipubs/catalogs/rma.htm>
In-depth reports from the United States Army War College covering RMA, alternative futures and information warfare.

Aidan Harris is currently studying for a B.A. in International Relations and Strategic Studies at Lancaster University, United Kingdom. He is currently working on a collaborative research project on RMA as part of the UNIDIR internship programme.

Key texts on RMA

- Arquilla, John and David Ronfeldt. 1993. 'Cyberwar is Coming!' *Comparative Strategy: An International Journal*, vol. 12, no. 2, pp. 141–65. This text introduces the concepts of 'cyberwar' and 'netwar' as a product of the information revolution, in which neither mass nor mobility will decide the outcome. The paper suggests an emphasis on communications and intelligence in future wars, rather than large armed forces.
- Carter, Ashton B. and John P. White, eds. 2001. *Keeping the Edge: Managing Defense for the Future*. January. A collection of articles on information warfare, RMA and Joint Vision operations. A full-text online publication from the Preventive Defense Project. Also in hard copy from MIT Press, Boston. <http://ksgnotes1.harvard.edu/BCSIA/Library.nsf/pubs/KeepEdgeFront>
- Freedman, Lawrence. 1998. 'The Revolution in Strategic Affairs'. *Adelphi Paper no. 318*, London, International Institute for Strategic Studies. Freedman addresses many aspects of RMA including asymmetric strategies, information warfare, consequences for force structures and America's relations with its allies. The author offers many different definitions of RMA and presents critiques of each.
- Libicki, Martin C. 1998. 'Alternative Futures, Adapting Forces, Future Posture'. *1998 Strategic Assessment: Engaging Power For Peace*. Washington, DC, Institute for National Strategic Studies, National Defense University, ch. 14–16. Three chapters examining possible scenarios for future conflict, and organizational and doctrinal responses to them. Also available online at <http://www.ndu.edu/inss/sa98/sa98cont.html>
- O'Hanlon, Michael. 2000. *Technological Change and the Future of Warfare: Understanding the Revolution in Military Affairs*. Washington, DC, Brookings Institution Press. Examines the hypothesis of a coming RMA from an American military perspective. O'Hanlon provides a historical perspective of RMA, presenting the origins and various schools of thought in the contemporary debate. Ultimately he is sceptical of RMA and develops technical and strategic arguments against it.
- Rathmell, Andrew. 1997. *Cyber-terrorism: The Shape of Future Conflict?* London, International Centre for Security Analysis, Kings College London. Outlines the essence of information warfare, which groups are able and likely to use it, and assesses the response to information warfare. Also available in *Royal United Service Institute Journal*, October, pp. 40–46. <http://www.kcl.ac.uk/orgs/icsa/Old/rusi.htm>
- Toffler, Alvin and Heidi. 1993. *War and Anti-War*. Boston, Little, Brown and Company. A key futurology text on the background of RMA and modern thinking about tactics and war fighting.
- Van Riper, Lieutenant General Paul K. and Lieutenant Colonel F.G. Hoffman. 2000. *Pursuing the Revolution in Military Affairs: Exploiting Knowledge-Based Warfare*. Washington, DC, National Security Studies Program, Georgetown University. The authors argue that exploiting the real RMA will involve far more than buying information technology and precision munitions. Also available as *Strategy and Force Planning Faculty*, New Port (RI), Naval War College Press, 2000, ch. 43, pp. 638–53. Also online at <http://www.georgetown.edu/sfs/programs/nssp/nssq/Hoffman.pdf>

Information warfare

- Arquilla, John and David Ronfeldt. 1996. *The Advent of Netwar*. RAND Organization. This report provides an overview of the 'netwar' concept, and explains the consequences for strategy and doctrine in the information age. <http://www.rand.org/publications/MR/MR789/>

- Buchan, Glenn. 1996. *Information War and the Air Force: Wave of the Future? Current Fad?* RAND Organization, March. Opportunities and risks to the United States Air Force in information warfare. <http://www.rand.org/publications/IP/IP149/>
- Devost, Mathew G. 1995. *National Security and the Information Age*. Burlington (VT), University of Vermont, May. This thesis examines the impact that information technologies have had on the national security of the United States. <http://www.terrorism.com/documents/devostthesis.html>
- Hundley, Richard O. and Robert H. Anderson. 1995. *Emerging Challenge: Security and Safety in Cyberspace*. RAND Organization. An evaluation of the potential for electronic attacks and the potential damage that could be inflicted. Also in *IEEE Technology and Science Magazine*, Winter 1995, pp. 19–28. <http://www.rand.org/publications/MR/MR880/MR880.ch10.pdf>
- International Institute for Strategic Studies. 1999. 'Information Technology: Vulnerability and Threats'. *Strategic Survey 1998/1999*, London, IISS, pp. 51–61. This article assesses the importance of electronic information systems today, and examines their vulnerability and the impact of their failure.
- Jacobson, Mark R. 1998. 'War in the Information Age: International Law, Self Defense, and the Problem of "Non-Armed" Attacks'. *Journal of Strategic Studies*, vol. 21, no. 3, September. Discusses the debate on whether information attacks are an act of aggression and concludes that under current international law they can be viewed as such.
- Kipp, Jacob W. 1995. *The Revolution in Military Affairs and its Interpreters: Implications for National and International Security Policy*. Fort Leavenworth (KS), Foreign Military Studies Office, September. Explores historical origins and criticisms of RMA theory and in particular information warfare. <http://call.army.mil/fmso/fmsopubs/issues/rmapap.htm>
- Osborne, Lieutenant Colonel William B. et al. 1996. *Information Operations: A New War-Fighting Capability*. A research paper presented to Air Force 2025. <http://fas.org/spp/military/docops/usaf/2025/v3c2/v3c2-1.htm>
- Rathmell, Andrew. 1998. *Information Warfare: Implications for Arms Control*. International Centre for Security Analysis, Kings College London. Discusses the possible integration of information warfare with arms control measures. Also available in *Bulletin of Arms Control*, April, no. 29, pp. 8–14. <http://www.kcl.ac.uk/orgs/icsa/Old/cds.html>
- . 1998. 'Strategic Information Warfare: Responding to the Threat'. *Brassey's Defence Yearbook 1998*, Centre for Defence Studies, King's College London, pp. 310–25.
- Soo Hoo, Kevin, Seymour Goodman and Lawrence Greenberg. 1997. 'Information Technology and the Terrorist Threat'. *Survival: The IISS Quarterly*, London, Autumn, vol. 39, no. 3. The authors assess the potential to be gained by terrorist movements from advances in information technology.
- Ullrich, George W. 1998. *Statement in 105/1 United States Congress, House of Representatives, Committee on National Security, Military Research and Development Subcommittee, Hearing: Threat Posed by Electromagnetic Pulse (EMP) to United States Military Systems and Civil Infrastructure*. Washington, DC, 16 July. http://www.fas.org/spp/starwars/congress/1997_h/h970716u.htm

Overview

- Bédar, Saïda and Maurice Ronai (eds). 1999. *Le débat stratégique américain 1998–1999. Défis asymétriques et projection de puissance*. Centre interdisciplinaire de recherches sur la paix et

