The Information Revolution and Post-Modern Warfare

by Steven Metz via rialator - Strategic Studies Institute, U.S. Army War College *Tuesday, Aug 29 2006, 6:11pm*
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Armed Conflict in the 21st Century:

> This is a fascinating paper for analysts, strategists, activists, hackers, political bloggers and numerous others. Written in 2000 it has already proven prophetic regarding proxy wars; States imitating the methodologies of organised crime; the increasing privatisation of warfare and much much more.
>
> It also serves as a window into the workings of the inept U.S. and Israeli administrations. Both regimes confuse wishful thinking and dissociative rhetoric with post-modern warfare; we refer to the Bush, "mission accomplished", statement and the dissociative Olmert announcement that the 'Hezbollah infrastructure has been completely destroyed'.
>
> This paper is a revealing document invaluable to those who oppose all forms of totalitarian rule -- know your enemy!
>
> [Published in four parts.]

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FOREWORD

Within the past decade, the U.S. military has implemented a number of programs to assess the changes underway in the global security environment and in the nature of warfare. Defence leaders

and thinkers have concluded that revolutionary change is taking place and, if the United States develops appropriate technology, war fighting concepts, and military organizations, it can master or control this change, thus augmenting American security.

In this monograph, Dr. Steven Metz, who was one of the earliest analysts of the strategic dimension of the revolution in military affairs, suggests that official thinking within the U.S. military may be too narrow. The information revolution, he contends, will have far-reaching strategic effects. The transformation it brings will not only be technological, but political, social, ethical and strategic as well. As he explores the impact that the information revolution may have on the conduct of armed conflict, Dr. Metz introduces a number of ideas which need further analysis, including the potential for the emergence of non-traditional, networked enemies; multidimensional asymmetry; the privatisation of security; and the potential impact of technologies like robotics, non-lethality, and nanotechnology. He concludes with an assessment of the features likely to characterize successful militaries in the 21st century.

Because it deals with the future, this study is conceptual and speculative. But the issues and linkages it raises are directly relevant to today's strategic thinkers and leaders. The Strategic Studies Institute is pleased to offer it as a contribution to debate over the nature of the challenges that the U.S. military will face in coming decades.

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SUMMARY INTRODUCTION

The information revolution is increasing interconnectedness and escalating the pace of change in nearly every dimension of life. By examining the ongoing changes in the nature of armed conflict and thinking expansively, looking for wider implications and relationships, and exploring cross-cutting connections between technology, ethics, social trends, politics, and strategy, the architects of the future U.S. military can increase the chances of ultimate success.

PART I: STRATEGIC CONTEXT

Interconnectedness and Globalisation.

One of the most important changes associated with the information revolution is a dramatic increase in the interconnectedness of people around the world. Almost no dimension of modern life has been untouched by the information revolution. In the realm of security, the information revolution brings both good news and bad news, speeding the accumulation of information and slowing the pace of decision-making.

The information revolution has also sped up the pace of change in all aspects of life. Rapid change always has winners and losers. Much of the violence that will exist in the early 21st century will originate from the losers of the change underway today.

Organisational Change.

The information revolution is altering the shape of economic and political organizations. Today, the successful commercial firm is one with a global perspective, a web of vii strategic partnerships, and internal flexibility based on project teams or work groups rather than hierarchies or bureaucracies.

This phenomenon is migrating to the political world as well. Clinging to old practices and organizations entails escalating costs and risks for governments as much as for corporations. At the same time that interconnectedness undercuts the viability of authoritarianism by allowing repressed citizens to communicate, organize, and mobilize, it also places handcuffs on elected governments. This reflects an historic de-concentration of political, economic, and ethical power.

The information revolution is both a force for stability and for instability. On the positive side, it complicates the task of old-style repression and facilitates the development of grass roots civil society. But the information revolution also allows organizations intent on instability or violence to form alliances, thus making the world more dangerous. Some of the most complex struggles of the 21st century will pit polyglot networks against states. Hierarchies and bureaucracies face serious disadvantages when pitted against unscrupulous, flexible, adaptable enemies.

The Changing Nature of Armed Conflict.

The U.S. Department of Defence and the military services hold that speed, knowledge, and precision will minimize casualties and lead to the rapid resolution of wars, thus minimizing the problems associated with the challenges to the political utility of force. States with fewer intellectual and financial resources than the United States
will not have the luxury of using technology to solve strategic problems. Whether the United States can be deterred from intervention by weapons of mass destruction or terrorism is one of the central questions for the future global security environment.

Privatisation.

Interconnectedness, the dispersion of power and knowledge that flows from the information revolution, and the eroding legitimacy of armed force are leading toward a multidimensional trend toward privatisation within the realms of security and armed conflict. As nations seek ways to attain a surge capacity without the expense of sustaining a large, peacetime military, and as they face difficulties recruiting from their own populations, contracting will be an attractive option for filling the ranks. Corporate armies, navies, air forces, and intelligence services may be major actors in 21st century armed conflict. This will open new realms of strategy and policy.

Asymmetry.

States which decide to commit aggression in coming decades will know that if the United States and the world community decide to counter the aggression, they can. The qualitative gap between the U.S. military and all others is wide and growing. This leaves aggressors two options: they can pursue indirect or camouflaged aggression, or they can attempt to deter or counter American intervention asymmetrically. Asymmetry is a characteristic of periods of rapid change, particularly revolutionary ones. In geological history, there have been times when many new species emerged. Most proved unable to survive, leading to new periods with less diversity. Military history follows the same pattern: periods of great diversity follow periods of relative homogeneity. The current era is one of diversity. For the period of diversity, asymmetry will be a dominant characteristic of armed conflict.

