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Warfare In the 21st Century and Technology Impacts on U.S. Army Military Intelligence

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Introduction

Since the conduct of the Persian Gulf War, the Western world, and particularly the United States, have been excited by the prospects presented by the rapid development of technologies that have military application. The Gulf War enabled the world to see that a major theater war could be won quickly, with minimal loss of life, through the delivery of precision munitions on specific enemy targets and through the decisive use of massed, superior ground forces, guided by accurate and relevant military intelligence. The astounding successes realized in the Gulf have spurred the research, development, and acquisition of technologies that will lead to as yet unmeasured enhancements of the seven United States Army's Battlefield Operating Systems (maneuver, fire support, air defense, command and control, intelligence, mobility and survivability, and combat service support).

Many specialists who monitor the development and execution of the military art, state that we are in the throes of a Revolution in Military Affairs (RMA), or an Evolution in Military Affairs (EMA), or a Military Technical Revolution (MTR). The actual term used to describe our current environment is a subject for lively debate. Many of these specialists believe that the very nature of warfare as we know it today will be changed, and is changing, as a result of the application of these new technologies to the conduct of warfare. One school of thought contends that this current RMA is driven by three primary factors: rapid technological advance compelling

a shift from the Industrial Age to the Information Age; the end of the Cold War; and a decline in defense budgets.[1]

Undoubtedly, technological advances are changing the way nations' political and military leaders plan for and conduct military operations, and these changes are coming quickly. These changes are partners with the wonders of the emerging Information Age. Our world is becoming more and more Information-centric, and all of us are becoming more reliant on information. In the armed forces, we strive to use information to advantage on the battlefield. A key to success for any nation or player in the world community, will be the effective management and synthesis of the incalculable amount of information that is, and will continue to, barrage our senses. Advanced sensors offer increased situational awareness of the battlespace, information handling systems provide more rapid command (decision) cycles, which speed up the pace of war, and stealthy, long-range precision weapons will allow discreet destruction of targets. These and other developments may result in a new regimen of warfare in the coming decades: a battlespace dominated by new systems, doctrine, and organizations.[2]

With the wonders of the technology-laden Information Age before us, United States Army Military Intelligence must be able to harness these technological advancements and maximize their capabilities. Now, and during first two decades of the new century, U.S. Army Military Intelligence must be able to assimilate this vast volume of information and distill it into intelligence if it is to remain credible and relevant to commanders in the 21st Century. The U.S. Army defines intelligence in this context as "the product obtained from the systematic collection, processing, analysis, production, dissemination, and assessment of available information on virtually any topic, area, or individual".[3]

This paper will identify the major interpretations or definitions of the term "Revolution in Military Affairs"; offer a brief outline/history of Revolutions in Military Affairs; present a view of the Near-term (15 to 20 years out) Threat Environment; offer some cautions about this fascinating age we are entering; look at the United States Army's Force XXI Effort, then focus on the major initiatives of the U. S. Army's Intelligence XXI Effort.

Definitions of the term "Revolution in Military Affairs"

The term "Revolution in Military Affairs" is contentious. Experts in the field of military history and in the development of the military art cannot agree on its meaning or define its bounds. The term is ambiguous and confusing. But, we must have a point of departure on this subject, so here is a view of three interpretations of the term. According to United States' Office of Net Assessments, Office of the Secretary of Defense,

> A Revolution in Military Affairs (RMA) is a major change in the nature of warfare brought about by the innovative application of new technologies which, combined with dramatic changes in military doctrine and operational and organizational concepts, fundamentally alters the character and conduct of military operations.[4]

As a matter of interest, the Canadian Forces use this as their definition for a Revolution in Military Affairs, as well.[5]

Another definition to consider is:

> " A military revolution occurs when the application of new technologies into a significant number of military systems combines with innovative operational concepts and organizational adaptation in a way that fundamentally alters the character and conduct of conflict. It does so by producing a dramatic increase – often an order of magnitude or greater – in the combat potential and military effectiveness of armed forces."[6]

The Office of Net Assessment within the United States Department of Defense appears to have developed one of the most accepted definition for a RMA and this is the one upon which I have built this paper.