- d'études stratégiques, Cahier d'études stratégiques, no. 25. Analyses, at the operational and strategic levels, the American reform towards RMA, and highlights asymmetric challenges facing American strategy (including information warfare and proliferation of WMD).
- Blaker, James R. and Lieutenant Colonel F.G. Hoffman. 1999. 'Response and Rebuttal: Revolution(s) in Military Affairs: Why the Critique?' and 'An Author's Response'. *National Security Studies Quarterly*, Winter, Washington, DC, Georgetown University. An interesting debate from two different perspectives on RMA. Blaker defends his perception of the coming RMA, and Hoffman provides a critique. <http://www.georgetown.edu/sfs/programs/nssp/nssq/Rebuttal.pdf>
- Bronson, Rachael and Daniel Goure. 1998. *The Diplomatic Consequences of the Coming RMA*. Washington, DC, Center for Strategic and International Studies. The report examines the impact on American relations with its allies and enemies if the current RMA is realized. <http://www.csis.org/html/op980901.html>
- Canadian Navy. *Tendance à la modernisation de la technologie militaire*. Brief description of advances in communication technologies and of their consequences on military operations. <http://www.dnd.ca/navy/marcom/ccp1ten.html>
- Galdi, Theodore W. 1995. *Revolution in Military Affairs?* Federation of American Scientists, December. Competing concepts, organizational responses and outstanding issues of RMA. <http://www.fas.org/man/crs/95-1170.htm>
- Joint Forces Quarterly*. 1995/1996. Winter, no. 10. A collection of ten essays on RMA. http://www.dtic.mil/doctrine/jel/jfq_pubs/wint9596.htm#fa
- Malis, Christian. *La révolution dans les affaires militaires – Signification historique et portée d'un phénomène américain*. Institut de Stratégie Comparée. Analyses the evolution of American military doctrine and discusses the role of RMA in the military policy of the United States. http://www.stratisc.org/act/Malis_RMA.html
- Murawiec, Laurent. 2000. *La guerre au xx^e siècle*. Éditions Odile Jacob, Paris. Genesis of RMA and description of its possible consequences.
- O'Hanlon, Michael. 1998. *Beware the RMA'nia!* Paper presented at the National Defense University, Washington, DC, September. The author presents a sceptical view of RMA debate. <http://www.brook.edu/views/articles/ohanlon/1998NDU.htm>
- . 2000. Transcript of an online discussion forum in which issues arising in his book *Technological Change and the Future of Warfare* were discussed, hosted by the Brookings Institution, Washington, DC, 30 March. <http://www.brook.edu/comm/chat/ohanlon000330.htm>
- Oxburgh, E.R. 1993. 'Détente, Security and Technology'. *The World Today*, London, Royal Institute of International Affairs, 6 August. This paper presents the current technological abilities of the major powers and the implications for global security.
- Shukman, David. 1996. *Tomorrow's War: The Threat of High Technology Weapons*. Harcourt Brace & Company. An account of the role of high technology weapons in future American and British military operations.
- Shultz, Richard H., Roy Godson and George H. Quester, eds. 1997. *Security Studies for the 21st Century*. Brassey's Inc. A collection of articles assessing the perceived changes in approach to security in the twenty-first century.
- Tertrais, Bruno. 1998. *Faut-il croire à la « révolution dans les affaires militaires » ?* Politique étrangère, no. 3/98, p. 611 à 629. Questions the revolutionary aspect of RMA and analyses the influence of information technology on weapons systems and military strategy.

Regional analysis

NORTH AMERICA

- Copeland, Thomas E., ed. 2000. *Information Revolution and National Security*. Strategic Studies Institute, United States Army War College, August. A collection of essays concentrating on the exploitation of the information revolution by the United States Armed Forces and the potential vulnerabilities and threats involved. <http://carlisle-www.army.mil/usassi/ssipubs/pubs2000/inforev/inforev.htm>
- Defense Technical Information Center. 1998. *The Revolution in Military Affairs and Joint Vision 2010. Annual Report to the President and the Congress by Secretary of Defense William S. Cohen*, ch. 13. A projection of defence strategies and re-organization in the twenty-first century. <http://www.dtic.mil/execsec/adr98/chap13.html>
- Dewar, Captain J.S. 1998. *Revolution in Military Affairs: the Divergence Between the Most Dangerous and the Most Likely*. Toronto, Canadian Forces College. Introduces North American concepts of RMA and discusses the dilemmas facing Canadian forces. <http://wps.cfc.dnd.ca/irc/amsc/amsc1/008.html>
- Hoffman, Bruce. 1994. *Responding to Terrorism Across the Technological Spectrum*. Strategic Studies Institute, United States Army War College. The evolving nature of international terrorism is addressed, and the author asserts that improvements in technology will increase the lethality of terrorism. Also available in *Terrorism and Political Violence*, Autumn 1994, vol. 6, no. 3. <http://carlisle-www.army.mil/usassi/ssipubs/pubs94/rspond/rspond.htm>
- Libicki, Martin. *The Revolution in Military Affairs*. Washington, DC, Institute for National Strategic Studies, National Defense University. A summary of a conference sponsored by INSS and its War Gaming and Simulation Center to support Project 2014, a study of the future national security environment undertaken for the Joint Staff. Two questions structured discussion: what sort of opponent should the United States be planning against over the long term, and how should American doctrine respond to foes that could use civilian information technologies in sophisticated ways. <http://www.ndu.edu/inss/strforum/z1106.html>
- MacGregor, Douglas A. 1997. *Breaking the Phalanx: A New Landpower for the 21st Century*. Connecticut, Praeger Publishers. MacGregor discusses the need for reorganization in the land forces of the American military.
- McLean, Lieutenant Commander E.G. 1998. *Canada 21's Navy: A Disaster in the Making Entering into the 21st Century*. Toronto, Canadian Forces College. Assesses and evaluates the differences between separate recommendations on the modernization of Canada's Naval Forces. <http://www.cfcsc.dnd.ca/irc/nh/nh9798/0062.html>
- Metz, Steven and James Kievit. 1994. *The Revolution in Military Affairs and Conflict Short of War*. Strategic Studies Institute, United States Army War College, July. Presents a detailed analysis of the current RMA debate, as well as addresses the potential costs and risks. <http://www.cs.virginia.edu/~alb/misc/rmaWarCollege.html>
- Scales, Major General Robert H. 2001. *Future Warfare Anthology*. Strategic Studies Institute, United States Army War College, June. Report on likely uses of military strategies as a projection of national security policy in the post-Cold War era. <http://carlisle-www.army.mil/usassi/ssipubs/pubs2001/futrwar/futrwar.htm>

- Semiamaw, Colonel W. 1998. *The Revolution in Military Affairs: All That Glitters Is Not Gold*. Toronto, Canadian Forces College. A look at contemporary RMA and technology in Canada following the Gulf War. <http://www.cfcsc.dnd.ca/irc/amsc/amsc1/038.html>
- Williams, Cindy and Jennifer M. Lind. 1999. Can We Afford a Revolution in Military Affairs? *Breakthroughs*, United States Department of Energy, Spring, pp. 3–8. A short report focusing on the financial implications of RMA in the United States and possible sources of funding. <http://web.mit.edu/ssp/db21/breakthroughs.html>
- Wirtz, James J. 1999. *QDR 2001: The Navy and the Revolution in Military Affairs*. Washington, DC, National Security Studies Program, Georgetown University. The author evaluates the Navy's potential role in RMA, including its ability to conduct joint power projection operations. Also available in *National Security Studies Quarterly*, Autumn 1999. <http://www.georgetown.edu/sfs/programs/nssp/nssq/Wirtz.pdf>

EAST ASIA

- Ji, You. 1999. *The Armed Forces of China*. London, Tauris Publishers. Discusses in depth the actions of the People's Liberation Army in modernization and preparing for twenty-first century warfare, including preparations for an offensive air force and a blue-water navy.
- Pillsbury, Michael. 2000. *China Debates the Future Security Environment*, hosted by FAS, January. This full-text online publication goes into details of the People's Liberation Army's preparations for future war scenarios and includes an extensive bibliography of Chinese language publications on the topic. Also available in hard copy from the National Defense University Press. <http://www.fas.org/nuke/guide/china/doctrine/pills2/index.html>
- Wortzel, Larry M., ed. 1999. *The Chinese Armed Forces in 21st Century*. Strategic Studies Institute, United States Army War College, December. A collection of articles examining China's likely strategy in the next few decades, particularly its relations with the United States, Taiwan and its military procurement ambitions. <http://www.fas.org/nuke/guide/china/doctrine/chinese.pdf>

