REVOLUTION IN MILITARY AFFAIRS

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The Soviet military thinkers first asked questions about the Revolution in Military Affairs (RMA) during the mid-Sixties, with respect to the impact of nuclear weapons and Intercontinental Ballistic Missiles (ICBMs). They believed that the employment of nuclear weapons would change the course of future warfare. It was in the mid-1980s that Nikolai Ogarkov, Chief of the Soviet General Staff, reviewed the debate about the RMA with reference to precision guided conventional weapons. It was only after this that American strategic experts coined the term RMA.

The full realisation of the RMA has three preconditions: technological development, doctrinal innovation and organisational adaptation. History tells us how technological developments have fundamentally changed the pattern of war. The technological development to achieve RMA must begin with the operational context and combat environment considerations. Emerging technologies will, no doubt, result in the development of advanced, and highly capable military systems but there is every likelihood that modern technologies will influence warfare in four areas which, in turn, would affect the conduct of war. These areas are: 'precision strike', 'information warfare', 'dominating manoeuvre' and 'aerospace warfare'. Of all these, information warfare has become more important because of the development in computerised information and telecommunication technologies and related innovations in management and organisational theory.

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New tools and processes of waging war like information warfare, network-centric warfare, integrated command and control, system of systems all powered by information technology have led to the RMA. This broadens the parameters of thinking about national security. The members of the international community are now on the brink of a major revolution regarding how to conduct national security affairs. The reunification of the RMA needs to be understood not only by military officers but also by strategic planners – both military and civilian. The military has to contend with the fifth dimension of warfare, particularly information, in addition to the developments in land, sea and space warfare.

REDEFINING RMA

There are by definition, significant differences between evolutionary and revolutionary changes. In the security context, these differences can be described as follows: while, on the one hand, evolution is the logical progression of an existing system of the framework, revolution, on the other, connotes a fundamental break with precedent, and performance improvements which signal a tactical revolution. A truly revolutionary strategic development emerges after perceptions of the relationship of means to ends and, most importantly, a reformation of the war-fighting doctrine – the codified precepts that govern military operations.[1]

Accordingly, revolutions are not merely more clever technological breakthroughs than ordinary evolutionary innovations; these revolutions are more profound in both their sources and implications.[2] They involve fundamental discontinuities, i.e. dramatic breaks with the existing status quo. It is important to recognise that a revolution is not simply an existential condition – i.e. created simply by the appearance of new technological

1. Lt. Leo S. Mackay, Jr., USN "Naval Aviation, information, and the Future," *Naval War College Review*, Spring 1992, p.7.
2. Jeffery R. Cooper, *Another View of the Revolution in Military Affairs* (Carlisle Barracks, PA: US Army War College, Strategic Institute, 1994), p.23.

capabilities. Without recognition and exploitation, both requiring positive action, there can be no revolution. Creating a revolution is, therefore, more than pushing the limits of military technology; it is an active process that requires effective adaptation by individuals and organisations for successful exploitation to occur.[3]

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The RMA movement is not motivated only by the allure of modern technology; other factors are at work as well. Some believe that only a high technology, stand-off warfare force can be the superior fighting force – the US military usable in a domestic political context, given the Americans' aversion to suffering casualties. This philosophy guided the North Atlantic Treaty Organisation's (NATO's) 1999 War over Kosovo, in which the United States lost no troops to hostile action and only two people in the entire operation – largely as a result of the decisions to eschew an early ground invasion and to fly combat missions from high altitudes. Truly speaking, revolutionary developments do not merely enhance the ability to fulfill existing missions, but are also best suited to perform new functions. However, if these new functions are not captured in the accepted method of assessment, innovative developments may not appear to offer significant operational enhancements. Thus, as the environment is affected by revolutionary innovation, it may no longer be appropriate to evalute the effectiveness of old measures. The new modes of operation may no longer be relevant to the altered objectives.[4] With revolutionary military innovation, fundamental change in the war-fighting paradigm is almost guaranteed. Most analysts define RMA as **a "discontinuous increase in military capability and effectiveness"** arising from simultaneous and mutually supportive change in technology systems, operational methods and military organisations.[5] The Pentagon's official concept of the RMA is,