RMAs just do not occur. The environment within a nation, or within a community of nations, has to be ripe. The conditions for an RMA have to exist before the full potential and an understanding of the impact of an RMA can be realized. "History suggests three common pre-conditions to the full realization of an RMA:

> 1. Technological Development – Since the Industrial Revolution new technologies intentionally or otherwise have had military applications. These new technologies have been incorporated into practical military systems, or systems of systems as technologies became more complex.
>
> 2. Doctrinal (or Operational) Innovation – Operational concepts incorporating and integrating the new technologies must be developed into coherent doctrines to fully exploit the potential of new systems. Military organizations must also train to use and interactively improve them.
>
> 3. Organizational Adaptation – The most profound changes require significant bureaucratic acceptance and institutional change.
>
> It is the synergistic effect of these three pre-conditions that lead to an RMA."[7]

In a special report on the subject of RMAs, Theodore W. Galdi identified another set of three conditions that could trigger a revolution of such magnitude as to fundamentally alter the character and conduct of military operations. Galdi cites the views of the late Carl H. Builder, a former senior analyst of the RAND Corporation. According to Galdi, Builder stated that RMAs could occur near or at the end of nation states, that period when the relative power of the nation state is declining, while the powers of business, advocacy, criminal, cultural and ethnic special interest groups are increasing; when the ability of nations to control the flow of information, commodities, and people is declining, while people are becoming more responsive to global events and opportunities; and when military weaponry is diffusing beyond the control of

governments. To describe a second view of how an RMA could occur, Galdi cites the beliefs of retired U.S. Navy Admiral William Owens, former Vice Chairman of the Joint Chiefs of Staff and one of the principle visionaries of "America's RMA." Galdi reports that Admiral Owens embraces the thought that the current RMA we are experiencing was caused by rapidly changing technical capabilities. Owens sees this RMA occurring in three areas: intelligence, surveillance, and reconnaissance; command, control, communications, and intelligence processing; and, precision force. Owens' views have given birth to the concept of the creation of "a system of systems" in which the interaction of these capabilities is key. Finally, Galdi notes that the future may not involve major discontinuities, but rather a gradual evolution of existing military organizations and equipment. Along this line of thought, proponents of this viewpoint do not deny that rapid technological change is taking place, but they believe that a true revolution in military affairs is unlikely in the near future. They feel that the current organizational ethos and responses will be adequate to deal with potential changes caused by either new technology or a new geopolitical environment.[8]

Brief Outline/History of Revolutions in Military Affairs

As I have mentioned, defining a "Revolution in Military Affairs" is difficult to accomplish. Complicating the understanding of RMAs is the uncertainty surrounding how many RMAs have occurred in the past. The purpose of this section of the paper is to propose some views on what has constituted RMAs in our world's history.

Renowned futurists, Alvin and Heidi Toffler believe that the world has witnessed only two true military revolutions. They base their view on their very strict definition of what constitutes a military revolution: "a military revolution, in the fullest sense, occurs only when an

entire society transforms itself, forcing its armed forces to change at every level simultaneously – from technology to culture to organization, strategy, tactics, training, doctrine, and logistics. When this happens, the relationship of the military to the economy and society is transformed, and the military balance of power is shattered".[9]

The Tofflers believe we underwent the first revolution when the agricultural revolution launched the First Wave of change in human history. During this period, premodern societies emerged, permanent settlements were developed, and many social and political innovations were born.[10] They state that starting with the very invention of agriculture, every revolution in the system for creating wealth triggered a corresponding revolution in the system for making war.[11] The second revolution, the Tofflers call the Second Wave, occurred with the start of the Industrial Revolution.[12] Millions of people changed the way they lived during this tumultuous period, and changes in the military art followed. Mass production of weapons, interchangeable parts, and standardization of combat equipment were but a few of the technological advances of this period.

Finally, the Tofflers contend that we are in the initial stages of the Third Wave – a new revolution that is fueled by the rapid advances of technology that are enabling us to enter what many specialists term the Information Age. The Tofflers believe that we are "speeding into a world that is sharply divided into three contrasting and competing civilizations – the first still symbolized by the hoe, the second by the assembly line; and the third by the computer".[13]

Other historians believe that revolutions have occurred much more frequently in our history. The Annex following the main body of this paper illustrates how Revolutions in Military Affairs can be interpreted.

The Near-term Threat Environment

Before military planners can begin their work to define what new doctrines, organizations, and equipment should be developed to exploit existing and emerging technologies, the intelligence community has to determine the threat as it is today, and then project a description of the Threat in the near term. The near term is the period of time from the present time to 15 to 20 years in the future. Decisionmakers must understand the Threat, so that they can properly shepherd resources and direct the crafting of a force that can leverage technologies to eliminate, neutralize, or deter the Threat.