EUROPE

- 'European Defence Autonomy?' 2000. *Survival: The IISS Quarterly*, London, International Institute for Strategic Studies, Summer, vol. 42, no. 2. A collection of six articles on the future of European co-operative security.
- Gregory, Shaun. 2000. *French Defence Policy into the Twenty-First Century*. Macmillan, June. This study presents wide-ranging analysis, setting out the background and policy framework of French defence, charting the transformation of policy between 1989 and 1996, and examining the role of the French military within and beyond Europe into the twenty-first century.
- Laird, Robbin F. and Holger H. Mey. 1999. *The Revolution in Military Affairs: Allied Perspectives*. Washington, DC, Institute for National Strategic Studies, National Defense University, April. Discusses RMA perspectives from Europe, France and Germany, with particular focus on defence industries. Also available at <http://www.ndu.edu/inss/macnair/mcnair60/m60cont.html>

Quille, Gerrard. 1998. *The Revolution in Military Affairs and the UK*. London, International Security Information Service Briefing no. 73, December. This paper analyses the current debate on RMA and considers some of the possible implications for British defence policy. <http://www.nyu.edu/globalbeat/usdefense/Quille1298.html>

Unterseher, Lutz. 1999. *Europe's Armed Forces at the Millennium: A Case Study of Change in France, the United Kingdom, and Germany*. Project on Defense Alternatives Briefing, November, report no. 11. Presents technical information on defence procurement and spending in these three countries. <http://www.comw.org/pda/9911eur.html>

AUSTRALASIA

Dickens, David. 1999. *The Revolution in Military Affairs: A New Zealand View, Part I*. Wellington, Centre for Strategic Studies, Victoria University. Discusses a New Zealand Defense Force along RMA trends and evaluates its potential effectiveness. http://www.vuw.ac.nz/css/docs/working_papers/WP14.html

Evans, Michael. 2000. *The Middle Way: Australia's Response to the Revolution in Military Affairs*. Washington, DC, National Security Studies Program, Georgetown University. Also available in *National Security Studies Quarterly*, Winter. The Australian armed forces' response to RMA. The author explains the current developments in Australian military organization, and highlights the differences in approach to RMA between Australia and other states. <http://www.georgetown.edu/sfs/programs/nssp/nssq/Evans.pdf>

SOUTH ASIA

Anand, Vinod. 2000. *Evolution of a Joint Doctrine for Indian Armed Forces*. New Delhi, Institute for Defence Studies and Analysis. This paper stresses the importance of joint operations in future Indian operations, and also discusses the possible applications for new technology. <http://www.idsa-india.org/an-jul-600.html>

Mahnken, Thomas G. and Timothy D. Hoyt. 2000. *Indian Views of the Emerging Revolution in Military Affairs*. Washington, DC, National Security Studies Program, Georgetown University, 2000. The authors relate India's ability to achieve RMA to its recent development of nuclear weapons, and assess the Indian Army's organizational and technological deficits. Also available in *National Security Studies Quarterly*, Summer. <http://www.georgetown.edu/sfs/programs/nssp/nssq/thoyt.pdf>

MIDDLE EAST

Cordesman, Anthony. 1999. *The Revolution in Military Affairs and Developments in the Persian Gulf*. Washington, DC, Center for Strategic and International Studies, September. Examines the military balance in the Gulf region, particularly Iranian and Iraqi capabilities. <http://www.csis.org/stratassessment/reports/RMAandGulf.html>

RUSSIAN FEDERATION

Kipp, Jacob W. 1995. *The Russian Military and the Revolution in Military Affairs: A Case of the Oracle of Delphi or Cassandra?* Kansas, Foreign Military Studies Office, June. Russia's current state of military affairs is analysed and the potential to improve its military capabilities is assessed. <http://www.fas.org/nuke/guide/russia/agency/rusma.htm>

DEVELOPING STATES

Demchak, Chris C. 2000. *The RMA in Developing States: Dilemmas of Image, Operations and Democracy*, National Security Studies Program, Georgetown University, Washington, DC, 2000. Also available in *National Security Studies Quarterly*, Autumn. The author examines the potential for developing countries to embrace RMA and under what circumstances the revolution could be used by those countries. <http://www.georgetown.edu/sfs/programs/nssp/nssq/Demchak.pdf>

Hasim, Ahmed S. 1998. *The Revolution in Military Affairs Outside the West*. Project on Defense Alternatives. Also available in *Journal of International Affairs*, Winter, vol. 51, no. 2. A paper examining the impact of RMA around the world, and whether or not other states will be able to achieve similar revolutions. <http://www.comw.org/rma/fulltext/hasim.html>

Non-lethal weapons

Guyatt, David G. 1996. *Some Aspects of Anti-Personnel Electromagnetic Weapons*. A synopsis prepared for the International Committee of the Red Cross Symposium 'The Medical Profession and the Effects of Weapons' presenting a medical and humanitarian perspective on the use of EMP weapons. http://www.infowar.com/class_3/class3_100997c.html-ssi

Leech, John. 2000. 'War Without Death'. *Strategic Review*, Boston, United States Strategic Institute, Spring, pp. 19–27. An examination of the use of non-lethal weapons in civil disturbances and operations other than war.

Mampaey, Luc. 1999. *Les armes non létales : une nouvelle course aux armements*. Group for Research and Information on Peace and Security, Rapport du GRIP, no. 99/1, May. Detailed analysis of non-lethal weapons and their possible implications on military doctrines. http://www.grip.org/pub/rap/rg99-1_anl.pdf

Medicine, Conflict and Survival. 2001. London, vol. 17, no. 3. Edition focusing on non-lethal weapons and RMA. Abstracts available at http://www.frankcass.com/jnls/mcs_17-3.htm

Truesdell, Amy. 1998. 'Non-Lethal Weapons and Discriminate Warfare'. *Brassey's Defence Yearbook 1998*. Lancaster University, Centre for Defence and International Security Studies, pp. 325–41.

Turner, Andrew. 2000. *The Impact of RMA on Peacekeeping*. Paper presented at the Third Annual Graduate Student Symposium of the Conference of Defense Associations Institute, 3–4 November. Discusses the applications for RMA technology in peacekeeping and other non-war operations. <http://www.cda-cdai.ca/symposia/2000/turner.htm>

United States Army Training and Doctrine Command. 1996. *Concept for Non-lethal Capabilities in Army Operations*. TRADOC pamphlet no. 525–73, September. The United States Army and

the use of minimum force with zero casualties to achieve its objectives. <http://www.fas.org/irp/doddir/army/p525-73.htm>

United States. House Armed Services Committee. 1999. *Electromagnetic Pulse Threats to US Military and Civilian Infrastructure*. Transcript of a presentation before the Military Research and Development Subcommittee on the dangers of EMP. http://www.fas.org/spp/starwars/congress/1999_h/has280010_0.htm

Strengthening the Role of Regional Organizations in Treaty Implementation

UNIDIR, in collaboration with the Monterey Institute for International Studies, has undertaken a project that focuses on strengthening the role of regional organizations in non-proliferation and arms control treaty implementation. Regional organizations could play a significant role in addressing questions of compliance related to WMD agreements.

The project will be launched with a small workshop in Geneva to discuss the existing verification system for WMD treaties and the gaps that regional organizations could potentially fill. Based on the findings from the workshop, authors will be selected and a series of consultations will take place with diplomats (in Geneva, Vienna and the Hague), academics, officials from multilateral treaty-implementing organizations (such as IAEA, CTBTO, OPCW), and experts in the field of verification. Interviews with key experts on the operational capabilities and roles of their regional organizations will assist to round out the research.

The preliminary findings will be presented at an international meeting where academics, multilateral arms control and disarmament experts, non-governmental organizations, diplomats, and representatives from both regional and treaty-implementing organizations will be invited to discuss the papers. The Ploughshares Fund has generously contributed to the establishment of this project.

For more information, please contact:

Jackie Seck

Research Programme Manager

Tel.: (+41 22) 917 11 49

E-mail: jseck@unog.ch

Visiting Fellowship Programme

UNIDIR is preparing its 2002 visiting research fellowship programme on regional security. Four researchers will be invited to Geneva for a period of up to six months. The researchers will work collectively on a single research paper, focusing on a particular question of regional security. The visiting fellows programme aims to: contribute to debates on regional security; provide training for

researchers; allow them to interact with each other, with researchers from other regions, the UN Secretariat, delegations, international organizations and non-governmental institutes; and contribute to UNIDIR's research programme.