3. Ibid., p.23.
4. Ibid., p.24.
5. Steven Metz, James Kievit , "Strategy and the Revolution in Military Affairs: From Theory to Policy," June 27, 1995.

as noted, remarkable for its ambition. It focusses on information systems, sensors, new weapons concepts, much lighter and more deployable military vehicles, missile defence and other capabilities. The watchwards for effecting this transformation, employed earlier in the Joint Vision 2010 – dominant manoeuvre, precision engagement, full-dimensional protection, and focussed logistics – imply light, agile, deployable main combat forces. Precision engagement conjures up images of very accurate and lethal long range firepower. Full dimensional protection suggests, among other things, highly effective missile defences.

Advanced conventional munitions have made spectacular advances in lethality by linking near- real-time information to precision-guided weapons controlled by digital command and control systems. Bombing has become so precise that weapon systems can routinely attack not just buildings or rooms, but even a corner of a room that will bring everything down – even the vent shaft that will put the bomb inside the shelter.[6] This may enable us to view the venerable **military principle of mass** from an entirely different perspective and alter the traditional relationship between offence and defence. A defender, equipped with these sophisticated munitions, can inflict unacceptable damage on an attacker before the latter can likewise reciprocate.[7]

The sensor revolution, which was enabled by the computerisation of individual platforms and weapon systems, complements these advances in weapons lethality. An individual platform – manned or autonomous – can now detect and attack individual vehicles, ships or aircraft well beyond visual range, and provide targeting information on a near- real-time basis to long-range offensive attack systems. Additionally, these sensors are becoming fully integrated with traditional command and control systems to achieve synergies which were never possible before. The Airborne Warning and Control System (AWACS) and the new E-8A Joint Surveillance and Target Attack Radar System (JSTARS) aircraft, which couple high-

6. Lt. Col. Edward Mann, USAF, "One Target on Bomb; Is the Principle of Mass Dead?" *Military Review*, September 1993, p.37.
7. Lt. Col. Lester W. Grav, USA, "In the Wake of Revolution, Continuity and Change: A Soviet General Staff View of Future Theatre War," *Military Review*, December 1991, p.11.

technology sensors and communications with command personnel, are but two examples of this kind of Command, Control, Communication, Intelligence (C^3I).

REVOLUTION IN STRATEGIC AFFAIRS

In the past, military commanders did not have the C^3 I capabilities to manage military forces to the limit of their potential effectiveness.[8] They had to rely on increases in the individual components of combat power i.e. mass, mobility, reach and firepower or the exploitation of an opponent's failing, to make up for these inadequacies. The associated costs were high not only in resources, but also in organisational distortions and operational constraints. What was often referred to as the "fog of war" in reality is a form of disorder: the inability to maintain unity of action due to shortcomings in the C^3I systems.[9]

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RMA proponents tend to be somewhat anti-Clausewitzian, unlike the 19th century German strategist Carl von Clausewitz, who coined the famous phrase "fog of war" to describe the unpredictability and confusion of battle. They believe that future militaries should attempt to achieve information dominance – and that a winning force will probably succeed in establishing it. They believe that future militaries will be able to depend on highly complex and integrated communication systems that enable them to fight in cohesive and complex ways. That basic concept tends to run counter to the Clausewitzian axiom that, in a war-time break, seemingly easy activities become slow and difficult. Initial battle plans must usually be discarded, and human character becomes as important as intelligence, technology, or strategy.