Combatants.

In the opening half of the 21st century, the types of state and non-state combatants which have characterized recent armed conflict will continue to exist, but they are likely to be ix joined by new forms. The U.S. military probably will be the first post-modern state combatant, attaining greatly amplified speed and precision by the integration of information technology and development of a

system of systems which links together methods for target acquisition, strikes, manoeuvre, planning, communication, and supply. Its organization will be less rigidly hierarchical than that of modern state combatants. The final type of combatants in 21st century armed conflict are likely to be post-modern non-state ones. These will consist of loose networks of a range of non-state organizations, some political or ideological in orientation, others seeking profit.

PART II: IMAGES OF FUTURE WAR

The Official View.

Broadly speaking, the opening decades of the 21st century are likely to see some combination of three modes of warfare: formal war, informal war, and grey area war. Formal war pits state militaries against other state militaries. It has been the focus of most futures-oriented thinking within the U.S. military and Department of Defence. The official vision of future war reflects the belief that "information superiority" will be the lifeblood of a post-modern military and thus the key to battlefield success.

Futures-oriented thinking deals with force development, which is a responsibility of the services. In fact, most of the future thinking within the U.S. military is still done by the services. So far, the Army's program is the most elaborate. It has formulated a vision that is highly innovative in its approach to technology, organization, and leadership, but conservative in its assumptions about the nature of warfare and the purposes of American military power. The U.S. Air Force's vision of future war is also characterized by a combination of creativity and conservatism. The Marines are looking at fairly radical changes in tactical and operational procedures, including new organizations and doctrine. The Navy's view of future war is based on a "revolution in strike warfare" using existing major platforms with better systems of target acquisition, intelligence, and guidance.

The official American view of the future consistently treats technology, particularly information technology, as a force multiplier rather than as a locomotive for revolutionary transformation. With the exception of adding three new tasks for the U.S. military—space operations, information warfare, and homeland protection—the official vision anticipates few if any strategic shifts.

Asymmetry Again.

Asymmetry has become a central concept in official American thinking about future warfare. The question then becomes: what forms of asymmetry will be most common and, more importantly, most problematic for the United States? Enemies using precision munitions or weapons of mass destruction to complicate deployment into a theatre of operations could pose a serious challenge to some of the most basic tenets of American strategy. A counter-deployment strategy is only one of several asymmetric approaches that future enemies may attempt. They might also resort to terrorism, either in conjunction with a counter-deployment strategy or in lieu of it. Of all forms of asymmetry, urban warfare may be the most problematic and the most likely. Two types of technology, though, might help alleviate some of the challenges posed by urban operations: non-lethal weapons and robotics. Broadly speaking, the opening decades of the 21st century will see both symmetric formal war pitting two modern states, and asymmetric formal war pitting a post-modern military against a modern one. It remains to be seen whether another post-modern military will emerge to challenge the United States or whether, as American strategic thinking posits, the post-modern U.S. military will always be able to overcome the asymmetric methods used by modern militaries.

Informal War.

Informal war is armed conflict where at least one of the antagonists is a non-state entity such as an insurgent army or ethnic militia. Twenty-first century informal war will be based on some combination of ethnicity, race, regionalism, economics, personality, and ideology. Informal war will both be more common and more strategically significant. Combat in future informal war is likely to remain "hands on," pitting the combatants in close combat. Warriors will be interspersed among non-combatants, using them as shields and bargaining chips. At times, refugee disasters will be deliberately stoked and sustained to attract outside attention and intervention. Unlike formal war, informal war will remain dirty and bloody.

Some types of informal war will be comparatively simple. Counterinsurgency, which uses military forces to attain not only the short-term restoration of order but also ultimate resolution of the conflict that led to disorder in the first place, is a different and more difficult matter. There is no doctrine or strategy for dealing with networked opponents, be they existing criminal cartels or future insurgents. To be successful against future insurgents, the U.S. military will need better intelligence, better force protection, and greater precision at the tactical and strategic levels. In part, these things require new organizational methods. Emerging technology also holds promise. Again, non-lethal weapons and robotics may prove the most vital.

Grey Area War.

Grey area phenomena combine elements of traditional war fighting with those of organized crime. Today, grey area threats are increasing in strategic significance. Since grey area war overlaps and falls in between traditional national security threats and law enforcement issues, states must often scramble to find the appropriate security structure to counter it. As the debate within the United States over the use of the military to counter grey area enemies intensifies in coming years, creation of an American national gendarmerie should be considered. It could form its own alliances with similar security forces around the world and operate more effectively against grey area enemies in an interconnected security environment and globalised economy.

Strategic Information Warfare.

Future war may see attacks via computer viruses, worms, logic bombs, and trojan horses rather than bullets, bombs, and missiles. Information technology might provide a politically usable way to damage an enemy's national or commercial infrastructure badly enough to attain victory without having to first defeat fielded military forces. Today strategic information warfare remains simply a concept or theory. The technology to wage it does not exist. But until it is proven ineffective, states and non-state actors, which have the capacity to attempt it, probably will, doing so because it appears potentially effective and less risky than other forms of armed conflict.