In 2002, the fellowships are reserved for researchers from the Middle East and the programme will focus on the Israeli-Palestinian conflict. The fellowships will be allocated on a competitive basis, taking due care to obtain national representation. The fellowship programme is scheduled to begin in January 2002.

For more information, please contact:

Olivier Brenninkmeijer

Fellowship and Internship Coordinator

Tel.: (+41 22) 917 15 83

E-mail: obrennkmeijer@unog.ch

Tactical Nuclear Weapons

To support efforts to address and curb the problem of TNWs, UNIDIR has launched a long-term project that includes a series of seminars and publications as well as attempts to raise the problem of TNWs in the eyes of the wider public through the international media. Various aspects of this project are carried out in co-operation with the Monterey Institute of International Studies and the Peace Research Institute Frankfurt.

In March 2000, UNIDIR held a seminar in Geneva on TNWs. Experts from different institutions presented papers on various aspects of the issue. Recommendations drawn from this seminar were distributed to policy-makers at the 2000 NPT Review Conference.

UNIDIR recently published two research reports on TNWs: *Tactical Nuclear Weapons: Options for Control* and *Tactical Nuclear Weapons: A Perspective from Ukraine* (see publications section). A press conference on TNWs was held in Geneva on 23 January 2001, which resulted in a number of newspaper articles as well as television and radio interviews.

UNIDIR's TNW project continues in 2001 with a study based on the recommendations presented in *Tactical Nuclear Weapons: Options for Control*. This report examines in detail and advances recommendations on codification as well as transparency and confidence-building measures related to the 1991 parallel unilateral declarations issued by the Presidents of the United States of America and the Russian Federation.

For the ten-year anniversary of the 1991 unilateral declarations UNIDIR held a seminar at the United Nations Headquarters on 24 September 2001. The meeting generated stimulating discussion and was extremely well attended. A seminar report is forthcoming.

For more information, please contact:

Taina Susiluoto

Visiting Fellow

Tel.: (+41 22) 917 33 68

E-mail: tsusiluoto@unog.ch

Handbook on Verification and Compliance

Successful arms control in the Middle East—an essential component of the peace process—will require a thorough examination of the means to determine compliance and of the implications of regional verification mechanisms. In order to assist the process of ascertaining the necessary level and the approach to compliance monitoring in the Middle East, UNIDIR and VERTIC are producing a compendium of agreements and terms, in-depth analyses of approaches to verification, methods and technologies and practical experiences. The book will be published in English and Arabic in hard copy and electronic format (with hyperlink text).

For more information, please contact:

Steve Tulliu

Editor

Tel.: (+41 22) 917 15 98

E-mail: stulliu@unog.ch

Fissile Materials

In April 1999, UNIDIR published *Fissile Material Stocks: Characteristics, Measures and Policy Options* by William Walker and Frans Berkhout. The publication is intended to support the Conference on Disarmament in its thinking on the range of options available to deal with stocks of fissile material. Additionally, UNIDIR has commissioned a report on fissile material inventories to provide an up-to-date account of fissile materials, assess national policies related to the production, disposition and verification of fissile materials, and identify facilities and locations which might be subject to safeguards under a treaty. In March 2001, UNIDIR in collaboration with the German Delegation to the Conference on Disarmament held a meeting on the verification of a fissile material cut-off treaty.

For more information, please contact:

Jackie Seck

Research Programme Manager

Tel.: (+41 22) 917 11 49

E-mail: jseck@unog.ch

Participatory Approaches to Evaluating the Implementation of Humanitarian Landmine Action

Evaluating mine action programmes in terms of cost-effectiveness and efficiency has its merits in a donor community concerned with value for money in project implementation. But humanitarian mine action is by definition a qualitative process. It is designed to enhance human security, provide victim assistance and encourage ownership of mine action programmes in affected communities and regions. Traditional evaluation and monitoring techniques do not readily lend themselves to assessments of such qualitative goals and objectives. Participatory monitoring and evaluation techniques (PM&E) are more appropriate to this task. PM&E involves key stakeholders in identifying their needs and assessing the most appropriate options for meeting those needs. Experience has shown that participatory approaches improve the quality, effectiveness and sustainability of donor programmes' actions and outcomes. By placing people at the centre of the monitoring and evaluation process, mine action efforts are guaranteed to empower local communities and encourage local ownership. The proposed pilot study is not only designed to pioneer PM&E approaches within the landmine community, but also to provide a unique opportunity for UNIDIR to help innovate bottom-up approaches to arms control implementation.

For more information, please contact:

Susan Willett

Senior Research Fellow

Tel.: (+41 22) 917 42 54

E-mail: swillett@unog.ch

The Costs of Disarmament

In order to present the cost-benefit analysis of disarmament, UNIDIR proposes to take key countries as examples and carefully research what their commitments to disarmament treaties mean to them in terms of financial and resource costs. In addition, the project will try to ascertain what each country perceives are the benefits brought to them through their participation in the agreements and whether there is consensus that there is a net gain to the state in question. The aim of the project is to achieve a better understanding of the costs and benefits of disarmament agreements with a view to assisting policy-makers decide how money is spent on such commitments, which budget lines are best structured to handle such spending and how states could approach this aspect of negotiations in the future.

For more information, please contact:

Susan Willett

Senior Research Fellow

Tel.: (+41 22) 917 42 54

E-mail: swillett@unog.ch

Peace-building and Practical Disarmament in West Africa

UNIDIR's West Africa project focuses on promoting the role of West African civil society in the fight against the proliferation of small arms and light weapons.

The project seeks to:

- Inform and raise awareness on the problem, notably security and humanitarian threats;
- Undertake locally based research with civil society groups and produce collaborative publications;
- Organize national and regional debates in West Africa to stimulate discussion on people-centred security and small arms proliferation;
- Build local capacities for peace and security research and light weapons monitoring regimes;
- Work for transparency and facilitate participation in decision-making and policy implementation;
- Enhance confidence-building and strengthen regional stability through community-based and cross-border arms control and peacebuilding; and
- Assist in the establishment of a culture of peace and disarmament.

The project operates in partnership with local non-governmental and community-based organizations. For the last two years the project has been working mainly in Sierra Leone and Liberia. For the coming two years, the project will enlarge its scope to Guinea, Côte d'Ivoire, Mali, Niger and Burkina Faso. Specific categories of people with high peacebuilding potential, such as women, young people, religious and traditional leaders, and the media, will be targeted as partners. Police forces and customs services will also be included.

Cooperating for Peace in West Africa: An Agenda for the 21st Century and *Bound to Cooperate: Conflict, Peace and People in Sierra Leone*, two recent publications of the project, are described in detail in the publication section.

For more information, please contact:

Anatole Ayissi

Project Manager

Tel.: (+41 22) 917 16 05

E-mail: aayissi@unog.ch

UNIDIR Handbook on Arms Control

UNIDIR is producing a handbook that will explain the major concepts and terms relating to arms control. The handbook will be used as both a primer for an audience with limited familiarity with arms control and as a reference for students, scholars, diplomats and journalists who are more experienced in arms control matters.

The handbook will be organized as a thematically structured glossary of approximately 400 terms relating to arms control. Each term is situated within its wider context so that, on the one hand, a specific term can be looked up quickly, and on the other hand, an entire issue can be covered. Cross-references to other terms and concepts will point the reader to relevant related issues. The researcher designing and drafting the handbook will be assisted by an editorial committee consisting of regional and arms control experts.

For more information, please contact:

Steve Tulliu

Editor

Tel.: (+41 22) 917 15 98

E-mail: stulliu@unog.ch

Geneva Forum

Together with the Programme for Strategic and International Security Studies of the Graduate Institute of International Studies and the Quaker United Nations Office, UNIDIR organizes an ongoing discussion series called the Geneva Forum.