Being anti-Clausewitzian may not be all bad. After all, the German Armies that executed the brilliant *blitzkreig* operations of World War II had themselves discarded his advice, insisting on speed and cohesion in

8. Martin van Creveld, *From Plato to NATO, The History of Command in War Essentially Consists of an Endless Quest for Certainty* (Cambridge MA: Harvard Press, 1985), p.264.
9. Jeffrey Cooper," The Coherent Battlefield," pp.1-2.

their attack plans. The US military took a similar attitude in the 1991 War against Iraq. Moreover, RMA proponents have their own famous military theorists to invoke for inspiration and validation. Most notable among these are the ancient Chinese strategist Sun Tzu and the 20th century British military scholar, B.H. Liddell Hart. Sun Tzu wrote of the desirability of battles avoiding enemy strengths with agility and conception, and winning through savviness and skill rather than brute force. Liddell Hart advocates an "indirect approach" to warfare that emphasises manoeuvre, deception, and above all, the avoidance of a pitched battle against prepared defence. The post-modern battlefield stands to be fundamentally altered by the information revolution at the strategical, operational and tactical ends.

The increasing breadth and depth of the battlefield and the inexorably improving accuracy and destructiveness – and, therefore, lethality – of even conventional munitions, have heightened the importance of C^3I to the point where dominance in this domain alone may, if exploited properly, yield consistent war-winning advantages.[10] Mastery over satellite technology has enabled man to obtain information from any part of the world to a resolution of up to 3 cm. This means that today nothing is hidden in the world from those who have this technology. All the information gathered in the real-time frame can be processed through computers which today are capable of processing three trillion functions per second. In military affairs, the important thing is the application of process analysis for discrimination of information. This integration of satellite and computer technology has greatly enhanced and facilitated the command and control systems and reduced the time and space dimensions to an extent that it is now real-time information gathering, processing and discrimination. This has been possible due to enormous storage and processing capability which has drastically cut down on rummaging. This enables **C^4ISR** (Command, Control, Communication, Computer, Surveillance and Reconnaissance). The application of **C^4ISR** is at a much higher level. It connects the strategic level with the tactical level in real-time. Thus, we can also call it a "Revolution in Strategic Affairs".

10. Arquilla and Ronfeldt. "Cyber is Coming in an Information-Based Revolution in Military Affairs" (CARAND, 1992), p.12.

This capability of information gathering and processing enabled a US Admiral to present the idea of "creating a web" of ship fighting units in the Indian Ocean and Mediterranean Sea to protect US interest in the pivotal region of the Caspian Sea and the Gulf. This concept of a "web" around the strategic driver with each ship/fighting unit about 100-150 knots apart would enable the commander to identify, acquire, analyse and engage a target anywhere in the area with the most appropriate response. All this process can be completed in the shortest possible time. The response will be so well coordinated and, at the same time, dispersed, that the enemy would be destroyed yet would not be able to know who has done it and from where it has been done. This strategic advantage of coordinating the action from various dispersed locations and remaining hidden is through the satellite/advance communication/computer systems and not by the fighting unit. This is what is called a Revolution in Strategic Affairs.[11]

ECONOMIC CONSEQUENCES OF RMA

It might appear that adaption of RMA capability is highly expensive, but if a realistic cost-benefit analysis is carried out, it would be found that it is more cost-effective to go in for RMA capability and that is probably the reason why the concept of "Joint Force 2010" became a reality. Generally speaking, RMA makes changes in strategy and reduces the battle space to increase the effectiveness of each fighting unit. Thus, it is more cost-effective. The components of RMA are not military specific—they are used in the civilian sphere as well. It enables the Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C^4ISR) capable forces to reduce deployment at the operational level. It provides more autonomy to field commanders and establishes a direct link in real-time between strategic and tactical levels through the latest electronic equipment, thus, reducing the cost of unnecessary paper work and intermediatory channels. Thereby, the cost of maintaining the forces can be reduced.