Cyber attacks might erode the traditional advantage large and rich states hold in armed conflict. Private entities might be able to match state armed forces. As one of the world's most "wired" nations, strategic information warfare could be particularly problematic for the United States, forcing policymakers and military strategists to examine some of their most basic beliefs about war fighting and national security.

Technological Transformation.

New technologies or new combinations of technology have the potential to alter not only tactics and operational xiii methods, but military strategy itself. Soon technology may allow military planners to select which individual or physical object in a building is to be destroyed. Coming decades are likely to see the proliferation of robots around the world and in many walks of life. As one of the most avid

customers of new technology, this will certainly affect the American military. Initially, the prime function of military robots will be to replace humans in particularly dangerous or tedious functions. The real breakthrough and decision point will come when robots advance to the point that they have the potential for combat use.

While initial thinking about robotics concentrates on miniaturization and the integration of networks of small robots with relatively limited functions, partially organic robots may prove nearly as useful. Beyond technological obstacles, the potential for effective battlefield robots raises a whole series of strategic, operations, and ethical issues, particularly when or if robots change from being lifters to killers.

Other emerging technologies could prove equally revolutionary. One example is what can be called "psychotechnology." Future military commanders might have the technology to alter the beliefs, perceptions, and feelings of enemies. Any developments in this realm warrant very close scrutiny. Barring some sort of truly fundamental change in the global security environment, they should be eschewed.

PART III: THE MARK OF SUCCESS FOR FUTURE
MILITARIES

Foundation.

Even in revolutionary times, continuity outweighs change. This holds true for the current revolution in military affairs. War will always involve a dangerous and dynamic relationship among passion, hatred, reason, xiv chance and probability. The "specialness" of war fighting and warriors will survive any real or apparent changes in the nature of armed conflict. War is and will be distinct from other types of human activity. Largely because of this, future warriors, at least in democracies like the United States, will continue to be bound by an ethos stressing duty, honour, sacrifice, and the highest ethical standards.

Speed.

One of the most important determinants of success for 21st century militaries will be the extent to which they are faster than their opponents. Tactical and operational speed comes from information technology—the "digitised" force—and appropriate doctrine and training. Strategic speed will be equally important as a determinant of success in future armed conflict. For nations that undertake long-range power projection, strategic speed includes mobility into and within a theatre of military operations. Strategic speed also entails faster decision-making. One of the core dilemmas the United States is likely to face is having a military that can deploy and operate at lightening speed, while strategic and political decision-making remains a time-consuming process of consensus building. Speed also has an even broader, "meta-strategic" meaning. The militaries which meet with the greatest success in future armed conflict will be those which can undertake rapid organisational and conceptual adaptation. Successful state militaries must institutionalise procedures for what might be called "strategic entrepreneurship"—the ability to rapidly identify and understand significant changes in the strategic environment and form appropriate organizations and concepts.

Precision.

So far thinking on the revolution in military affairs has focused on what might be called physical precision—the ability to hit targets with great accuracy from great xv distances with precisely the desired physical effect. Military strategists and commanders must come to think in terms of

psychological precision as well: shaping a military operation so as to attain the desired attitudes, beliefs, and perceptions on the part of both the enemy and other observers, whether non-combatants in the area of operations or global audiences.

Precision has a strategic component that is sometimes overlooked. Strategic precision entails shaping a military so that it best reflects its nation's strategic situation, including strategic culture, level of technological development, and most significant threats. For the U.S. military, this entails finding the appropriate balance among capabilities to deal with formal war, informal war, and grey area war. It also entails reaching a degree of privatisation, which maximizes efficiency without creating unacceptable risks. In attaining strategic precision, past success can be a hindrance. Victory limits the urge to adapt and innovate. For the United States, avoiding a victory-induced slumber will be a key step toward a post-modern military.

Finding and Hiding.

One of the most crucial dynamics of future armed conflict will be the struggle between finding and hiding. Successful militaries will be those better at finding their enemies than their enemies are at finding them. Within the United States, the emphasis has been on the offensive part of this equation—the finding. Hiding, though, warrants more attention. Future military strategists must rebuild their understanding of deception and hiding, working with new information technology that allows things like morphing and sophisticated spoofing (including things like holographic soldiers, tanks, planes, and so forth). In particular, the notions of operational and strategic deception must be revisited.

Reorganising.

The most successful future militaries will be those that undertake a "blank slate" re-evaluation of their most basic concepts and organizational precepts. Developing hybrid blends of hierarchical structures with networks, public components with private, and humans with machines will be particularly important. Re-evaluating career paths in the military also might be necessary. The trend in the commercial world has been toward a blurring between management and staff. If this is extrapolated to the military, it might be necessary to consider whether the division of a service into enlisted personnel and commissioned officers makes sense in the 21st century. In addition, the organization of militaries into land, sea, and air services needs assessed. Perhaps it would make more sense to organize them into components focused on a specific type of armed conflict—one for formal war, one for informal, and one for grey area war. Alternatively, post-modern militaries must consider whether a new service is needed for new operating environments. Those militaries able to let go of old organizational patterns and embrace, even master new ones will be the most likely to succeed in future armed conflict.

Adjusting Civil-Military Relations.