The Geneva Forum is an intellectual space in which expertise on a broad range of disarmament issues is shared among government delegates, United Nations personnel, NGOs and academics. Experts from various fields of disarmament are regularly invited to share their knowledge in briefings, seminars and workshops. Such meetings provide disarmament negotiators with valuable opportunities to benefit from in-depth research and to interact with one another in a relatively informal atmosphere. The issues dealt with in Geneva Forum meetings reflect the priorities of the disarmament agenda at any given time. The aim is to provide negotiators with relevant information that will assist them in their disarmament work.

Now in its third year, the Geneva Forum is expanding its work thanks to a generous grant from the Ford Foundation. New areas of activity will include increased networking between Geneva's disarmament, human rights and humanitarian communities in order to discuss mutual interests in security and disarmament issues and to explore possibilities for co-ordination and collaboration. Also, in recognition of the important role that public opinion plays in advancing disarmament, the Geneva Forum will intensify its interaction with international media covering disarmament issues in Geneva.

The first volume of collected Geneva Forum papers on the issue of small arms and light weapons has been published (see publications section).

For more information, please contact:

Patrick Mc Carthy

Network Coordinator

Tel.: (+41 22) 908 59 32
E-mail: mccarthy@hei.unige.ch

UNIDIR Disarmament Seminars

UNIDIR occasionally holds small, informal meetings on various topics related to disarmament, security and non-proliferation. These off-the-record gatherings allow members of the disarmament community, missions and NGOs to have an opportunity to discuss a specific topic with an expert. Recent topics covered include: verification of nuclear disarmament, restoring momentum to nuclear disarmament, missile defences, disarmament as humanitarian action, deadlock at the Conference on Disarmament, fissile materials, and next steps for nuclear disarmament and arms control. Speakers at recent meetings have included: Jonathan Dean, Daryl Kimball, Soren Jessen-Petersen, Martin Griffiths, Randall Forsberg, Rebecca Johnson, Tariq Rauf, Mutiah Alagappa, Graham Andrew, Anatoli Diakov, Annette Schaper, Tom Shea, Alain Munier, Seiichiro Noburu, Munir Akram, Thomas Markram, Christopher Westdal, Yuri Kapralov, Fu Zhigong, Robert Grey, William Potter, Lewis Dunn, Paolo Cotta-Ramusino and Harald Müller.

For more information, please contact:

Jackie Seck

Research Programme Manager

Tel.: (+41 22) 917 11 49
E-mail: jseck@unog.ch

DATARIs

In co-operation with SIPRI (Stockholm International Peace Research Institute), UNIDIR has developed an online database of disarmament, arms control, security and peace research institutes and projects around the world. The database can be accessed through UNIDIR's website and institutes can update their information via a password. A new feature allows the inclusion of the names of the director and research staff.

If you would like your institute to be included in DATARIs, please contact:


Anita Blétry

Publications Secretary

Tel.: (+41 22) 917 42 63
E-mail: abletry@unog.ch

PUBLICATIONS

Coming to Terms with Security: A Lexicon for Arms Control, Disarmament and Confidence-Building



Coming to Terms with Security: A Lexicon for Arms Control, Disarmament and Confidence-Building is aimed at informing people on the body of arms control and disarmament terms that has developed over recent decades. There is so much information existing in the literature that a newcomer to the field can be overwhelmed and not know where to begin. UNIDIR intends this compilation to be a reference manual for the young and the experienced scholar alike.

In the future, the lexicon will be published in different languages—each bound together with the English version—so that the language and culture of arms control and disarmament become accessible to a much larger readership.

Introduction

Overview

The Big Picture on ‘Defence by other Means’

Arms Control and Disarmament Agreements (includes conventional, biological, chemical and nuclear weapons, as well as their delivery systems)

Building Trust and Confidence (CBMs)

Treaty Basics

Implementation of Arms Control and Disarmament Agreements (verification and compliance)

Index

Steve Tulliu and Thomas Schmalberger

ISBN 92-9045-135-1

Sales number GVE.00.0.12

Cooperating for Peace in West Africa: An Agenda for the 21st Century

The last two decades have witnessed a growing determination in the efforts of the Economic Community of West African States (ECOWAS) to consolidate the institutional capacity of the organization to prevent violence and manage crises. From the signing of a Non-Aggression Pact in 1978 to the establishment of a Mechanism for Conflict Prevention, Management, Resolution, Peacekeeping and Security in 1999, ECOWAS member states have endowed their organization with a rich and promising legal framework for conflict management. These efforts could be taken as an inspiration for the rest of the African continent struggling to extricate itself from a seemingly endless cycle of endemic violence. For that reason, these achievements deserve to be widely known and concretely encouraged.

Cooperating for Peace in West Africa: An Agenda for the 21st Century, a collection of ECOWAS legal instruments for peace and security, aims at making the endeavours of ECOWAS better known and supported by the rest of the international community. It is our wish that all those interested in the making of and the future of peace and security in West Africa, notably academics, researchers, students, diplomats, military and civilian experts in preventive diplomacy, would find in this compendium a useful tool for their work and a faithful companion in their quest for better knowledge of what is being done in terms of institutional peacebuilding in the Western part of the African continent. Preface by H.E. Olusegun Obasanjo, President of the Federal Republic of Nigeria.

Anatole Ayissi

Editor

ISBN 92-9045-140-8

Sales number GV.E/F01.0.19

Illicit Trafficking in Firearms: Prevention and Combat in Rio de Janeiro, Brazil

Since the 1980s, Brazil has faced one of the worst small arms problems in the world. Drug and arms trafficking have led to increasing levels of violence in Brazilian society, notably in large cities such as São Paulo and Rio de Janeiro. This publication offers an account of the arms trafficking situation in Rio de Janeiro and the Brazilian Government's response to it.

Local initiatives constitute a society's front line of defence. In the case of Brazil, efforts to curb the flow of illicit firearms into the country, notably by addressing cross-border smuggling as well as sea routes, would be a good first step. Local initiatives, however, are not enough. Small arms trafficking involves many actors, from both inside and outside the country. To realistically address the firearms problem, concerted and co-ordinated action is needed at all levels—from local to international.

Detailing the specific case of a Latin American metropolis, this book serves as an excellent illustration that combating illicit firearms is a national, subregional, regional and global problem. The publication presents recommendations for increased co-ordination and response.

Introduction

Illicit Firearms in Rio de Janeiro

The New Brazilian Drive Against Illicit Trafficking

The Subregional and Regional Dimensions of the Fight Against Illicit Trafficking

Essential Additional Measures to Curb Illicit Trafficking in Firearms

Final Reflections

Péricles Gasparini Alves

ISBN 92-9045-139-4

Sales number GVE.01.0.2

Tactical Nuclear Weapons: Options for Control

At the end of the Cold War, it was well understood that tactical nuclear weapons, which were forward-based and integrated with conventional forces, were a particularly dangerous category of nuclear weapons. A great deal of uncertainty remains today over the implementation of the 1991 unilateral declarations.

Since 1999, the spectre of tactical nuclear weapons has again been raised as a serious concern. The culminated response by Russia to NATO enlargement, the conflict over Kosovo, and United States proposals to modify the Anti-Ballistic Missile Treaty, thus allowing national missile defences, has led to renewed interest in tactical nuclear weapons in Russia and to calls to remanufacture or modernize the existing tactical nuclear force within the near future. In addition, regional nuclear weapons developments, particularly in South Asia following the nuclear weapons tests by India and Pakistan in 1998, have fostered concerns over the deployment of tactical nuclear weapons in Asia and the Middle East.

It is clear, particularly when considering the possession of nuclear weapons by States other than the *de jure* nuclear weapon states, that the definitions of tactical nuclear weapons are inadequate. If strategic nuclear weapons are defined in terms of the capability and mission to hit the heart of an adversary's homeland, then the range of these weapons is not always the key factor in their definition, neither is the explosive yield. In the United States-Russia dialogue on such weapons however, geographical range has been the overriding feature in attempts to delineate tactical from strategic. A number of critics argue that the subdivision of nuclear weapons into strategic and tactical is not as useful as treating all nuclear weapons collectively. Others feel strongly that the particular dangers of tactical nuclear weapons, with regard to their missions, command and control, are sufficient to warrant their separate and urgent treatment.

