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## THE REVOLUTION IN MILITARY THINKING AND ARMY MODERNIZATION

Technology has always had an impact on the conduct of warfare. Gunpowder, the machine gun, the tank and the ballistic missile, along with other technological innovations, have redefined warfare. Military thinkers say a revolution in military affairs (RMA) occurs when a single technology or combination of technologies is exploited and adapted to equipment, organization, doctrine and tactics.

The advent of the information age has prompted military practitioners to once again examine the impact of technological change on warfare and ask if this signals another RMA. Determining whether an ongoing technological change signals the beginning of a new era redefining the conduct of warfare is not that easy, even with the modern predictive analytical tools at our disposal. This is because "we don't know what we don't know." An RMA involves technological change of such scope and impact that its consequences for warfare are visualized by few, though with uncertainty, and fully appreciated by most of us only after the fact.

In 1962, a small group of West Point cadets visited Fort Monmouth, New Jersey, to observe a demonstration of high energy focused through a ruby to become a fine, continuous red beam traveling only a few feet. Little did the cadets realize they had observed one of the earliest demonstrations of the laser beam. At that time it was not easy for them to visualize how this curiosity of such limited range and energy would be of value on the future battlefield. They would find out later in their military careers.

The laser demonstration of the 1960s was an element in the technological innovations to come with the emerging post-industrial age that we now call the information age. The U.S. military successes in Desert Storm in 1991 are directly attributable to the early stages of applying vastly higher levels of precision to military capabilities – in terms of weapons accuracy and knowing almost exactly the location of oneself and a target.

The era after Desert Storm has thus far been one of organizational and doctrinal adaptation to the rapidly emerging and accelerating pace of technology symbolized by the computer chip that performs millions of functions per second. The recently acclaimed Pentium microprocessor is already being surpassed by more powerful microchips entering the marketplace. Only a year ago the high end home computer chip was rated at 75 MHz; today that is the low end and the high end is now 200 MHz. The Internet, originally a DoD worldwide scientific and analytical information system, is "open to the public" and increasingly giving the man on the street access to information heretofore out of reach. Both the soldier and the man on the street are being equipped with the capability to elevate their standards of information accessibility, accuracy and timeliness.

The American military, as in the recent past, is very much in touch with emerging technologies. In particular, the Army has undertaken to shape the technology that is emerging by exploiting the capabilities of information-based systems to "digitize

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the battlefield.” Recognizing that precision weapon systems and information technology alone cannot move the Army toward its Force XXI enhanced capabilities on the battlefield, the Army is using computer-based systems of simulation and virtual reality training and modeling to address soldier skills to employ modern systems of warfare. The context of operational doctrine is also being addressed in order to adapt the battlefield parameters that will guide tactics and weapons employment. A monograph from the Strategic Studies Institute, U.S. Army War College, states it clearly: The Army “seeks to define change rather than be defined by change.”

The Army’s future Force XXI is embedded in applications of information age technology in order to adapt to the requirements of the national military strategy which visualizes the rapid projection of ready-to-fight forces to a theater of operations. The core capability of the Army of the next century will be information processing. This means that capabilities which allow information to be distributed and acted upon rapidly with precision, and without excessive expenditure or loss of limited resources, must be developed. Preservation of operational resources, which are already limited in a smaller resources-constrained Army, will be realized by denying key information to a foe while retaining dominating control of information flow about friendly and adversary forces. In turn, the exacting precision of information made available to battlefield units will add further to the lethality of precision weapons which already possess the inherent capability to respond rapidly and hit a target with a high level of accuracy.

The RMA process is long-term. The capabilities of Army units in Desert Storm were not achieved in a few years. As with the case of the laser beam described above, much of the technology built into the

Army’s systems employed during Desert Storm was emerging in the 1960s. If the Army is to succeed in the military operations of the early twenty-first century, the boundaries of technology must be stretched and tested continuously.

Competing with this longer-term need are requirements for resources to meet short-term operational needs. Lately, this has meant that sufficient resources are not available for the technology investigation inherent in weapons modernization programs. Resources are being diverted from the investment accounts which support efforts to apply emerging technology to long-term weapons development. At the same time, the resources being made available through the budget process are inadequate for continuing research, development and procurement. The overall shortfall in level of funding – some \$3-4 billion per year – and discontinuity and unpredictability in the levels of funding hamper a rigorous, systematic and responsible approach to modernization. In turn, this limits efforts directed toward understanding the implications of the emerging RMA.

The agrarian and industrial ages have sequentially and uniquely wedded the political, economic and military capabilities of the last centuries. Now, the third wave – as it is referred to by contemporary theorists – is upon us and guiding much that we do across the spectrum of human activity. Information technology, for now, appears to be the core technology of the RMA that is underway. However, this third wave may only be part of a larger change in technology that we have yet to recognize. Resources have to be expended in this vital area if the Army is to possess the capabilities needed to defeat a technologically potent adversary in the next century. We cannot afford to be wrong.

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