The current health of American civil-military relations is based on the perception that: (1) the military has a vital job to do in defending the nation against external enemies, it does so very competently, and should receive adequate resources to do so; (2) the effectiveness of the U.S. military does not threaten domestic civil rights or political institutions; and, (3) the U.S. military represents the best of traditional American values. Changes in any of these three components could degrade civil-military relations. The U.S. military must do its part to help forestall problems with civil-military relations. Foremost, it must assure that any capabilities or methods it develops reflect national values and strategic culture. For instance, it should eschew operational concepts that call for the pre-emptive use of force on the part of the United States or for actions that would

indiscriminately harm non-combatants. And, unless circumstances change in some fundamental way, the military should eschew development of dangerous new technologies like psychotechnology, which run counter to American values like personal privacy and civil rights.

Controlling for Asymmetry.

Since asymmetric conflict will be common in the opening decades of the 21st century, finding ways to resist or transcend it will be one of the determinants of success for militaries and other organizations that participate in armed conflict. For the United States, what might be called an asymmetry of time is likely to be particularly problematic. Today, long wars are simply considered inconceivable in American planning While everything suggests that the future United States (just like the current one) would prefer short wars, failing to plan for protracted conflict increases the chances it will occur. Given this, greater attention should be given to protracted war in the various war games, seminars, and simulations that the U.S. military uses to think about future armed conflict.

Adapting to Technological Shifts.

The ability to accept and capitalize on emerging technology will be a determinant of success in future armed conflict. No military is better at this than the American, in large part because no culture is better at it than the American. That said, there would be new, radical technologies with great promise, which will challenge the ability of the military to master and integrate. In particular, robotics, miniaturization, and non-lethality are likely to provide the keys to future success.

Anticipating Second and Third Order Effects.

Because strategy and armed conflict are so complex, any action has a multitude of second order effects (and third, fourth, and so on). Strategic decisions made today, particularly by the United States, will have second and third order effects on 21st century armed conflict. Some of these second order effects will be strategic and political. To take one example, by vigorously pursuing a revolution in military affairs designed to augment power projection and, perhaps, to lessen the need for allies, the United States may very well encourage the strengthening of regional security structures designed to minimize the need for American involvement or intervention. Many future innovations will bring equally unexpected second and third order effects. The development of military robotics, biotechnology, and psychotechnology, in particular, may unleash a hurricane of political, legal, and ethical problems.

Conclusion.

No nation has ever undertaken a full revolution in military affairs unless it is responding to perceived risk or recent disaster. The paralysis of victory is great and vested interests always powerful. If historical patterns hold, the U.S. military may not be able to make the leap into the future on its own. It often seems that the Pentagon's plans for the future, including systems acquisitions, are based on "bygone battles." Ultimately, firm prodding may be necessary. This could come from Congress, the President and Secretary of Defence, or from battlefield defeat. If the nation is lucky, visionary leadership rather than American blood will inspire the necessary changes.

Recommendations.

The key strategic challenges for the Army in the short- to mid-term (5 to 20 years) will be attaining greater strategic mobility, completing digitisation, and becoming as effective at shaping the

strategic environment as it is at responding to threats. The key strategic challenges for the mid- to long-term (15-30 years) will be:
developing and integrating robotics and miniaturized systems;
stressing the full modularity of equipment, systems and organization; developing methods for the rapid transformation of doctrine, concepts, and organizations; and, developing greater psychological precision, including the full integration of non-lethal capabilities.

To prepare for this second wave of transformation, the Army should use its futures-oriented programs and intellectual resources, particularly the Army After Next Project and the War College, to explore the strategic implications.

INTRODUCTION

The German philosopher Hegel held that revolutions are the locomotive of history. According to his theory, every social, political, and economic system builds up tensions and contradictions over time. Eventually these explode in revolution. Taking the argument one step further, Lenin held that a revolutionary did not have to wait for the explosion, but could speed it up, manipulate it, and control it. But Lenin was wrong. One cannot create a revolution in the way that an architect designs a building. Nor is it possible to control revolutions like a conductor leads an orchestra. Revolutions are much too big and complex for that. Those who live in revolutionary times can only make a thousand small decisions and hope that they move history forward in the desired direction. This holds as much for military revolutions as for any other kind.

A "revolution-centric" perspective on the development of war emerged among American strategic thinkers in the 1990s. Now security analysts, military leaders, and defence policymakers, not only in the United States, but around the world, accept the idea that some sort of revolution in military affairs is underway. Its nature and eventual outcome, though, are less clear. One thing is certain: the United States has a greater stake in the revolution in military affairs than any other nation. By definition, revolutions upset existing relationships and hierarchies. Since the current configuration of global political, economic, and military power is favourable to the United States, the chances are that fundamental strategic change will prove deleterious to the American position. Washington is thus faced with the difficult task of modulating, directing, or controlling the revolution in military affairs. History has seen two types of military revolutions.

Operational and tactical revolutions occurred when new technology, operational concepts, or military organizations combined to generate a substantial increase in the effectiveness of military organizations. The revolution of the 1920s and 1930s that led to mechanized land warfare, strategic air war, and carrier war at sea is one example. Strategic revolutions have been much rarer. Alvin and Heidi Toffler suggest that strategic revolutions occur when a much broader shift in the method of production changes the entire panoply of human relationships, thus altering not only how militaries fight, but who fights and why they fight. Today American strategic thinkers assume that the world is in the midst of an operational or technological military revolution and plan accordingly. In fact, a strategic revolution may be under way, spawned by and reflecting the information revolution.