11. Sharjeel Rizwan, file III H: (Revolution/20 in % 20 Military Affairs, 20 (RMA) hts.

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ENABLING TECHNOLOGIES

The renowned British strategist, J.F.C. Fuller, argued that with each change in weapon technology, organisations and tactics must also change. Then a determination must also be made to identify the most dominant weapons around which the employment of other weapons must be arranged. It is important to note that it is not necessary for the 'master weapon' to be the decisive weapon on the battlefield. Its qualification for mastery is found in its ability to immobilise or upset the enemy's tactics and so enable other weapons to be decisively used. In short, it sets the tactical pace.[12] The key to exploiting this revolution in military affairs will be to correctly identify what systems constitutes the "master weapons" in this new era.

POWER OF THE MEDIA

This emanates from the proliferation of means of transmission to include print television, radio, internal and mobile telephony, commercialisation, financing and professionalisation of the media as an industry. The speed of transmission is imparted by satellite communication and wireless telephony and the forum provided for transmitting varied opinions without being held responsible for the views aired. The media can also impart momentum to events, converting these into what are commonly known as tipping events for action through the generation of hype, hope and expectations. A typical example is the Lahore Summit between Indian Prime Minister Vajpayee and Pakistani Prime Minister Nawaz Sharif held in Lahore in February 1999, reportedly based on momentum imparted by Shekhar Gupta, the Editor of the *Indian Express*. Lack of a foundation to this led to the Kargil conflict, a few months later. In fact, the Kargil conflict was perhaps happening even as the handshake was going on in Lahore.

12. J.F.C Fuller," A Study of Mobility in the American Civil War," *Army Quarterly*, January 1935, p.271.

The media can also impact a positive momentum by exploiting the constructive aspects related to peace and development. The ability to integrate psychological operations, public diplomacy and military public affairs into instruments of national policy represents the power of the modern media in the public domain.

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In future warfare, the struggle for information will play a central role, taking the place, perhaps, of the struggle for geographical position in earlier conflicts. Information superiority is emerging as a newly recognised, and more intense area of competition. In response to these developments, C^3I systems must be designed to provide commanders at all levels the information and communications needed to direct the dispersion or concentration of their forces and, more importantly, the weapons effects at the decision point in time and space.

It may now be time to design the command and control systems, firstly, based on the full range of technological possibilities, and then select an individual weapons for acquisition based upon our ability to most effectively integrate them into the C^3I systems. This is not as far-fetched as it might seem at first. Throughout history, successful military organisations have based their organisation and battlefield formations upon existing command and control technologies. In a sense, it is the soldiers of the modern age who are out of step with history, acquiring weapon systems and platforms based principally on their mechanical capabilities and then improvising a command and control system that barely meets battlefield requirements.[13]

The ability of the major powers to construct and amortise a global information network as the foundation of such a command and control system is the principal source of long-term advantage over potential adversaries.[14] While constructing this system will be expensive, the US has already made much of the necessary research and development investment

13. Maj. Ralph Peters, USA, "The Moveable Fortress, Warfare in the 21st Century," *Military Review*, June 1993, p.66.
14. Cooper, n .9, pp.33-34.

to lay the foundation for future capabilities. Moreover, many of the important components of such a future system (e.g. the global positioning systems, worldwide communication surveillance and reconnaissance platforms, etc.) are already in place. It is this global C^3I system that will be the master weapon of the 21st century. The C^3I systems by themselves, however, do not fight and win wars. The weapons of tomorrow must be designed to take advantage of the possibilities offered by this global system. In fact, the era of precision-strike weapon systems that require both absolute (latitude and longitude) and relative positioning information (i.e. bearing, range, course and speed) has already arrived.[15]

An important feature of this RMA should be that the supporting technologies are the same as those being rapidly developed in the commercial world. Thus, this revolution can be based on technologies that are also critical for our success and comparative advantage in the global economy. A sound national security investment strategy would focus upon the resources and not only on the acquisition of a small number of large scale arms, global systems, or networks to provide surveillance and targeting information but also inexpensive weapons that can be directed by this system. These investments would provide a significant operational advantage during the short-term, and also on the capability to meet some uncertain security challenges.[16] Needless to add, they would also be cost-effective in the long run.