Lieutenant General (LTG) Claudia Kennedy, the U.S. Army's Deputy Chief of Staff for Intelligence (DCSINT) recently identified the near-term Threat as consisting of warlords, tribal chiefs, drug traffickers, international criminal cartels, terrorists, and cyber-bandits. She acknowledges that "conventional warfare remains a possibility, especially in Korea and the Persian Gulf, and that regional conflicts could be ignited by any number of circumstances, as contemporary revolutions break down traditional structures, and as the effects are exacerbated by growing populations, global urbanization, unprecedented diasporas, cheap transportation, and mass communications; those actors prone to violence will find plenty of opportunities."[14]

The U.S. intelligence community's assessment complements LTG Kennedy's analysis and states that the most likely Threat to face the United States in the near term will be asymmetrical. Operation DESERT STORM was most likely that last time a nation (or nations) will attempt to confront the U.S. and her allies/coalition members in a face-to-face, linear or symmetrical confrontation. Technologies today can enable a state, or non-state entity, to attack other nations in indirect ways, such as through the conduct of Information Warfare. Cyber War and Cyber Warriors are terms being used today in many circles and are associated with the

realization that war today and in the first decades of the new century will be as it never has been before. Information Warfare has become much more that just a buzzword. It has become a major focus of today's U.S. military.

As the U.S. Army realized the significance of this emerging technology-based Information Age, and the potential gains and losses associated with Information Warfare, they recognized that "the character of future military operations can no longer be anticipated merely by analyzing an adversary's stage of economic development; regional or even local powers may possess the capability of employing extremely advanced military technologies. An adversary's actions will require intelligence analysis of fields extending far beyond the traditional battlefield focus. Boundaries within the spectrum of operations will become even more blurred than they are now. Current political and technical trends suggest that, as a matter of course, successful conflict prosecution and termination will depend upon multinational commitment, joint operations, and a high professional tolerance for the new forms of conflict. The days of the all-purpose doctrinal threat template are gone, just as the days of a single-prescription Army doctrine are gone."[15]

Some Cautions

The development of new doctrine and operational and organizational concepts must be tethered to the arrival of new systems into the military arena. This will be the only way we can capitalize on the capabilities of these new systems and have them assist us in meeting the challenges of the future. Obviously, the future is unknown. As experts paint the threat for us, we can begin to understand that the threat, or potential adversaries, is/are ill-defined. Within the enthusiasm associated with the realization that these new technological capabilities can help us

more effectively and efficiently conduct future military operations, may lurk an over-reliance on what these new systems can do for us. This over-reliance could cause us invest too heavily in systems acquisition and not properly integrate these new systems into the development of new doctrine, operational concepts, and organizational structures. It may also cause us to relegate the human dimension to a position of secondary importance. We cannot allow our enthusiasm for the potential that these new technologies bring to bear on the conduct of military operations to over-ride our ability to conduct the systematic integration of these new systems into the way we do our business.

Senior practitioners of the military art and specialists in the field offer some cautions as well. Admiral Owens believes "that the architects of the American RMA have never claimed to be able to completely dissipate the fog or war or fully eliminate the friction of conflict. However they have argued that the revolution can introduce such a disparity in the extent to which fog and friction apply to each side in war as to give one (side) unprecedented dominance".[16]

LTG Kennedy sees reality in her view that "we are most likely to face forms of conflict that are unconventional and asymmetrical. These will be unpredictable, complicated, at times extremely violent, and inextricably bound to socio-economic issues".[17]

General Robert W. RisCassi, U.S. Army, Retired, the former Commander-In-Chief of the United Nations and the Republic of Korea-U.S. Combined Forces Command, former Commander of U.S. Forces, Korea, and the former Commanding General, Eighth U.S. Army recognized that technology wields a double-edged sword. He stated that "as we continue to improve our capabilities for collecting, analyzing, and disseminating intelligence, managing the vast amounts of information upon which decisions are made, and incorporating more and more computer aids to the battlefield decision and execution processes, we must exercise care that

these systems do not evolve into exclusionary processes. Unless the architecture incorporates the ability to share with, and in-turn receive from, other national forces, the battlefield will not be seamless and significant risks will be present."[18]

Finally, and perhaps most importantly, Earl H. Tilford, Jr. cautions that "the danger in the current RMA, is that we may be neglecting the warrior skills and relinquishing the kind of military culture that would be needed to pursue warfare at the gut level". [19]