Underestimating the extent of the ongoing revolution in military affairs and failing to understand its intricacies and second order effects can endanger American security. The need to think broadly and holistically is pressing. In simple terms, the information revolution is increasing interconnectedness and escalating the pace of change in nearly every dimension of life. This, in turn, shapes the evolution of armed conflict. Whether in economics, politics, or war fighting, those who are able to grasp the magnitude of this will be the best prepared to deal with it. The architects of the 21st

century American military must understand the broad political, economic, social, and ethical changes brought by the information revolution and by its manifestations—interconnectedness and an escalated pace of change. They must understand the effect these changes are having or might have on the evolution of armed conflict. Then, most importantly, they must develop some notion of what characteristics the future American military must have to prosper in the new strategic environment. The better an individual, an organization, or a state understands the nature of a revolution, the better its chances of emerging a winner. By examining the ongoing changes in the nature of armed conflict and thinking expansively, looking for wider implications and relation-2 ships, and exploring cross-cutting connections between technology, ethics, social trends, politics, and strategy, the architects of the future U.S. military can increase the chances of ultimate success. This study provides some suggestions on how this might be done.

PART I:
STRATEGIC CONTEXT
INTERCONNECTEDNESS AND GLOBALISATION.

What is driving the current revolution in military affairs? Throughout history, many factors have altered the human condition: new ideas, religions, ecological shifts, disease, migrations, conquest, and so forth. Today technology, particularly information technology, is the locomotive, defining what is possible and pushing old ideas, values, methods, and organizations into obsolescence. As part of this, the information revolution is shaping the strategic environment in which armed conflict takes place. The revolution in military affairs is the dependent variable, driven and buffeted by wider changes. To understand future armed conflict, then, one must at least attempt to understand the political, economic, social, and ethical dimensions of the information revolution.

One of the most important changes associated with the information revolution is a dramatic increase in the interconnectedness of people around the world. This is evident at many levels and in many ways. For individuals, the number of people with whom they can cultivate some sort of relationship has increased exponentially. For most of human history, people only connected with the relatively few people who lived in their locale or whom they met on travels. Printing and literacy increased this somewhat by allowing people to develop at least a rudimentary understanding of others far away. Radio, the telegraph, the telephone, and television increased interconnectedness further by escalating the speed with which ideas could be transmitted and augmenting their psychological impact by making them more "human." Today, information technology allows the transmission of massive amounts of data to large audiences over great distances very quickly.

These relationships are much more dynamic, interactive, and powerful than the static one between author and reader. On a personal level, individuals can cultivate a relationship with hundreds or thousands of people, whether through email, online chat, or other means. The explosion of wireless communications means that anyone who wants to can stay "connected" twenty-four hours a day. One can stand in the middle of an African game reserve many kilometres from the nearest paved road and read office email from a hand phone. By 2025, according to the United States Commission on National Security/21st Century, "the entire world will be linked, so that from any stationary or mobile station it will be physically possible to send and receive near-instantaneous voice, video and other serial electronic signals to any other station." As Bill Gates phrases it:

Universal connectivity will bring together all the information and services you need and make them available to you regardless of where you are, what you are doing, or the kind of device you are using. Call it "virtual" convergence—everything you want is in one place, but that place is wherever you want it to be, not just at home or in the office.

Even more importantly, information technology allows everyone with access to it to become attuned to issues and problems in far-flung parts of the globe. There are tens of thousands of newspapers, newsletters, magazines, radio stations, and government documents available online. Chat rooms, email distribution lists, and online newsgroups exist for every conceivable topic. One can cultivate a fairly sophisticated understanding of any part of the world without leaving home. Information previously available only to those with the ability and the time to visit a library can now be delivered to anyone with a simple PC and a phone.

The information revolution opens new vistas for those who do leave home. For most of history, to migrate 6 demanded extraordinary boldness or desperation. Today, information technology allows potential migrants to both reconnoitre the area they would like to move to, and to retain reasonable ties with the family and friends left behind. International travel and migration—whether permanent or temporary—is thus easier and more common than it has ever been. The world is crisscrossed by networks, some based on ties like ethnicity or nationality, others on shared ideas, concerns, or ideology. These provide not only a source of information, but also a means to mobilize economic and political support for an organization or an idea. Some dimensions of the information revolution and technological advancements are destabilizing or even dangerous. They have, for instance, blurred the distinction between fantasy and reality. Users of Internet Relay Chat (IRC) jokingly compare "RL" (real life) to the virtual world that entertains, informs, and, sometimes, confuses them.

The psychologically mature users understand the distinction between RL and IRC. For others, particularly adolescents and less mentally stable adults, the boundary is unclear, causing misunderstanding, confusion and anxiety. The fact that one can create an online persona unencumbered by reality can be liberating, but also dangerous for the immature or irresponsible. Freedom is always potentially dangerous. In this IRC is simply a microcosm of the wider problems brought by the information revolution. Advances in communication technology, especially the ability to meld reality and fantasy through things like morphing, when combined with the marketability of violent entertainment, confuse the young and the unstable who then feed each others' delusions via virtual communications. In the worst cases, fantasy and reality become hopelessly entangled and the result can be events like the murders at Columbine High School. The information revolution has brought information overload. Everyone with a PC and an Internet connection runs the risk of being bombarded with ideas and images. While this can broaden an individual's perspective by providing access to different points of view and sources of information, it can also reinforce delusions by showing that others believe the same thing. Bizarre ideas and outright lies can be propagated much more easily than in the past. One has only to look at the plethora of conspiracy or racist web sites to see this at work. And, information technology is also broadening the gap between the "haves" and "have nots," both within advanced societies like the United States and in the world as a whole.

