Strategic Insight

Comparing the Nuclear and Information RMAs

by Lukasz Kamienski

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The history of warfare is dialectical. There are moments of continuity (characterized by an evolution of forces, strategy and doctrine) and discontinuity (characterized by revolutionary changes in warfare, weaponry and doctrine). These revolutionary periods have recently been described as "revolutions in military affairs" (RMAs). The notion of an RMA is based on the idea that technology, especially the development and introduction of new weapons and weapon systems, is an important force of change in the character of war.[1] This Strategic Insight explores two recent RMAs: the nuclear revolution and the more recent information-based revolution in military affairs. It suggests that the nuclear revolution is a genuine and mature RMA, while the information-led RMA is still in its formative stages.[2] It can be said that it is *in statu nascendi*. The information revolution, however, already has enjoyed its strategic moment, a point in time described by Colin Gray as "a flash in the sky of strategic consciousness."[3] For the information RMA, this "flash" was the Gulf War, which generated a great debate about the RMA that resembled the 1960s debate about the nuclear revolution.

RMAs and Rising Military Expectations

It was thought that nuclear weapons would render most conventional forces obsolete. The "absolute weapon" was seen as a way to reduce reliance on expensive conventional weaponry because it was extremely powerful and relatively cheap. One atomic device could deliver a blast equal to thousands of tons of conventional explosives. The expectation that nuclear weapons might come to replace conventional weapons, however, never materialized. Nuclear weapons created the so-called stability-instability paradox,[4] which led to the further development of conventional weapons by both superpowers and their allies during the Cold War. Nuclear weapons and mutual vulnerability to nuclear attack did not make conventional arms obsolete. Instead, they created the conditions necessary for the information-based revolution in military affairs.

Just as many expected that nuclear weapons would come to replace conventional armaments on the world's battlefields, the current information-based RMA is often depicted as marginalizing the role of nuclear weapons. The great effectiveness of precision-guided conventional weapons combined with advanced command, control and reconnaissance systems lead some observers to suggest that conventional munitions will soon have the same strategic effect as a nuclear strike. Soviet military theorists were probably first to identify the coming "military-technical revolution." In his May 1984 interview in *Red Star*, Marshal N. V. Ogarkov, then chief of the Soviet general staff, claimed that the increase in the destructive potential of conventional weapons would "bring them closer ... to weapons of mass destruction in terms of effectiveness."[5] Soviet military theorists predicted that advances in conventional weaponry would allow them to replace nuclear weapons in terms of their ability to destroy not only specific targets, but also entire military infrastructures. They suggested that these precision-guided conventional weapons would cause slight collateral damage, thereby eliminating the political backlash that would accompany the use of nuclear

weapons.[6] In this sense, the information RMA helped to accelerate recent efforts to marginalize and stigmatize nuclear weapons.[7] But just as the nuclear revolution did not lead to the obsolescence of conventional arms, the current RMA will not lead to the complete marginalization of nuclear weapons. Nuclear weapons cannot be un-invented; they will continue to serve as weapons of last resort. And, despite what nuclear abolitionists suggest, nuclear weapons might have an increasingly important role to perform on the modern battlefield.[8]

Cost-Effectiveness

Many Western observers believed that nuclear weapons would provide a cost-effective way of addressing the Soviet military threat.[9] This idea was based on the calculation that it was cheaper to generate explosive yield using fissile material than high explosive. This nuclear parsimony was captured by the phrase "bigger bang for a buck" (which was first used in a *Newsweek* article in 1954). The argument was most powerfully put in 1951 by Brien McMahon, then chairman of the Joint Committee on Atomic Energy: "The cost of military fire power based upon atomic bombs is hundreds of time cheaper; dollar for dollar, than conventional explosives. … [S]ince 1945, only 3 cents out of each American dollar paid for military defense has been spent on atomic weapons. ...[P]resent expansion plans still assign 3 cents in the military dollar to these weapons."[10] Similarly, an argument often used to boost support for the information-based RMA is its "financial edge over traditional 'manned' systems employed by the services."[11] New RMA-style conventional weapons are challenging old platforms and systems in terms of their costs. In this instance, the cost-effectiveness of the information-based RMA is not based on a claim about "more bang for the buck," but on "Moore's Law." In 1965 Gordon Moore of Intel Corporation stated that the capability of microchip processors would double every 12 to 18 months without an increase in cost.[12] He predicted that "in 1970, the manufacturing cost per component can be expected to be only a tenth of the present [1965] cost."[13] So far, Moore's Law has been exceptionally accurate, although "Moore's Second Law" (the capital cost of *manufacturing facilities* will continue to rise each year, eventually reversing the cost-benefit ratio of developing new microchips) is beginning to emerge on the technology horizon.[14]

The 'Obsolescence' of Clausewitz

The coming of the nuclear era seemed to undermine the Prussian philosopher Carl von Clausewitz's most famous and most fundamental dictum of war: that war is a "true political instrument, a continuation of political intercourse, carried on with other means."[15] Nuclear war could not be a rational tool of state policy because it would be too destructive. Indeed, as the nuclear arsenals of the superpowers increased in size, nuclear escalation of any conflict posed the risk of national suicide. General war became an irrational means of "political intercourse." But the stability-instability paradox guaranteed that war itself was not rendered obsolete by nuclear weapons. The use of the "absolute weapon" as a deterrent also transformed nuclear weapons into a very important instrument of "political intercourse."