Overview of the United States Army's Force XXI Effort

The fall of the Iron Curtain, the collapse of the Soviet Union, the robustness of Western and Asian economies, the military and technology successes of the Persian Gulf War, the arrival of a technology-based Information Age, and the assessment of the Threat facing the United States in the near term have contributed to the way the U.S. Army conducts, and plans for conducting, its business. In August of 1994, the U.S. Army embarked upon its Force XXI effort. The effort started to examine, redefine, and modify the way the U.S. Army is organized, how it trains, how it mobilizes, how it projects it capabilities, and how it sustains the force. The Army's Training and Doctrine Command (TRADOC) developed "TRADOC Pamphlet 525-5: Force XXI Operations" as a vision of the future as seen by the Army's senior leadership. It is not doctrine, but it sets the azimuth the U.S. Army has followed these past five years while exploring "what might be", for developing hypotheses to be tested, and serves as the basis for analysis and experimentation. The pamphlet is entitled: "A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century". The pervasive theme of the document is captured by the words "How you think about the future frames what you think about the future, which drives what you do about the future".

"TRADOC Pamphlet 525-5: Force XXI Operations" describes the conceptual foundations for the conduct of future operations in War and OOTW (Operations Other Than War) involving Force XXI – the Army of the early twenty-first century. It applies to the entire Army – the active force, the Army Reserves, the Army National Guard, and to Department of the Army civilians. It provides TRADOC's Task Force XXI, the Battle Laboratories, the doctrine writers, the combat developers and the trainers a vision of future conflict for the development of supporting concepts, programs, experiments, and initiatives. The concepts contained in the pamphlet have implications for Army doctrine, training, leader development, organizations, materiel, and soldiers (DTLOMS).[20]

The Army XXI effort exploits technology and applies to each of the seven Battlefield Operating Systems. The effort has, and will continue to examine, the characteristics of future armies, battles, and threats. It examines the battle dynamics (such as command, battlespace, depth and simultaneous attack, and early entry to name a few) of today's environment.

The Army is testing the concept of a digitized force and has already conducted Army Warfighting Experiments (AWEs) to examine the feasibility of a digitized maneuver brigade and division. A digitized brigade is one that is built with enhanced command, control, communications, and intelligence technologies that enable rapid information flow between the commander and his units. It also allows units in the field to have a much clearer picture of the battlespace, termed battlespace awareness, than ever before through the use of digitized systems that enable them to "see" accurate pictures of friendly and enemy unit locations on screens in their vehicles or in their command posts. The Army's 4th Infantry Division (Mechanized) is the test unit, located at Ft. Hood, Texas. It's parent headquarters, the III Corps, is closely tied to the experimentation. Lesson learned during the AWEs are being infused into the force and have

contributed to the Chief of Staff's recent decision to create two very deployable, highly lethal brigades at Ft. Lewis, Washington. This decision was enabled by the presence of technologies that have military application and by the acknowledgement of the most likely operations the Army will be committed to in the next two decades.

Overview of the U. S. Army's Intelligence XXI Effort

The U.S. Army's Intelligence XXI effort articulates the Army's concept for Force XXI intelligence operations. These concepts are incorporated into "TRADOC Pamphlet 525-75, INTEL XXI – A Concept for Force XXI Intelligence Operations". This pamphlet was published on 1 November 1996 and describes how the intelligence force is being designed and postured to meet the demands of future operations across the spectrum of Force XXI operations.[21]

Army intelligence is affected by significant changes in the world environment, such as reduced U.S. defense spending, the tremendous growth of information technologies and emergence of digitization, the change in the U.S. Army's forward presence posture to one of a heavy reliance on power projection, the continuing involvement in stability and support operations, and the proliferation of weapons and technologies that will enable potential adversaries to be much more lethal and, perhaps brazen, than ever before. Yet, despite these factors, the Army's intelligence community is well on the way to meeting the challenges that face it as the 21st Century approaches.