Almost no dimension of modern life has been untouched by the information revolution. One of its most important effects has been the cascading globalisation of economies. The "tactical" outcome is that businesses must have a global approach to markets, financing, trends, risk amelioration, partners, and suppliers. The "strategic" outcome is a linkage of economies around the world. "Economic downturns," notes the U.S. Commission on National Security, "that have usually been episodic and local may become, thanks to the integration of global financial markets, more systemic in their origins and hence more global in their effects." In a sense, this is not an entirely new phenomenon. Thomas Friedman points out that the period from the late 19th century to the middle of the 20th also saw substantial globalisation driven by a decline in transportation costs arising from the invention of the railroad, steamship, and automobile. But the process of globalisation underway today is immensely more powerful in terms of its impact on politics, economics, culture, and values.

Every state must choose between participation in the globalised economy or persistent poverty.

Participation means that the state—not just businesses within a state, but the government itself—must follow certain rules of behaviour, including things like limiting corruption and making budgeting and finances transparent. "Transparency," write Robert Keohane and Joseph Nye, "is becoming a key asset for countries seeking investments.

The ability to hoard information, which once seemed so valuable to authoritarian states, undermines the credibility and transparency necessary to attract investment on globally competitive terms." This has immense implications. Decisions made by multinational financial institutions, overseas banks, or investors on the other side of the world now determine the economic health of a nation nearly as much as decisions made by its own leaders. As Jessica T. Mathews writes, "National governments are not simply losing autonomy in a globalising economy. They are sharing powers—including political, social, and security roles at the core of sovereignty—with businesses, with international organizations, and with a multitude of citizen groups, known as nongovernmental organizations." In a sense, all states have taken on some of the weakness, vulnerability, and lack of control that traditionally characterizes small states. As the ability of the state to control its economy fades, it is likely to become weaker across the board, thus leading to a major, perhaps revolutionary transformation of the global security system.

Economic globalisation has a direct effect on security. In all likelihood, there will be states that refuse to participate. As they fall further and further behind, they may lash out with military aggression or terrorism. While Washington did not create globalisation, Americans have been the most successful at adapting to it and thus have gained substantial advantages. "Those people who do not benefit from a more integrated global economy," according to the U.S. Commission on National Security/21st Century, "are unlikely to blame their own lack of social capital; they are more likely to sense conspiracy and feel resentment." In the eyes of many other nations, then, globalisation is a deliberate strategy on the part of the United States to spread its influence and culture.

While this is not true, the idea is pervasive and is likely to spark anti-American sentiment in states that come out losers during globalisation. Mahathir Mohamad, Malaysia's Prime Minister, who accused the "Great Powers" of deliberately using globalisation to cause his nation's 1997 economic crisis, is simply one of the first of what will be many leaders looking for a scapegoat to explain their shortcomings or frustrations. As globalisation erodes the ability of political leaders to fully control their own country's destiny, it simultaneously erodes their propensity to accept responsibility for events. This leads to a search for scapegoats. Often the symbols of globalisation—the United States, the International Monetary Fund, and similar icons—will serve this function.

The information revolution, by eroding the control that authoritarian regimes can exercise over their citizens, is both liberating and destabilizing. The information revolution helped destroy Marxism-Leninism by stoking discontent and allowing opposition movements to form coalitions both within their states and outside. It may not necessarily represent the global ascendance of truth, but it certainly shortens the lifespan of lies. With the exception of dinosaurs like North Korea, Libya, Afghanistan, and Iraq, which will tolerate opprobrium rather than surrender control of their citizens, world public opinion matters.

Increasingly, states that practice repression do so through quick, spasmodic campaigns as in Rwanda. Since international intervention will continue to require a slow process of consensus building, the world will see a long series of humanitarian disasters in the face of rapid genocide or ethnic cleansing. In so many ways, the information revolution brings both good news and bad news, speeding the accumulation of information and, by increasing the data that must be considered and the range of available options, slowing the pace of decision-making. While amplifying and magnifying connections, the information revolution has drastically increased the pace of change in

human life. "By almost any measure," writes Hans Moravec, "the developed world is growing more capable and complex faster than ever before." Social, personal, economic, political, ethical, and technological factors all shift with breathtaking speed. Transformation and revolution are daily events. Successful individuals and organizations adapt to the pace of change and, at times, even control it. Those that cannot will face anxiety, stress, conflict, and failure.

Rapid change always has winners and losers, revolutionary change even more so. Much of the violence that will exist in the early 21st century will originate from the losers of the change underway today. The losers will be a polyglot group. They will include some societies or states unable or unwilling to adapt to globalisation, particularly ones that cannot continence the lack of control and transparency that successful integration into the globalised economy demands. The more benign ones may attempt isolation from the world (even given the human costs this will entail.) Others, like Iran or Afghanistan, will wrap their cause in cultural identity and use the tools of state power to resist or punish the United States, the International Monetary Fund, and other nations or organizations associated with globalisation and interconnectedness. But there will also be losers within globalising states.

The protests against the World Trade Organization's 1999 Seattle meeting may give birth (or, at least, coherence) to a new ideology defined by opposition to globalisation and interconnectedness. It is likely to bring together environmental activists, industrial workers, religious and cultural leaders opposed to the globalisation, and political conservatives concerned about the erosion of national sovereignty and the intrusiveness of globalisation.

