



New paradigms of revolution in military affairs

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Abstract

The objective of the present study is to study the concept of RMA along with Information Warfare and its application in future battlefields.

The questions arise as to what is the relevance of RMA in today's world and are the nations ready for it? What is it that is essential, affordable and operationable? Do they have in place concepts, and organizational systems that can best evolve and exploit advanced technologies for greater effectiveness in war fighting on the ground, at sea, and in the air. This study would broadly seek to examine and define the nature of the on-going technological revolution, its linkage with information technology, and importance of information dominance, future shape of war spaces and combat and the challenges politico-military leadership the world over would have to confront in the technology and information-driven 21st century.

Keywords: revolution in military affairs, military revolution, C4I2SR, control command communication, national security, information warfare, security, modern weapons, India's military technology

1. Introduction

Revolution in military affairs in traditional sense means or implies revolutionary history of military affairs, introduction of any goods or practices in military, of which by itself impacts war decisively or significantly. Revolution in Military Affairs in traditional sense means or implies revolutionary history of military affairs.

The military concept of Revolution in Military Affairs (RMA) is a theory about the future of warfare, often connected to technological and organizational recommendations for change in the United States military and others.

Especially tied to modern information, communications, and space technology, RMA is often linked to current discussions under the label of Transformation and total systems integration.

Any such technological developments which can affect wars strategically is termed as Revolution in Military Affairs. For example; Introduction of engines provided speed, which was in itself a revolutionary change. The second example could be introduction of Nuclear weapons which changed the complete concept of war and transformed it into the concept of peace. Today world is experiencing information age, everything today is network based.

The revolution in military affairs (RMA) has been a quite debated topic amongst military and academic specialists regarding military affairs. There is a strong belief that there is an RMA taking place in the world, particularly in the technologically advanced military forces. A common theory accepts the origin of the RMA debate to Russian writings, in particular those of Marshal N. V. Ogarkov on a military-technology revolution in the early 1980s, thereby giving the RMA a technical terminology. This was natural as much of these writings referred to the impact of modern technologies on the battlefield. These writings, which had been translated

by Americans in the mid-1980s, suggested that a new era of warfare had dawned wherein conventional weapons would have the military effects of tactical weapons, without the side effects of nuclear explosions. This military-technical revolution as visualised by the Soviets did not find willing acceptance in the West till the Gulf War of 1991, which saw the virtual collapse of Iraqi military power. This war also enhanced the notion that weapons of war that were high technology, high cost, and, hence, less in numbers were more effective. The quality versus quantity balance shifted significantly towards the former, which has continued to be reinforced through statistical data regarding such weapons being quoted since the war. The post-Gulf War period has seen an amalgamation of the military-technical revolution theory and the high-tech war approach to form what is now a highly discussed subject, although not as clearly understood, and is termed as the RMA ^[1].

2. History of revolutions in military affairs

Creation of the modern and effective nation state based on organised military power in the 17 century, the French revolution and the industrial revolution (beginning at the same time during the period 1789-1815) and First World War are cited as epochal events that brought in their wake such systemic changes in the political, social and cultural arenas as to be largely uncontrollable, unpredictable and above all, unforeseeable. Throughout history nations have always pursued innovation in increase relative military effectiveness. It is the acceleration of evolutionary technological change combined with associated operational and organisational transformation that altered the character of war over the last two hundred years. Some of these developments which progressively shaped the eventual technological metamorphosis are:

- Railways, telegraph, steam - powered naval ironclad and

rifle.

- Change over from wooden sailing ships to steam powered armoured hulls.
- Machine gun, aircraft, submarine, main battle tank and armoured fighting vehicles.
- Internal combustion engines, improved aircraft, radio and radar.
- Nuclear weapons, ballistic missiles.
- Information technology and micro-chip advances, laser, satellite applications.

According to James Adams, author of "The Next World War: The Warriors and Weapons of the New Battlefields in Cyber Space", beginning with 1340 AD, when a more sophisticated bow was developed, in 1420, artillery revolutionised old siege warfare. In 1600, ship-borne artillery, better fortress construction methods and muskets brought a three-way revolution. After the advent of the modern Army built around a staff system (1800), steam turbines, submarines and the torpedo (1800-1850), the arrival of the railways, telegraph and the rifle (1860) tanks and aircraft carriers (1920), the last revolution was in 1945, the nuclear bomb. The recent (present) revolution (1991) is the micro chip^[2].