There is also the debate about the role of tactical nuclear weapons beyond the national boundaries of the possessor states, focusing much attention on tactical nuclear weapons in NATO Europe and on NATO doctrine. The large numerical superiority of Russian deployed tactical nuclear weapons and recent changes in Russian nuclear weapons doctrine were cause for increasing concern. A number of approaches to dealing with the tactical nuclear weapons issue are outlined in this book. It is hoped that these proposals will add value to the discussions and debates.

Harald Müller is Executive Director at the Peace Research Institute Frankfurt, Germany, where Annette Schaper is a Senior Associate in the Arms Control and Disarmament Group. William C. Potter is the Director of the Center for Nonproliferation Studies and the Center for Russian and Eurasian Studies at the Monterey Institute of International Studies, United States. Nikolai Sokov is also at the Center for Nonproliferation Studies.

Harald Müller, Annette Schaper, William C. Potter and Nikolai Sokov

Sales number GV.E.00.0.21

Tactical Nuclear Weapons: A Perspective from Ukraine

After a decade in the background, the question of tactical nuclear weapons (TNWs) in Europe has begun to raise concern among politicians and the public. Although the problems of today are not as dramatic as those of the Cold War, when the threat of TNW use was ever present, TNW remain a cause for concern and must be addressed. The approaches used during the Cold War are no longer effective and new ones have not yet been devised.

This study is concerned with the present and future role of TNW in the new European security system as seen from Ukraine, a country which once had the world's third largest nuclear arsenal stationed on its territory.

The study is the work of a team of researchers at the Dnipropetrovsk Branch of the National Institute for Strategic Studies led by Professor A. Shevtsov. A. Shevtsov writes on the problems that faced Ukraine in choosing the non-nuclear alternative. A. Gavrish contributes the analysis of the situation with regard to the tactical nuclear weapons possessed by NATO countries. A. Chumakov provides the corresponding analysis of the Russian arsenal. A. Yizhak presents the prospects for nuclear disarmament.

Tactical Nuclear Weapons in Europe: History of Deployment

Renunciation of Nuclear Weapons: The History of Ukraine

Tactical Nuclear Weapons in the New European Security System: To Be or Not To Be?

Prospects for Reducing the Role of Tactical Nuclear Weapons in Europe

A. Shevtsov, A. Yizhak, A. Gavrish and A. Chumakov

Bound to Cooperate: Conflict, Peace and People in Sierra Leone

The chapters of this book wrestle with fundamental questions of practical disarmament and peace-building in Sierra Leone. Although they were written prior to the May-June 2000 upsurge of violence in Freetown that led to the arrest of Foday Sankoh, these incidents underline the relevance of the authors' analyses.

What links this series of research papers is the fact that all the authors are actors: they are Sierra Leonean civic leaders who are working for sustainable peace in their country. Each author is involved at one level or another in the search for a permanent peaceful resolution to the civil war, and a solution to the destabilizing influence of small arms and light weapons. In enabling these writers to get their views across, we hope to encourage a much-needed debate on security and security-sector reform in West Africa. We hope to enrich the understanding of Sierra Leone's partners and donors. In the long run, we believe that this partnership approach will shore up the peace builders, and contribute to sustainable peace across the whole region.

This is the first in a series of books designed to feed into the debate on sustainable peace, security and development in West Africa. The next book in the series will present a collection of papers from civil society actors in Liberia. Depending on funding, we will publish similar studies by civil society in other ECOWAS countries.

Background to the Conflict (1961–1991): What Went Wrong and Why?—*Joe A.D. Alie*

The Long Road to Peace: 1991–1997—*Abubakar Kargbo*

Bound to Cooperate: Peacemaking and Power-sharing in Sierra Leone—*Chris Squire*

Arms Smuggling in Post-War Sierra Leone—*Nat J.O. Cole*

Arms Regulation—*J.P. Chris Charley*

Arms Control Policy Under Threat: Dealing with the Plague of Corruption—*Abdulai Bayraytay*

Peace by Other Means: The Missing Link in DDR Programmes—*Michael Foray*

Disarmament, Demobilization and Reintegration in Post-War Sierra Leone—*Francis Kai-Kai*

Community-Based Disarmament and Post-Conflict Peace-building—*Isaac Lappia*

Women Against Weapons: A Leading Role for Women in Disarmament—*Binta Mansaray*

A Price for Peace? Justice and Reconciliation in Post-War Sierra Leone—*Joe A.D. Alie*

Anatole Ayissi and Robin-Edward Poulton

Editors

Sales number GV.E.00.0.20

Peacekeeping in Africa: Capabilities and Culpabilities

African regional and subregional organizations have an important role to play in the promotion of peace and security on their continent. The United Nations Security Council has relied on them excessively, however, in large part because it has been reluctant to authorize United Nations peacekeeping operations. Although there is merit to strengthening indigenous capabilities, the issue of whether Africans are prepared for the challenge of assuming primary responsibility for responding to conflicts is another matter. What can African states and organizations do to enhance their peacekeeping capabilities? How can the international community better tailor its initiatives to the needs of African actors? This book answers such questions.

Part I of this book describes challenges to African peace and security and discusses the reasons why the United Nations Security Council has changed its peacekeeping policy. Part II examines African attempts to manage and resolve conflicts on their continent. Part III reviews African peacekeeping experience outside of African regional, subregional and ad hoc initiatives. Part IV describes and analyses efforts made by non-African states to address the deficit. The study concludes with a series of recommendations on how to make current approaches more effective. It provides concrete suggestions for strengthening African regional and subregional efforts and for improving Western capacity-building programmes. It also emphasizes that the United Nations must assume a greater role in both promoting and undertaking peacekeeping on the African continent.

Preface by the Secretary-General

PART I Setting the Stage

PART II African Organizations and Ad Hoc Initiatives

PART III Understanding African Peacekeeping Abilities and Limitations

PART IV Efforts to Develop African Capacities

Conclusion

Annexes and Selected Bibliography

Eric Berman and Katie Sams

ISBN 92-9045-133-5

Sales number G.V.E.00.0.4

The Small Arms Problem in Central Asia: Features and Implications

Although Central Asia has been seriously afflicted by the proliferation, accumulation and misuse of small arms, the region has been largely ignored by the international community. This report attempts to highlight the gravity of the situation in the region by describing the ways in which the small arms problem manifests itself within the Central Asian context. The study specifically focuses on the following issues: the factors generating demand for small arms; the external and internal sources of small arms; the routes through which arms and ammunition are transferred; the various types of small arms in circulation; the humanitarian, political and societal implications of small arms; and finally, the factors hampering the efforts to combat the small arms problem. The study concludes with remarks on the impact of small arms in Central Asia and on possible approaches for their control.

Afghanistan: Two Decades of Armed Conflict

The Cold War Legacy

Small Arms and the Taliban Ascendancy

The Human Costs of Small Arms

The Conflict in Tajikistan

The Civil War 1992–1997

The Sources of Small Arms

The Fragile Peace

Uzbekistan, Kyrgyzstan, Kazakhstan and Turkmenistan: Small Arms and Latent Threats to Stability

Weaponized Societies

Potential Sources of Armed Internal Conflict

Bobi Pirseyedi

ISBN 92-9045-134-3

Sales number G.V.E.00.0.6

West Africa Small Arms Moratorium: High-Level Consultations on the Modalities for the Implementation of PCASED

*A report of the Experts' Meeting and the Civil Society Meeting
23–24 March 1999, Bamako, Mali*

Recognizing the threats to national security posed by the proliferation of small arms and light weapons, West African States have sought to address the issue through a subregional grouping, the Economic Community of West African States (ECOWAS). Inspired by the 'security first' approach, on 31 October 1998, in Abuja, all sixteen ECOWAS member states signed the *Declaration of a moratorium on the importation, exportation and manufacture of light weapons in West Africa*.