HUMAN FACTOR IN RMA

The primary impact of the information revolution is to push the envelope of the decision-making speed limit i.e. the speed of thought, to a higher plain. The result of these technological advances will be that the time required to take action on the battlefield will become increasingly limited by the speed at which the 'human in the loop' can make a tactical decision. In the past, decisions were made at a given command level because only that level had the requisite information to make the appropriate decision. But now,

15. Keaney and Cohen, *Gulf War Air Power Survey*, p.248.
16. Cooper, n.9, pp.40-41.

everyone in the chain of command can have access to the same information at essentially the same time. This has important consequences, both good and bad. Now the President or Prime Minister can select bombing targets in one part of the globe and direct helicopters in another from the control room, or he may sleep through the night while a third target is bombed. A commander now has to know exactly by when to give an order and when to hang up the telephone and let the organisational structure execute the plan he has devised. For action-oriented people, as senior military officers often are, the decision to do nothing is often the hardest to make, which could be a constraint.

THE MYTH OF RMA

RMA has given birth to certain myths in current strategic thinking about wars which need to be addressed. One of the most important is that we can achieve information superiority and even dominance in future conflicts. Even as the "US Joint Vision 2010" plan insisted that we must have information superiority, the information explosion engendered by new technologies may not let any combatant achieve superiority, much less dominance. One reason would be the transformation of the media as it exploits the new technologies. We already know that the media can project powerful images that can build or erode public support for a military operation and can be used as a force multiplier. Historically, however, governments with a mind to do so have been able to exercise significant control over media access to war zones as well as the dispatch of stories from the battlefields. That will seldom be the case in the future. One can envision vertically integrated news organisations with their own surveillance satellites and self-contained communication systems that will allow them to function virtually autonomously. Indeed, one firm, Aero Bureau of Mclean, already can deploy a self-sustaining flying newsroom. The aircraft is equipped not only with multiple, radiant satellite video, audio and data communication links, but also gyro-stabilised cameras, side and forward-looking radars, and, its own pair of camera-equipped remotely piloted vehicles. Information technologies will empower new organisations to such a degree that virtually no significant

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observable detail will escape their view, and huge interconnected databases will add tremendously to their data sources. Advanced software, along with a cadre of expert ex-military consultants, will enable them to fuse the raw inputs into useful, real-time or near-real-time reports. With immense amounts of information available from the global media, the question arises as to what would the need be for future enemies to spend money building extensive intelligence capabilities? In reality, the media will become a "poor man's intelligence service". The media's ability to provide real-time battlefield reports independent of military control will likely create difficulties for casualty-averse democracies.

During the Gulf War of 1989-90, we saw how gruesome photos of the so-called 'highway of death' undermined support for continuing the war – and those were pictures of the destruction of a brutal enemy force. What should we expect when the bodies are those of friends and relatives? Tomorrow's communication capabilities may allow the families of soldiers to establish a virtual presence with them on the battlefield. When live media reports, combined with information from other high-tech sources, begin to communicate the horrific shrieks and terrifying sights of death and mutilation as it happens to a loved one in combat, the political pressure to terminate hostilities at almost any price may become inexorable. In addition to the information disseminated by the news media, information will spill from the proliferating and vulnerable presence of personal cell phones, laptop computers equipped with e-mail and fax machines that troops themselves own and carry with them. This advantage of information will profoundly affect 21st century warfare. When we combine these information sources, future adversaries will also be able to buy high resolution commercial satellite products in the open market. Given all these information sources, the goal of seeking information superiority, let alone dominance, on the 21st century battlefields is unrealistic.