3. Toffler's Concept

Famous futurists like Alvin Toffler and Heidi Toffler have quoted that, "*a military revolution, in its fullest scene, occurs only, when an entire society transforms itself, forcing its armed forces to change at every level simultaneously from technology and culture to organization, strategy, tactics, training, doctrine and logistics*"

Alvin and Heidi Tofflers' scenario portrays a world once bisected into First Wave (agrarian) and Second Wave (industrial) powers changing drastically as the U.S., Europe and Japan move toward a Third Wave economy that creates and exploits electronic information and advanced technology. The result on the battlefield, they claim, is the potential for more wars dominated by "knowledge strategy" and featuring high-tech weaponry such as battlefield robots, pilotless combat aircraft, omniscient surveillance satellites, non-lethal weapons like sleep-inducing agents, and by low-cost "niche warfare" using special forces. The Tofflers sketch a preventive strategy for peace that includes the sharing of information technology to halt weapons proliferation and the creation of a "rapid reaction contingency broadcasting force" capable of beaming news anywhere in the world.

For an easy understanding of this I am making all three waves understandable in easy language. Toffler talk about three major waves or stages of development or stages of Revolution in Military Affairs. In 20th century these changes were represented by three major military developments, in chronological order as follows:

- **1st Wave-mechanized warfare, submarine warfare and air warfare:** The changes that occurred were increased speed and pace of warfare. Concept of Fortification emerged. Second concept that came to existence with this wave was of self-defense. Earlier strategy was offensive but now it changed to offensive as well as defensive. War was not only between the armies but between the nations. Speed changed war into total war. Mass armies were involved.

Now strategic points shifted to civilian sector too. They were attacked.

- **2nd Wave-nuclear weapons, ballistic missiles & electronic warfare:** With the introduction of Nuclear weapons and electronic warfare the biggest change that world witnessed in the field of Warfare and military doctrines was that the concept of War itself changed completely. It transformed the concept of war to the concept of peace. Theory of Deterrence (how without using weapons we can make enemy work in our national interest) came into use and a shift from war to peace was visible.
- **3rd Wave-cybernetics and information technology:** With advent of cybernetics and Information technology in war, the first big change was that it reduced the reaction time and increased the information. You can defend yourself better when you are completely aware of enemy's information and don't let the enemy know about your information or to create 'Fog of information' to confuse the enemy. Mobility of weapons too increased.³

The aim of current Revolution in Military Affairs is to enable military to strike anywhere with weight, volume, precision and relative safety. The biggest examples today are 9/11 terror attack on twin towers and the second example is operation Geronimo at Attobabad thereafter.

Another objective is to electronically confuse the enemy by creating Fog of information and to be able to completely be aware of enemy's information.

4. Perspectives of revolution in military affairs

RMA today can be divided into two stages- The Present stage is based on standoff platform, stealth, precision, information dominance, improved communications, computers, GPS, digitization, smart weapons, and jointness.

The Future stage is based on robotics, non-lethality, psycho technology, cyber defense, Nano-technology and hyper flexible organization.

There is growing understanding among the military planners that human warfare is entering the stage of Information Warfare (IW) following the stage of mechanized warfare. The essence of this shift is provided by the revolution in information technology in the field of warfare. RMA has five distinctive features. First, weapons and equipment have become more intelligent oriented, where in precision guided long distance attacks are increasingly playing a critical role in operations and are increasingly becoming the main form of attack. The second perspective is that the RMA has allowed force structures and systems to become more streamlined. This has been possible through rightsizing and readjusting force structures leading to force optimization, but with stronger combat capabilities. Third, a consequent result of above has been automation of command and control(C2) systems, which have incrementally moved from Command, Control, Communication and Intelligence(C3I), to Command, Control, Communications, Computers and Intelligence (C4I), Command, Control, Communication and Computers, Intelligence, Surveillance and Reconnaissance(C4 ISR) and now Command, Control, Communication and Computers, Intelligence, Information, Surveillance and Reconnaissance

(C4I2SR) in order to meet the demand for real time, robust, reliable and efficient command and control systems. Fourth this has led to spatial expansion of warfare, from traditional three dimensions, i.e., land, sea, and air, to five dimensional that includes in addition, the spatial and electromagnetic dimensions. Implication of above is that anybody who controls the information will gain the initiative in high tech battlefield. Finally, and most importantly, operations are

becoming more system-oriented requiring not only a high degree of system integration but the integrated application of power in all five dimensions leading to warfare being transformed into completed operations of system versus systems. This is increasingly impacting on the need for integration and jointness^[4].