This movement, with its dizzying, almost bizarre complexity and reliance on modern technology for mobilization and communication at the same time that it rejects the economic and social consequences of modernisation, will typify many of the political movements of the coming era. Most of its components will not use violence and armed force, but some will. The information revolution will empower those opposed to it as well as those who accept it.

ORGANIZATIONAL CHANGE.

The onward rush of information revolution is altering the shape of economic and political organizations. During the industrial age big, hierarchical organizations held advantage over smaller, less formally organized ones. Firms like Standard Petroleum and General Motors could crush or absorb smaller competitors through brute power. Small states, unless protected by some quirk of politics or geography, could seldom compete militarily with large ones. Today, the trend in the business world is toward macro-level integration and "strategic partnerships" but internal decentralization and the loosening of hierarchies. Technology is forcing a major shift in paradigms of scale with adaptability and speed as important as aggregate resources. By allowing multiple, cross-cutting connections between individuals and organizations, technology is dispersing power, creativity, and productive capability. Today, the successful commercial firm is one with a global perspective, a web of strategic partnerships, and internal flexibility based on project teams or work groups rather than hierarchies or bureaucracies. This phenomenon is migrating to the political world as well.

In the business world, the pressure to adopt modern organizational structure is a matter of institutional life or death. Corporations that resist risk failure. Governments, with their political and military resources, can hang on to outmoded structures longer than businesses. A government using outmoded organizational methods is in less danger of failure than a corporation that refuses to adapt. But clinging to old practices and organizations entails escalating costs and risks for governments as much as for corporations. As the same time that interconnectedness undercuts the

viability of authoritarianism by allowing repressed citizens to communicate, organize, and mobilize, it also places handcuffs on elected governments. More and more, governments are blamed for economic and social conditions that they cannot ameliorate or control.

This reflects an historic deconcentration of political, economic, and ethical power. Carl Builder and Brian Nichiporuk wrote, "Since so many of the institutions of the nation-state are hierarchical and so many of the transnational organisations are networked, the net flow of power today tends to be out of the nation-state and into non-state actors." Global public policy networks, which are loose alliances of government agencies, international organizations, corporations, nongovernmental organizations, professional societies, and other social groups, are becoming major political actors. Information technology allows issue, goal, or project oriented networks to grow as dispersed actors communicate and coordinate across great distances, thus mobilizing pressure on governments. Interest networks, if they have skilled leadership and an attractive "product," can wield influence disproportionate to their size. More and more, flexibility, creativity, astute marketing and responsiveness to supporters or constituents trump pure size or an aggregation of resources. States are like dinosaurs toward the end of the Cretaceous Period: powerful but cumbersome, not yet superseded but no longer the unchallenged masters of their environment.

The information revolution is both a force for stability and for instability. On the positive side, it complicates the task of old-style repression and facilitates the development of grass roots civil society. It is not coincidence that there is more democracy today than at any time in history. But the information revolution also allows organizations intent on instability or violence to form alliances, thus making the world more dangerous. Some of the most complex struggles of the 21st century will pit polyglot networks against states. Colombia today offers a glimpse of this. There the alliance of political insurgents, drug cartels, international mafias, hired legal and economic advisers, and other affiliates is flush with resources and unbound by ethical or legal considerations.

Characterized by "nimble new organizations" and "high tech gear," the Colombian drug traffickers contract out many functions, thus limiting the exposure of their core organization, and use the latest technology for encryption and cellular phone cloning. The Revolutionary Armed Forces of Colombia, a leftist guerrilla movement, which protects the heroin and cocaine industries, has amassed a small air force. Such dangerous and polyglot enemies will probably propagate, posing great dangers for state security services. Hierarchies and bureaucracies face serious disadvantages when pitted against unscrupulous, flexible, adaptable enemies. If states are like dinosaurs, networks are like early mammals, still weak but waiting for the time that they will inherit the earth.

The strategic context in which future armed conflict will unfold will be a tempestuous blend of the old and the new. The information revolution is challenging the traditional frameworks which provided personal identity and moderated behaviour, whether the family, village, church, place of employment, region, state, or nation. The replacements for these things are nascent, but not yet in place. As a result, the old bedrocks still matter—as Thomas Friedman points out, even the most forward-looking human still needs an "olive tree," which is his metaphor for "everything that roots us, anchors us, identifies us and locates us in this world." Individuals, organizations and states are redefining themselves, altering who they are, what they do, and how they relate to others. The world will never be the same.

THE CHANGING NATURE OF ARMED CONFLICT.

The essence of warfare will always remain the same as antagonists attempt to impose their wills on each other while struggling with fog and friction. The information age, though, is generating important changes in the conduct of armed conflict. As these mature in the second decade of the

21st century and beyond, some will be "case specific," affecting a limited number of states or particular regions.

Others will be cross-cutting trends affecting nearly every participant in armed conflict and every mode of it. All organisations that participate in armed conflict from the smallest terrorist cell to the most complex state military are being changed by new technology, particularly information technology. For relatively simple war-making organizations, technology is helping to overcome shortcomings in communications, intelligence, and planning. For the complex militaries of advanced states, the change is even deeper, leading—at least according to American military thinkers—toward a fully "digitised" force where information technology eradicates fog and friction.