The Moratorium — commonly known as the West African Small Arms Moratorium — entered into force on 1 November 1998, for a renewable period of three years. This Moratorium is an innovative approach to peace-building and conflict prevention. It is not a legally binding regime but rather an expression of shared political will. In order for the Moratorium regime to be effective, concrete measures need to be adopted to ensure that West African governments remember this political commitment and to mobilize national, regional and international support for its implementation. Located in Bamako, the Programme for Coordination and Assistance for Security and Development (PCASED) is the designated implementation mechanism for the Moratorium.

On 23 and 24 March 1999, ECOWAS, the UN Development Programme and the UN Regional Centre for Peace and Disarmament in Africa hosted high-level consultations with West African and small arms experts to elaborate the modalities for the implementation of PCASED. This report outlines the various discussions that took place within both the Experts' Meeting and the Civil Society Meeting about these priority areas.

Jacqueline Seck

United Nations Institute for Disarmament Research
United Nations Regional Centre for Peace and Disarmament in Africa

GE.00-00475
UNIDIR/2000/2

Small Arms Control: Old Weapons, New Issues

The twenty-nine papers collected in this volume were originally prepared for four regional workshops organized by the United Nations Department for Disarmament Affairs to inform the work of the United Nations Panel of Governmental Experts on Small Arms. These workshops were held during 1995–96. Most of the papers were updated in 1998. Authors include academic, military, governmental and activist experts.

The editorial committee consisted of: Jayantha Dhanapala, Under-Secretary-General for Disarmament Affairs, United Nations; Mitsuro Donowaki, Ambassador and Special Assistant to the Minister for Foreign Affairs of Japan; Swadesh Rana, Chief, Conventional Arms Branch, Department for Disarmament Affairs, United Nations; and Lora Lumpe, Senior Researcher for the Norwegian Initiative on Small Arms Transfers (NISAT) at the International Peace Research Institute, Oslo (PRIO).

The publication is divided into four parts:

Causal Factors and Policy Considerations

The Problem of Small Arms and Light Weapons in Africa

The Proliferation of Small Arms and Light Weapons in Latin America and the Caribbean

The Plague of Small Arms and Light Weaponry in South Asia

Jayantha Dhanapala, Mitsuro Donowaki, Swadesh Rana and Lora Lumpe

Editors

UNIDIR/Ashgate publication
ISBN 0-7546-2076-X

Fissile Material Stocks: Characteristics, Measures and Policy Options

In 1998, on the basis of the Shannon Mandate, the Conference on Disarmament (CD) established an ad hoc committee for negotiating a fissile materials treaty. The treaty is intended to achieve a ban on the production of fissile materials for military purposes in a non-discriminatory, multilateral and internationally verifiably manner. Stocks of fissile materials have accrued transnationally due to armament and disarmament processes, as well as to civil uses of nuclear power. However, very little is known in the public domain about the nature, size and whereabouts of such stocks, and the complexities surrounding their regulation and control. UNIDIR's report on fissile material stocks seeks to begin to redress this problem by providing factual background information on all of these important matters. The report categorizes and quantifies fissile material stocks, and examines the measures which have heretofore been developed regarding their control and management. The report also includes an overview of broad policy options available to states in addressing the stocks issue, which could prove valuable in informing negotiations in the CD.

Fissile material stocks: function, scale and distribution

Characterization by type of inventory

The scale, type and location of fissile material stocks

Measures relating to fissile material stocks: recent developments

Military inventories: continuing absence of international regulation

Transitional inventories: towards regulation and disposition

Civil inventories: the extension of transparency

Policy strategies and options

Stocks and the FMT: possible diplomatic approaches

Possible measures for reducing risks posed by fissile material stocks

Fissile materials and their production processes

International safeguards and physical protection

William Walker and Frans Berkhout

Sales no. G.V.E.99.0.15

ISBN 92-9045-131-9

Sensors for Peace

United Nations peace operations have a tradition of several decades, and their scope and importance has increased markedly since the end of the Cold War. Peacekeeping operations, both of the traditional and the extended type, comprise monitoring tasks as a central part of their mandates. Agreements or resolutions, whether they demand withdrawal behind a cease-fire line, keeping a buffer zone demilitarized, or banning heavy weapons in control zones or safe havens, require that compliance is checked reliably and impartially. The more comprehensive the monitoring, the more likely the compliance. In practice, however, monitoring duties often require the surveillance of such large areas that United Nations peacekeeping units cannot provide continuous coverage. Thus, peacekeeping personnel are permanently deployed only at control points on the roads or areas deemed most sensitive. Minor roads and open terrain are covered by spot-check patrols. This creates many opportunities for infractions and violations.

Unattended ground sensor systems allow all this to change. Unattended ground sensors are suited to permanent, continuous monitoring. They can be deployed at important points or along sections of a control line, sense movement or the presence of vehicles, persons, weapons, etc. in their vicinity and signal an alarm. This alerts peacekeepers in a monitoring centre or command post, who can send a rapid-reaction patrol immediately to the site to confront the intruders, try to stop them, or at least document the infraction unequivocally.

Unattended ground sensor systems generally have not been used in peace operations. Thus, the wider introduction of unattended ground sensor systems in future United Nations peace operations requires fresh study from operational, practitioner, system design and legal perspectives. *Sensors for Peace* is an excellent first look at this timely issue.

Introduction — *Jürgen Altmann, Horst Fisher & Henny J. van der Graaf*

The Use of Unattended Ground Sensors in Peace Operations — *Henny J. van der Graaf*

Questionnaire Answers Analysis — *Willem A. Huijssoon*

Technical Potentials, Status and Costs of Ground Sensor Systems — *Reinhard Blumrich*

Maintaining Consent: The Legality of Ground Sensors in Peace Operations — *Ralph Czarnecki*

Conclusions and Recommendations — *Jürgen Altmann, Horst Fisher & Henny J. van der Graaf*

Jürgen Altmann, Horst Fischer and Henny J. van der Graaf

Editors

Sales No. GVE.98.0.28

ISBN 92-9045-130-0

Non-Offensive Defence in the Middle East?

Non-offensive defence (NOD) emerged as a proposed remedy to the military security problems of East and West during the latter part of the Cold War. Grounded in the notion of “cooperative security”, NOD is premised on the postulate that states in the international system are better off pursuing military policies which take account of each other’s legitimate security interests than they are in trying to gain security at each others’ expense. Competitive military policies which seek to achieve national security through a build-up of national military means may well be counter-productive and leave states more insecure. Seeking to procure national military security through a build-up of national armaments raises suspicions as to the purpose of these armaments, which in turn trigger countervailing armament efforts and ultimately lower the level of security for all. By making the defence of domestic territory the sole and clear objective of national military policies, NOD aims to strike a balance between the imperatives of ensuring adequate national military security and of avoiding provocation.

NOD aims towards national military defences strong enough to ensure adequate national military security, but not strong enough to be seen as threatening by others. The provision of adequate yet non-threatening military defence can be highly useful in a region such as the Middle East where political and military confrontations are inextricably linked, and where political settlement in the absence of military security is inconceivable. In the Middle East, NOD could reduce prevailing military tensions and open the way for broader political arrangements on the future of the region.

The introduction of NOD in the Middle East would not require that all Middle Eastern states adopt the same NOD model. Rather, each Middle Eastern state can select the particular NOD model most suitable to its requirements.