The RMA perspective changed in a drastic way which can be represented in the following flowchart:

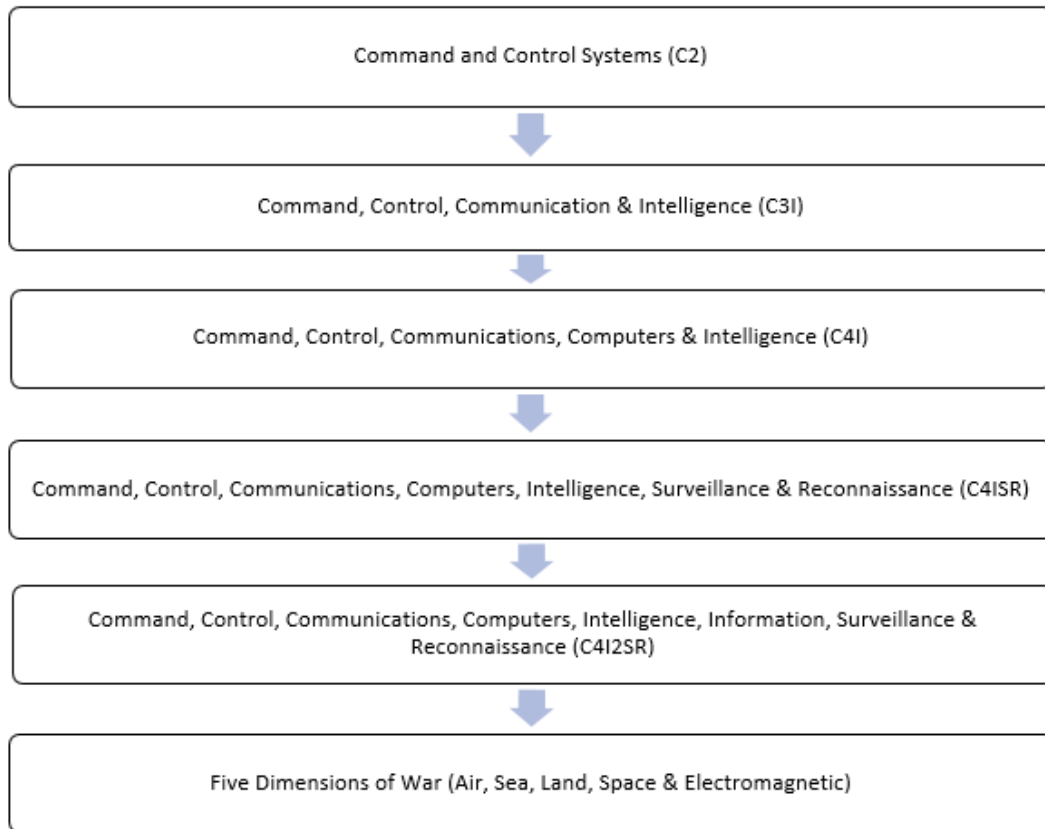


Fig 1

5. Dynamics of current RMA & its impact

The current RMA includes the new tools and processes of waging war like Information Warfare (IW), Network Centric Warfare (NCW), Integrated Command and Control (C4ISR), System of Systems, all powered by IT. The status of information has been raised from being raw material for intelligence to a level where it is now accepted as a tool, or even a new medium for war fighting. Information superiority has led to attainment of decision superiority. The lethality of information power is like any other power. Op Iraqi Freedom launched on 19 March 2003 was a major success essentially due to receipt of information in a short time frame. Establishing information dominance over one's adversary will become a major focus of the operational art in the future^[6].

The United States has led and maintains a significant advantage in the development of information-based technologies. This advantage is well grounded in U.S. military capabilities⁷. The roots of the U.S. military's information-based RMA have been decades in the making. As information-based technologies and capabilities continue to mature, they have become much less expensive, and by their

very nature, can be rapidly incorporated by other military forces to enhance their capabilities.

Information superiority consists of the integration of offensive and defensive information operations. Improved intelligence collection and assessment, as well as modern information processing and command and control capabilities, are at the heart of the current RMA^[8]. With such enhanced capabilities nations will be able to respond rapidly to any conflict. Forces will achieve a state of information superiority, in near real-time, which will be pervasive across the full spectrum of military operations, enabling the force commander to dominate any situation. Velocity of battles would be speeded up causing a collapse of enemy's command and control structures causing a rout essentially due to shortening of own OODA loop^[9].

The capabilities of the present RMA have yielded transformation of weapon systems, military organizations and operations through the integration of Information Technologies. When information technologies are integrated into a coherent system that includes modern weapon systems operated by highly trained personnel, they provide force

multipliers to military formations ^[10], allowing them to perform more complex manoeuvres, to fire accurately at longer range and to experience a higher degree of situational awareness compared to their opponents. Information warfare can be anything from striking headquarters or communications systems with conventional weapons, hacking computer systems, conducting propaganda and psychological operations, or even to committing atrocities to instill panic in the enemy's population.