Another myth is that modern technology will make future war bloodless or at least humane. It has become almost an accepted truth that information

technologies will allow wars to be waged virtually bloodlessly. In a scenario depicted in a *Time* magazine article in 1995, a US Army officer conjured up a future crisis in which someone sitting at a computer terminal in the USA could derail a potential aggressor without firing a single shot. The officer visualised the foe's phone system brought down by a computer virus, logic bombs ravaging the adversary's transportation network, false orders confusing his military, propaganda messages jamming television broadcasts, electronically zeroing out the enemy leaders bank account. All of this is expected to cause the adversary to give up.

Perhaps, this technologically is possible. But, perhaps, technology will have to become inexpensive so that poor nations will be able to afford redundancies that would severely reduce, if not eliminate, the likehood of success in cyber attacks. We also seem to continually underestimate the ability to devise low-tech ways to circumvent high-tech capabilities. Shouldn't we expect that our targets will plan for precisely this kind of cyber assault? It is also possible that such an enemy might even develop a cell of operators who are equally technologically sophisticated.

Anyway, no one in any future conflict would abandon his cause for such reasons. No one can count on such discomfiture deterring a warrior society or street fighter nation driven by a powerful sociological imperative and acting under the spell of a charismatic leader. In fact, future wars might be more savage. An adversary waging neo-absolutist war could resort to a variety of horrific actions to offset and divert high-tech forces.

What if a country relying on miniatured communications devices to maintain command and control, deliberately disperse its forces into civilian areas. The intent would be to discourage high-tech attacks by raising fears that there would be a replay of the furore that followed the bombing of the Al-Firdaus bunker during the Gulf War. Precision weapons will be no panacea in a high-tech war. Critical supply facilities as well as those communications nodes that can't be miniaturised and dispersed may be buried below Prisoner of War (POW) camps, schools, hospitals, and similar facilities. Again, the objective would be to deter high-tech attacks by playing on the legal and moral conundrums that would arise, for example, in a

situation where one could destroy an underground ammunition dump only by bombing a hospital above it.

CONCLUSION

We have to analyse whether war has been affected by the RMA or not. Further, to evaluate the impact of technology on war, we also have to see how technology has affected the objective, efficiency, effectiveness, magnatitude and duration of war.

Let us see them one by one. First of all, we have seen that the objectives of war are the same. There is no change on that count. The main objective of war was, and is, the subjugation of nations and occupation of territory in order to obtain the national interest. Secondly, in term of efficiency and effectiveness, there is no revolutionary affect. War is as efficient and effective as it was earlier. Thirdly, the duration of war has been considerably reduced but sometimes has also become irrelevant as in the case of the wars in Afghanistan and Vietnam. Last, but not the least, is the magnitude of war. Previously, it was the case that 70 to 80 percent of a country's population used to take part (to be involved directly) in war but now it is only 3 to 4 percent, in spite of the increase in population. In fact, technology is only one of the three main factors which affect the battle. These three factors are technology, organisation and concept or strategy. Technology is not the primary determination, but it is the concept that leads to victory or failure. For example, the Mujahideen's successful effort against the Soviets in Afghanistan was a result of this concept. Every new technology was not only neutralised by its antidote but also by the mind of the person using the technology, that is why the concept or strategy at times becomes more important. Take the example of *blitzkreig* which decreased the importance of the weapon system (a product of technology) and concentrated on the better use of it. This led to a rise in Research and Development (R&D) to find ways and means to use such hardware in a better way to defeat the adversary. If we look through the last 20 years, there is a merger in the field of armour, artillery, infantry, logistic, ships, etc. The only change is in the capability of information gathering and processing.

An interesting thing to note is that when one side has an advantage, RMA is revolutionary and helps to make the strategic environment advantageous. Hence, the one who enjoys the sole advantage in the RMA will enjoy "full spectrum dominance". Finally, it may be concluded that the RMA cannot and will not transform war into gentle electronic exchanges as some people hope. Video games are certainly not the paradigm of warfare. Wars will continue to be savage and brutal in spite of the advances in the RMA.