Proponents of the information-based RMA pronounce another end to a somewhat different part of Clausewitzian logic. They suggest that the information RMA will eliminate the effect of friction, chance and uncertainty in war. Information and communication systems will provide real-time knowledge of the battlefield that will produce a "situational awareness" that will overcome the fog of war. By having this god's eye view of the battlefield, friction might be reduced to peacetime levels. Reliance on a system-of-systems architecture of computers, communications and precision-guided weapons, however, could create its own source of vulnerability and friction. Information noise (the problem of identifying valuable information in a vast stream of superfluous data), information overload, and the ever-present threat of temperamental electronic systems might serve as a source of friction and confusion on the 21st century battlefield

Differences Between the Nuclear and Information-Based Revolutions

Revolutions in Military Affairs are usually based not on single technologies, but on seemingly spontaneous combination of several emerging technologies. The nuclear revolution is an exception to this rule. It was a single-system revolution—a result of dramatic scientific-technological developments in atomic physics. Although the coming of the missile age added a second component to this nuclear equation, the nuclear revolution was basically about one thing—fission and then fusion-powered warheads. New delivery systems augmented the scope and strategic landscape (mutual vulnerability) but did not change the essence (or the nature) of the revolution.

The information RMA, by contrast, is about the "system of systems." It is produced by a complex and integrated synergy of technologies. To use Martin Libicki's phrase, it is a "Meta-System" revolution,[16] composed of computers, information, telecommunications, and high-technology conventional weapons. Each of these components is a necessary element of the information-based RMA.

Battlefield Use

The destructiveness of nuclear weapons and the eventual mutual vulnerability of both superpowers to mutual annihilation made a general war unacceptable in terms of its costs and unthinkable in terms if its consequences. Although in terms of strategy and tactics, Soviets and Americans prepared to fight a nuclear war, both now appear to have been generally concerned with the need to avoid Armageddon. Preparations to engage in nuclear combat were necessary if deterrence was to be credible but, as president Eisenhower said, "there is no victory [in a nuclear war] except through our imagination."[17]

In contrast, the information RMA is far more about warfighting then deterrence. That is because an information-style RMA has many desirable qualities. As the Gulf War, the air campaign over Kosovo, and Operation Enduring Freedom demonstrate, the information-based RMA allows for decisive conventional military victory with minimal collateral damage and with minimal risk to the side that enjoys information superiority. For the moment at least, there is no information-based equivalent to Mutual Assured Destruction.

Casualties

The fundamental feature of nuclear weapons is their destructiveness and potential to inflict indiscriminate casualties. The nuclear revolution eliminated the distinction between combatants and non-combatants. Strategists' fine distinctions between counterforce and countervalue strategies could not alter the fundamental destructiveness of nuclear warfare. A large-scale nuclear exchange could result in the obliteration of whole societies.

By contrast, the information-based RMA can be best described as "casualty averse." Public attitudes towards war constitute the psycho-sociological dimension of the information RMA. Political leaders are under public pressure to keep casualties, especially among civilians and friendly combatants, to an absolute minimum. This pressure is important because it is related to the legitimization of political action and makes civil-military relations an important force shaping the RMA. It also is part of a Western impulse to make war more humane. Long-range precision-guided munitions and unmanned vehicles virtually remove soldiers from the battlefield. Non-lethal weapons can be used to reduce casualties among enemy combatants. By minimizing risk to life and limb on both sides of the conflict, the information RMA helps maintain public support for military action.

The Information Revolution in a Nuclear Age

Two members of the Nanjing Army Command Academy offer an interesting insight into the relationship between nuclear and information weapons. They reject the claim that information weapons will replace nuclear ones and argue that, "the Americans view 'information weapons' and 'nuclear weapons' as 'twin brothers', and treat them as instruments for exercising their hegemony."[18] This double superiority may lead to some undesirable effects. The first one would be "information war under the nuclear shadow," that is the use of nuclear weapons to obtain the initiative on some battlefield so that precision-guided weapons might be used to greater effect. The second one might be "the nuclear shadow under information war conditions." Here nuclear weapons would be used to mount an asymmetrical challenge to strategy and force structure based on information superiority. The greatest challenge for the current proponents of the information-based RMA is to reduce the tensions between the nuclear revolution and the ongoing efforts to transform conventional operations by exploiting the information revolution.

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References

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