Other forces are also shaping armed conflict. The proliferation of weapons of mass destruction is particularly important. In fact, Martin van Creveld contends that proliferation will obviate traditional state-on-state war. Even if one does not go that far, there is no question that proliferation will dramatically alter the strategic calculus for most nations. Nearly every moderately advanced state will have weapons of mass destruction, ballistic or cruise missiles, or the capacity to make them by the second or third decade of the 21st century. This may not make armed conflict itself obsolete but, as van Creveld argues, will certainly make old-style major war unbearably dangerous. Proliferation, in combination with interconnectedness and globalisation, has created challenges to the political utility of armed force. This is likely to escalate in coming decades. This is not entirely new. History is replete with attempts to constrain, regulate, ban, or de-legitimise armed force. The United Nations Charter, which constitutes binding international law for its signatory states, places strict limits on the conditions under which armed force is acceptable. The Article states:

The parties to any dispute, the continuance of which is likely to endanger the maintenance of international peace and security, shall, first of all, seek a solution by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice. Since the end of the Cold War, challenges to the acceptability of armed force have continued and even accelerated, particularly in open political systems like the United States. To a large extent, this is a result of the information revolution.

The casualties of war and their families are no longer faceless, but real, grieving humans. It is harder for policymakers to use force when their constituents understand the likely results. American leaders have responded by searching for modes of warfare that minimize friendly military and civilian casualties, particularly the use of precision aerial bombing. The problem is that such modes of warfare are inherently less decisive. It is possible that the concept of decisive victory will fade from the lexicon of strategy in coming decades. As Edward Luttwak contends, early 21st century war may look like early 18th century war where campaigns were waged for relatively limited objectives and the antagonists were not willing to pay a high blood cost for success.

Other elements of interconnectedness appear to be constraining at least state on state aggression. Globalisation of the economy has created such tight linkages that armed violence in one part of the world has a ripple effect, often causing price increases or inflation elsewhere. This increases the pressure on hostile parties—particularly those integrated into the global economy—to refrain from war or seek a speedy end to one already underway. Undoubtedly there will be times when states consider the interests at stake in a conflict so important that they are willing to accept the costs of going to war. But the frequency of conflicts where a state sees its vital interests at stake and where war is seen as an acceptable means of promoting or protecting these interests is declining. This is particularly true for the United States.

Preserving democracy and freedom against communism was a cause for which most Americans were

willing to shed blood. Many of today's persistent conflicts, with their roots in ethnic and religious enmity, are difficult to understand and do not seem worth dying for, so minimizing casualties has become a central consideration for military planners, sometimes the pre-eminent one. When the interests at stake are less than vital, the economic and political costs of armed conflict may serve as a brake. Ironically, though, these same constraints may prevent states from mobilizing and deploying overwhelming force in all but the most extreme cases, and thus cause those armed conflicts that do occur to be protracted. Again like wars in the early 18th century, early 21st century wars may drag on for extended periods of time. In some ways, interconnectedness and globalisation are creating new vulnerabilities for the United States.

Future enemies are likely to have a better understanding of the American mentality than past ones and thus be able to craft more effective political and psychological campaigns. Their leaders may be attending college in the United States today. Those who are not can use the Internet as a window into the American psyche. And, as Martin Libicki suggests, small states may be able to use the "globalisation of perception" to cast themselves as victims and mobilize world public opinion if they engage in conflict with the United States. Interconnectedness also means that future enemies will have a potential constituency within the United States. This is not to imply that émigré communities are automatic breeding grounds for "third columnists." But immigrants or even native-born children or grandchildren of immigrants can, in some cases, retain a tie to their ethnic homeland which can lead them to lobby for or against American military involvement, as did Serbian Americans during the first stages of the 1999 air campaign.

This increases the pressure on American policymakers and military leaders to minimize casualties if the use of force becomes necessary. Émigré communities can also provide logistics and intelligence support for terrorists. Interconnectedness will make protection against terrorism more difficult.

The U.S. Department of Defence and the military services hold that speed, knowledge, and precision will minimize casualties and lead to the rapid resolution of wars, thus minimizing the problems associated with the challenges to the political utility of force. States with fewer intellectual and financial resources than the United States will not have the luxury of using technology as a palliative for the strategic problems associated with interconnectedness and thus must seek other solutions. One such response has been renewed interest in multinational peacekeeping. The idea is that containing or deterring armed conflict limits the chances of full-blown war.

Some states may turn instead to strategies of passive defence. One of the dilemmas of interconnectedness is that what happens in one place affects many others, but explaining this to mass publics remains difficult. Aggressive states or non-state actors will also have to find ways to transcend the constraints brought on by interconnectedness. Some will rely on proxy conflict, providing surreptitious or, at least, quiet support to insurgents, militias, or terrorists whose activities further the aims of the sponsoring state. Some may attempt hidden or camouflaged aggression, particularly cyberwarfare aimed at the information systems of their enemies. Some—particularly those which find their ambitions blunted by the United States—will turn to political methods, acceding battlefield superiority to the American military while seeking to constrict Washington through legal and political means. America's military advantages, after all, are not always matched by an equal political and diplomatic superiority. Because globalisation and interconnectedness erode the control, which regimes can exercise within their states, those with a shaky hold on power will often seek scapegoats but will sometimes turn to the time-tested method of solidifying internal unity by external aggression as well. Since globalisation and interconnectedness raise the political and economic cost of protracted war, regimes that seek to deflect internal discontent through external aggression will probably seek lightening campaigns, seizing something before the international community can reach consensus on intervention.

Future actions like the Iraqi seizure of Kuwait are not out of the question, at least for states that believe that the United States cannot or will not stop them. Whether the United States can be deterred from intervention by weapons of mass destruction or terrorism is one of the central questions for the future global security environment.

http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=226

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