The current RMA is driven by three primary factors ^[11] i.e. rapid technological advance compelling a shift from the Industrial Age to the Information Age, the end of the Cold War and a decline in defence budgets. The transition is forcing a change in the way the military services are organized, how they are supplied, how they procure weapons and how they are managed, and, most importantly, how they think and fight. The extent to which the U S Armed Forces have accepted these changes, however, has been remarkable, particularly given that the draw downs, relocations, reorganizations and other fundamental alterations to the way they operate began immediately following a victory of immense proportions in the Gulf War; a victory which confirmed the tremendous progress made in rebuilding the services, especially the Army, after the Vietnam War. The Army is not only restructuring as it downsizes, it also is changing the very way it thinks about war.

The development of computers, satellites, and imagery has been occurring at an astounding rate, and there is no indication that this will slow down in the foreseeable future. The inference is that the future military will expand the ability to collect, evaluate and disseminate information relevant to the battlefield at a rate far greater than now. According to Libicki, future precision strike capabilities will mean that, "to be seen on the battlefield is to be killed".

Gen Shalikashral of the US Army realising the current RMA's importance gave the concept of "Joint Force 2010" ^[12]. This concept is basically aimed at giving a frame work for the application of RMA by US forces by 2010 to achieve "Full Spectrum Dominance" or total dominance. This concept is based on four pillars:-

1. Dominant Manoeuvre. It implies an operation from various dispersed points all focusing on one target. Dominating manoeuvre will deploy the right forces at the right time and place to cause the enemy's psychological collapse and complete capitulation.
2. Precision Engagement. This means the engagement of the target with extreme precision by PGMs from land or sea platforms. For this accurate data collection about the target is very important to make the engagement effective.
3. Full Dimensional Protection. This is the ability to protect the forces including plans from any damage. This enhances the scope of what has to be protected.
4. Focussed Logistics. It means reducing the logistic load to only the essential requirement in shortest possible time, at the fastest speed and in the correct quantity. The RMA also enables to calculate precisely what is required, how much is required and where required.

The current rate of change suggests that state of the art in any

technological context will be an extremely short-lived phenomenon¹³, particularly with respect to the technologies that were key to the success of Desert Storm including space systems, telecommunications systems, computer architectures, global information distribution networks, and navigation systems. Future revolutions will occur much more rapidly, offering far less time for adaptation to new methods of warfare. The growing imperative in the business world for rapid response to changing conditions in order to survive in an intensely competitive environment is surely instructive for military affairs. Corporations repeatedly have to make major changes in strategy to accommodate the full implications of technologies, which have already existed many years.

Exploiting the Information Age. The armed forces must develop the essential competences in personnel to exploit new technologies and systems to the full and to ensure that leaders have the right skills to deliver and integrate information projects successfully. To help meet these requirements, there is a need to develop information age skills for everyone joining the armed forces. Efforts should also be made to increase opportunities ^[14] for personnel already serving besides increasing IT awareness training during initial training.

Many analysts agree on one important fact that the current revolution in military affairs seems to have at least two stages ^[15]. In the drive to limit military casualties, stand-off platforms, stealth, precision, information dominance, and missile defence are the first stage. The second may be robotics, nonlethality, psychotechnology, and elaborate cyber defence. The revolution in military affairs may see the transition from concern with centres of gravity to a less mechanistic and more sophisticated notion of interlinked systems.

The armed forces no longer have to request scientists to develop a specific technology for possible military use. Quite likely, it will be the scientists who would be chasing military planners prodding them to use technologies that can now be converted to weapons much quicker than before through computer simulation, cutting development and production cycles dramatically ^[16].

6. Conclusion

One of the biggest threats of technological & Information Warfare is that no one can really predict the time, duration, source and how much damage it will make. We have no idea as how much information our enemies have and how deep they can attack. As in today's world of cyber dominance, they have information and access to almost each and every individual via hacking social media and social networks as a tool. Man, today is slave to machines and technology.

It is very expensive and there is doubt about whether RMA expenditures will generate the expected benefits or not. Will it give the promised ROI-Return of Investment?

Although the objective of war is still the same even after achieving such technological superiority. There is no revolutionary change can be seen in efficiency and effectiveness of war. Though duration of war and reaction time has considerably reduced. Earlier 70-80% of country's population was directly indirectly involved in war but now that magnitude is reduced to only 3-4%.

From open war now it has shifted to asymmetrical wars. Non state actors became more active and better sound technologically, examples of which we have witnessed in 9/11 terror attacks on twin tower and 26/11 Mumbai terror attacks and many more, where non state actors used technology better than the security forces which is alarming.

Without war, without weapons, without using arms, a war like situation can be created today. So the concept of 'Unmanned War' is already introduced. Keeping pace with the RMA will require review of existing defense resources, to instill efficiency, economy and modernization through integrated and accountable systems.

"The intractable problem of today is not how to cope with modern technology that is advancing at a dizzying pace but how to grapple with the available technology and use it in ingenious ways to fulfill the felt needs of their people."

-Kenneth Boulding

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