As "TRADOC Pam 525-75" describes, Army intelligence has developed new doctrinal tenets to enable it to provide accurate and reliable intelligence to 21st Century warfighters. These tenets are: 1) The Commander drives Intelligence (the Commander must direct the intelligence effort to ensure the intelligence effort at all echelons is focused on answering his Priority

Intelligence Requirements and identifying and locating high payoff targets), 2) Intelligence Synchronization (translates to directing the intelligence effort to provide commanders what they need, when they need it. In other words to employ the correct asset/collector at the right time to give the commander the specific information he needs at a specific time. To accomplish intelligence synchronization, intelligence personnel must be extremely familiar with the commander's intent and his scheme of maneuver), 3) Split-based operations (in force projection operations, intelligence assets are forward deployed with maneuver elements. Intelligence assets that remain in sanctuary support the deployed force by accessing and leveraging all available resources, national to tactical, and pushing the intelligence forward), 4) Tactical Tailoring (deployed intelligence packages will be tiered and modular in order to allow the commander the greatest flexibility to change the size, composition, and capability of his intelligence support team based on the situation), and 5) Broadcast Intelligence (this is (a) the incorporation of the download and broadcast of raw and initially processed data that has been collected from multiple sensors with analyzed intelligence products in order to satisfy commanders' requirements and (b) access to intelligence products and databases that can be "trapped" and pulled into a commander's area of operations).[22]

U.S. Army intelligence is exploiting information-based technologies to gain the capability to provide wide-area, multi-spectral surveillance of the battlespace; to aggregate and fuse bottom-up information with top-down feeds, down to the brigade level; to produce a common picture for battlefield visualization and situational awareness; to accurately locate, identify, and track high payoff targets (HPTs), and to conduct battlefield damage assessments (BDA); to assure interoperation with joint and multi-national organizations and capabilities; to conduct electronic attack and support all aspects of command and control warfare (C2W)

operations; to provide support to force protection by identifying actual or potential threats to the force; and to assist in friendly force tracking efforts to reduce incidents of fratricide and to, at times, vector friendly forces to objectives or to other areas of interest.[23]

The challenge for U.S. Army military intelligence is to effectively manage and synthesize the vast quantities of information it will face in the decades ahead and to provide accurate and relevant intelligence to commanders. Army intelligence will meet this challenge by conducting tough, realistic training; through leader development; by designing appropriate organizations; by acquiring proper materiel; and through focusing on quality people. Training remains centered on all members of the team: the active duty soldiers, the Reserve and National Guard troops, and the Department of the Army civilians. Realistic combat simulations are being used to ensure that intelligence personnel are well-versed in the operational context of Force XXI. Computer literacy is being stressed. Training at the institutional, unit and individual levels is being revamped to teach the complexities of the future battlefield and of the intelligence/ Reconnaissance-Surveillance-Target Acquisition (RSTA) systems supporting the battlefield commander. Commanders, as well as intelligence personnel, will be trained on how to access and leverage higher, lower, adjacent, combined, joint, and multi-national capabilities. Force XXI commanders and operators are now formally learning the capabilities and limitations of intelligence systems and how these systems assist them in visualizing the battlespace. Intelligence leaders, as well, are now receiving more focused training on Force XXI decisive operations. Intelligence organizations, in all components, will be designed to be modular, highly mobile, deployable, and tailorable – with assured communications. They must be structured in such a way as to link to national, joint, and multinational systems. Dedicated intelligence teams will be deployed to each Army echelon to satisfy commanders' Priority Intelligence

Requirements and to assist them with battlespace visualization. Military intelligence systems will incorporate emerging technologies and be integrated into intelligence architectures at all echelons. These systems will be made up of collection, automated data processing, analysis, management, and multi-media presentation technologies. And finally, present and future Intelligence XXI operations will take full advantage of the Army's premier asset – its highly skilled and dedicated people. Quality people who are motivated and well-trained will remain the focus of combat training and leader development initiatives.[24] This statement refers to the soldiers who already are in the force and does not reflect any judgement on the ability of the U.S. Army and its sister services to meet their present recruiting goals and to retain the numbers of servicemembers necessary to completely fill its ten active duty combat divisions.

Conclusion

It is irrelevant that historians and those who specialize in the development of militaries, even practitioners of the military art and members of the societies they protect, cannot agree on the term to use to describe the changes in militaries brought about by the massive influx of technology. Whether people chose to use the term "Revolution in Military Affairs (RMA)", or "Evolution in Military Affairs (EMA)", or "Military Technical Revolution (MTR)", the important thing to realize is that something significant is happening now, and that this significant happening is benefiting from the massive technology explosion that most assuredly is affecting the manner in which nations, and non-state entities, build and operate their militaries. Most of the literature on this subject refers to this significant happening as a Revolution in Military Affairs, so at least for clarity, perhaps we should, also.