Non-Offensive Defence in the Middle East — *Bjørn Møller*

Non-Offensive Defence in the Middle East: Necessity versus Feasibility — *Ioannis A. Stivachtis*

Cooperative Security and Non-Offensive Defence in the Middle East — *Gustav Däniker*

Non-Offensive Defence and its Applicability to the Middle East: An Israeli Perspective —
Shmuel Limone

Bjørn Møller, Gustav Däniker, Shmuel Limone and Ioannis A. Stivachtis

Sales No. GVE.98.0.27

ISBN 92-9045-129-7

A Peace of Timbuktu: Democratic Governance, Development and African Peacemaking

Mali is admired for two recent accomplishments. The first is the country's transition to democracy, which took place in 1991–1992. This effort included the overthrow of Moussa Traoré's twenty-three year military dictatorship on 26 March 1991—a process of military and civilian collaboration which fostered national reconciliation, a referendum for a new constitution, and elections which brought to power Mali's first democratically elected president, government and legislature. The second achievement is the peacemaking between the Government of Mali and the rebel movements in the northern part of the country: this process successfully prevented the outbreak of civil war and presents useful lessons in preventive diplomacy for the international community. The peacemaking culminated in a ceremony known as the Flame of Peace, when rebel weapons were incinerated in Timbuktu on 27 March 1996. This study of the events surrounding the uprisings in the North of Mali and the measures which restored peace (and those which will maintain it) is the result of a collaboration between the United Nations Development Programme and the United Nations Institute for Disarmament Research.

This peace process was remarkable for the way in which the United Nations agencies were able to help, discreetly dropping oil into the machinery of peacemaking. For a cost of less than \$1 million, the United Nations helped the Malians to avoid a war, and lit the Flame of Peace. With less than \$10 million, the United Nations became the leading partner of Mali's Government and civil society, in peace-building, disarming the ex-combatants and integrating 11,000 of them into public service and into the socio-economy of the North through a United Nations Trust Fund. The experience shows that not only is peacemaking better than peace-keeping, but that it is much cheaper.

A Peace of Timbuktu includes in-depth coverage of the following topics:

- Mali's History and Natural Environment
- The Build-up to the Crisis in Northern Mali
- The Armed Revolt 1990–1997
- Peacemaking and the Process of Disarmament
- The International Community as a Catalyst for Peace
- Ensuring Continued Peace and Development in Mali
- The Flame of Peace Burns New Paths for the United Nations

United Nations Secretary-General Kofi Annan has written the preface. The book includes maps, texts of relevant documents and laws, and a bibliography, as well as photographs by the authors and peace drawings by the children of Mali.

Robin Edward Poulton and Ibrahim ag Youssouf

Sales No. G.V.E.98.0.3

ISBN 92-9045-125-4

Updated second edition available in French

G.V.F.98.0.3

The Implications of South Asia's Nuclear Tests for Non-proliferation and Disarmament Regimes

On 7 and 8 September 1998, UNIDIR held a private, off-the-record meeting on *The Implications of South Asia's Nuclear Tests for the Non-proliferation and Disarmament Regimes*. This 'track one and a half' meeting was designed to address the needs of policy-makers—governmental and non-governmental agents—in their assessment of the impact of the nuclear-weapons tests carried out by India and Pakistan in May 1998. The governments of Australia, Denmark, Italy, Norway, New Zealand and the United States generously sponsored the meeting.

More than fifty people from over twenty-five countries attended the conference. Each participant attended in his or her personal capacity as an expert and not as a representative of a country or a NGO. At the end of this two-day meeting, there was general agreement among participants that neither India nor Pakistan had enhanced its own security or international status by conducting the tests, but that the risk of nuclear war in the region is now greater. Also, it was recognized that the NPT and the CTBT had been in difficulty prior to the tests, although they remained the best solutions available to reduce potential for further conflict and therefore remained crucial. Finally, many participants expressed their concern that if India and Pakistan were rewarded in any way for demonstrating their nuclear capabilities, this may cause some NPT members to reassess their membership in the regime.

International response to the nuclear tests in South Asia was inadequate: there is a need for more coherent and collective action. Participants focused on practical suggestions to policy-makers to reduce the risk of war; to save the non-proliferation and nuclear arms control regimes; and to anticipate the effects of the tests on areas of regional tensions, particularly the Middle East.

The Responses to the Tests

Causes of the Tests

Consequences of the Tests

Regional Security

Consequences for Non-Proliferation and Disarmament

Damage Limitation

Developing the Non-Proliferation and Disarmament Agenda

Conclusions and Policy Options

Main Summary

Prevention of Nuclear War

Saving the Non-Proliferation and Arms Control Regimes

The Effects on Regional Tensions, Especially in the Middle East

GE.99-00415
UNIDIR/99/2

The Geneva Forum: Seminars on Small Arms, Vol. 1

Since 1997, the Quaker United Nations Office, the Programme for Strategic and International Security Studies of the Graduate Institute of International Studies, and the United Nations Institute for Disarmament Research have collaborated in bringing expert presentations on issues in contemporary arms control and disarmament to the international community in Geneva. These presentations have been addressed to the members of the diplomatic missions in Geneva, and our goal has been to offer high-quality analytical perspectives on contemporary issues in a 'user friendly' format related to the policy development needs and possibilities of this particular community.

The focus of the Geneva Forum in 1998 and 1999 was the issue of small arms and light weapons. In this small volume, the reader will find the summary results of the seminars that were held between May 1998 and November 1999. We hope, through this volume, to reinforce the experts' presentations by making them available to a wider audience.

Introduction

Conventional Arms Transfers: Surplus Weapons and Small Arms — *Herbert Wulf*

Illegal Arms in Albania and European Security — *Chris Smith*

Weapons: A Question of Health? — *Robin M. Coupland & David Meddings*

The International Commission of Inquiry (Rwanda) — *Eric Berman*

The United Nations and Small Arms: The Role of the Group of Governmental Experts —
Mitsuro Donowaki, Graciela Uribe de Lozano & André Mernier

Monitoring the Flow, Availability and Misuse of Light Weapons: A New Tool for the Early Warning
of Violent Conflict — *Edward J. Laurance*

The Norwegian Initiative on Small Arms Transfers: West Africa and Beyond — *Ole-Petter Sunde*

War, Peace and Light Weapons in Colombia: A Case Study — *Daniel Garcíá-Peña Jaramillo*

Quaker United Nations Office, the Programme for Strategic and International Security Studies of the Graduate Institute of International Studies and the United Nations Institute for Disarmament Research

Editors

Additional UNIDIR publications

Building Confidence in Outer Space Activities, Péricles Gasparini Alves, ed., 1995, ISBN 1855216302, published for UNIDIR by Dartmouth (Aldershot)

Curbing Illicit Trafficking in Small Arms and Sensitive Technologies: An Action-Oriented Agenda, Péricles Gasparini Alves and Daiana Belinda Cipollone, eds., 1998, Sales No. GV.E.98.0.8, also available in Spanish, GV.S.98.0.8

Evolving Trends in the Dual Use of Satellites, Péricles Gasparini Alves, ed., 1996, Sales No. GV.E.96.0.20, ISBN 92-9045-115-7

The Fissile Material Cut-Off Debate: A Bibliographical Survey, Daiana Cipollone, 1996, Sales No. GV.E.96.0.30.

Increasing Access to Information Technology for International Security, Péricles Gasparini Alves, ed., 1997, Sales No. GV.E.97.0.23

National Threat Perceptions in the Middle East, by James Leonard, Shmuel Limone, Abdel Monem Said Aly, Yezid Sayigh, the Center for Strategic Studies (University of Jordan), Abdulhay Sayed and Saleh Al-Mani, 1995, Sales No. GV.E.95.0.24.

Nuclear-Weapon-Free Zones in the 21st Century, Péricles Gasparini Alves and Daiana Belinda Cipollone, eds., 1997, Sales No. GV.E.97.0.29, also available in Spanish, Sales No. GV.S.97.0.29

The Transfer of Sensitive Technologies and the Future of Control Regimes, Péricles Gasparini Alves and Kerstin Hoffman, eds., 1997, Sales No. GV.E.97.0.10

Verification of a Comprehensive Test Ban Treaty from Space — A Preliminary Study, Bhupendra Jasani, 1994, Sales No. GV.E.94.0.30.

Contact **Anita Blétry** for availability information

Fax: (+41 22) 917 0176

E-Mail: abletry@unog.ch