That said, recognized benefits of technology are being funneled into the creation of modernized militaries. This undertaking is being accomplished in full recognition of the most probably near-term Threats facing the United States, and I think it safe to say, facing other industrialized Western states as well.

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The United States Army is making the most of this technology explosion, is energetically exploiting it, and experimenting with it in its Force XXI effort. The results of this effort will change the way the United States conducts military operations forever and will set the tone for many of the world's armies. It already has in many instances.

U.S. Army Military Intelligence is attuned to its responsibilities of effectively managing and synthesizing the tremendous vo

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soon, however, to say that these significant changes are actually fundamental changes. There can be no doubt as to the peril we risk if we forsake the human element during this remarkable period of transformation and throw too much into the wonders of technology.

Annex

Possible RMAs[25]

Time Period	Technological Advance	Driving Force
14th Century	the longbow	cultural
15th Century	gunpowder	technological/ financial
16th Century	fortifications	architectural/financial
17th Century	Dutch-Swedish tactical reforms	tactical/ organizational/ cultural
17th Century	French tactical reforms	tactical/ organizational/ administrative
17th-18th Centuries	naval warfare	administrative/social/ financial/ technological
18th Century	British financial revolution	financial/ organizational/ conceptual
	French Revolution	ideological/social
18th-19th Centuries	Industrial Revolution	financial/ technological/ organizational/ cultural
19th Century	American Civil War	ideological/ operational/ technological/ administrative
late 19th Century	naval war	technological/ cultural/ administrative
19th and 20th Centuries	medical	technological/ organizational
20th Century	combined arms (WWI)	tactical/conceptual/ technological/ scientific
	BLITZKREIG	tactical/operational/ conceptual/organiza-tional
	carrier war	conceptual/technolo-gical/operational
	strategic air war	technological/

Possible RMAs (continued)

Time Period	Technological Advance	Driving Force
		conceptual/tactical/ scientific
	submarine warfare	technological/ scientific/tactical
20th Century (continued)	amphibious warfare	conceptual/tactical/ operational
	intelligence	conceptual/political/ ideological
	nuclear weapons	technological
	peoples' war	ideological/political/ conceptual

Footnotes

[1] Tilford, Earl H., J., The Revolution In Military Affairs: Prospects and Cautions, Strategic Studies Institute, U.S. Army War College, 23 June 1995, p. 2.

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[3] How the Army Runs: A Senior Leader Reference Handbook – 1999-2000, U.S. Army War College, 1 April 1999, p. 18-1.

[4] Schneider, Barry R. and Grinter, Lawrence E., editors, Battlefield of the Future, Air War College Studies in National Security No. 3, September 1995, p. 65.

[5] Canadian Defence Beyond 2010 – A Way Ahead: An RMA Concept Paper, 31 May 1999, p. 3/42.

[6] Metz, Steven and Kievit, James, Strategy and the Revolution in Military Affairs: From Theory to Policy, 27 June 1995, p. 3.

[7] Fitzsimonds, James and Van Tol, Jan M., "Revolutions In Military Affairs", Joint Forces Quarterly, Spring 1994, pp. 25-26.

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[9] Toffler, Alvin and Heidi, War and Anti-War, Little, Brown, and Company, Boston-New York-Toronto-London, 1993, p. 32.

[10] Ibid, p.33.

[11] Ibid, p. 37.

[12] Ibid, p. 38.

[13] Ibid, p. 21.

[14] Kennedy, Claudia, LTG, The Age of Revolutions, LeTort Paper No. 3, U.S. Army War College, 10 March 1998, p. 7.

[15] "Force XXI Operations, TRADOC Pamphlet 525-5", 1 August 1994, p. 2-11.

[16] Owens, William A., "The American Revolution in Military Affairs", Joint Forces Quarterly, Winter 1995-96, p. 38.

[17] Kennedy, p. 15.

[18] RisCassi, Robert W., "Principles for Coalition Warfare", Joint Forces Quarterly, Vol.1, No. 1, 1993, p. 69.

[19] Tilford, p. 17.

[20] Ibid, p. i.

[21] "INTEL XXI: A Concept for Force XXI Intelligence Operations, TRADOC Pamphlet 525-75", 1 November 1996, p. 1.

[22] Ibid, p. 5.

[23] Ibid, p. 7.

[24] Ibid, pp. 18-21.

[25] Murray, Williamson, "Thinking About Revolutions In Military Affairs", Joint Forces Quarterly, Summer 1997, p. 70.

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