

the

**Revolution
in Military
Affairs-**
*Panacea
or Myth?*

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There is a great deal of popular debate taking place in political, industrial, academic and military circles as to whether there is a Revolution in Military Affairs (hereafter referred to simply as the RMA) currently underway. Put in simplistic terms the proponents of the RMA claim that the current state of military technology and likely future advances in technology will enable military operations to be conducted with such speed, precision and selective destruction that the whole nature and way in which future wars are fought, and the consequent political impact of such operations, will fundamentally alter the way in which military and political affairs are conducted in the international system in the next millennium. However, these proponents claim that in order to fully exploit the potential which these new technologies offer, the military and political organisations and processes concerned with the whole business of producing a military capability will need radically restructuring. Indeed somewhat paradoxically unless there are some 'revolutionary' changes in the way military affairs are conducted, (and in this context military affairs includes the whole spectrum of military related activities ranging from conceptual and doctrinal thinking and development, the budget allocation, command and control organisations, development and procurement of military equipment, infrastructure and logistics systems, training, right through to actual war fighting) then the 'revolutionary' changes in technology cannot be fully exploited and there can be no RMA.

Other views are not so enthusiastic as to efficacy of the RMA. The advocates of the RMA so far seem to have only concentrated on the higher levels of conflict and there is little work to suggest how the RMA will affect the lower levels of the spectrum of conflict. The RMA proponents also seem to advocate that technology, an essentially mechanical process, can overcome the problems inherent in war, an essentially human process. These are bold claims which the RMA theorists have yet to prove. Underlying all this is the core issue that the RMA is being constructed around a Western, American led, military affairs paradigm and its applicability to the situations outside this paradigm is yet to be demonstrated.

The purpose of this essay is to critically examine these claims that there is indeed an RMA occurring and offering an opinion as to whether these claims are valid or like reports of Mark Twain's death, are an exaggeration. To that end it examines the nature of RMAs with specific reference to the historical context of previous events which are considered to have constituted RMAs, and following on from this it examines the current processes within the realm of military affairs which may suggest that there is an RMA taking place, and critically assesses whether an RMA is taking place. It also exposes some arguments that suggest that because a technology driven RMA is being constructed around a Western, American led, military affairs paradigm its applicability to the situations outside this paradigm is suspect, and also suggests that the advantages that an RMA may give to those who embrace it, may be countered as a result of technology and doctrine transfer and adaptation, and the employment of asymmetric strategies.

WHAT IS AN RMA?

The term RMA has no agreed definition, and it is precisely how one defines an RMA which will influence the views and conclusions which can be made about the nature of an RMA. The term itself has been used increasingly to describe events which have effected the conduct of military affairs, but as Freedman cautions it should be used sparingly, and only when its meaning is truly applicable to the events being described. The term RMA has advantages as a 'marketing device' which dramatizes issues by linking them to a sense of profound change, and thus giving them more credibility than perhaps they merit, thereby running the risk of turning the idea of revolution into something hackneyed and without substance.¹ Certainly an RMA is about change, but the scale, impact and consequences of that change are the defining aspects as to whether the change has been revolutionary. Similarly the timescale over which that change takes place may be an important factor in considering whether the change has been revolutionary. Indeed can a series of small incremental evolutionary changes cumulatively provide such synergy (the whole being greater than the sum of the parts) that it becomes revolutionary? Similarly is it possible for those experiencing revolutionary change to actually perceive that revolutionary change is taking place, or can it only be with hindsight that a revolution can be discerned? Freedman sums the situation up thus:

*"Revolution involves more than change, and certainly more than simply change of an incremental variety. It represents a moment of transformation. Such moments may not be appreciated until later historians study them; occasionally, they may be imagined in advance. With the RMA, as with most revolutions, there is confusion over whether it represents a stage in the historical process, or a vision that cannot be realised unless the visionaries seize the initiative."*²

Therefore, it is not merely enough to have some form of change to constitute an RMA. It must also involve some form of conceptual change in the way in which military affairs are conducted. Herman claims that an RMA occurs when emerging technologies are applied to modern military systems, whose uses are optimised via custom-tailored operational concepts and force structures, resulting in vast increases in military effectiveness".³ However, this suggests a rather narrow definition of an RMA. Indeed the United States' Department of Defense's Office of Net Assessment defines an RMA as: 'a major change in the nature of warfare brought about by the innovative application of technologies which, combined with dramatic changes in military doctrine, and operational concepts, fundamentally alters the character and conduct of operations'. What is lost in this definition and in subsequent discussions is the nature of war, which remains a complex interaction of political objectives, human emotions, cultural and ethnic factors, and military skills.⁴

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Thus for an RMA to be truly 'revolutionary' it must encompass the wider aspects of conflict. As Lambeth states:

"A revolution in military affairs' cannot be spawned merely by platforms, munitions, information systems and hardware equities. These necessary but insufficient preconditions must be supported by an important set of intangibles that have goals backed by proficiency and boldness in execution. In the so called 'RMA debate', too much attention has been devoted to technological magic at the expense of the organisational, conceptual and other human inputs needed to convert the magic from lifeless hardware into combat outcomes.⁵

It seems then that the recognition of the potential effects of change upon military affairs and subsequent adaptation of concepts and organisation, concerned with the whole spectrum of military affairs, are required to constitute an RMA.

Historically the term RMA was first coined as result of the historical debates over the major changes in warfare that occurred in the 16th and 17th centuries, and it was also used to refer to the impact of nuclear weapons. Interestingly, and somewhat ahead of their Western counterparts, writers in the Soviet Union coined the phrase 'Military Technical Revolution' or MTR in the early 1980s when discussing the impact of the West's, primarily the United States', military technological lead over the Soviet Union and its impact on superpower relations.⁶ However, despite this wealth of historical debate over previous RMAs, the precise definition and agreement over what constitutes an RMA is no more clear than the current debate. The essential elements appear to be some form of change, be it technological, economic, political or social, which results in step changes in the conduct of military affairs with subsequent impact upon the operation of the international political system.

Viewing RMAs historically, Ritcheson identifies three common features to military revolutions. Firstly and most importantly new technologies must be complemented by doctrinal and organisational adaptations, as it is the synergy among these three elements that fundamentally alters the conduct of warfare. Secondly the magnitude of change compared to the previous state of military affairs must be great. This can be manifested in decisive military results, relatively low casualty rates, and a disproportionate destruction of enemy forces. The third feature of an RMA is the blending or blurring of the strategic, operational and tactical levels.⁷ Increased battlefield manoeuvrability and communications have been a key feature, particularly in this century, of the merging of these three levels. Many writers agree that historically RMAs can be traced back to around 1500AD. However, Murray in Figure 1 identifies 21 possible RMAs between the 14th century and the present day together with the types of driver which brought about the RMA.⁸ An important point to note is that the drivers are not necessarily technological but include administrative, social, financial, organisational, conceptual, ideological, cultural, operational and tactical drivers.

Figure 1. Possible RMAs

<i>Period</i>	<i>RMA</i>	<i>Driving Forces</i>
14th Century	Longbow	Cultural
15th Century	Gunpowder	Technological, Financial
16th Century	Fortifications	Architectural, Financial
17th Century	Dutch-Swedish Tactical Reforms	Tactical, Organisational Cultural
	French Military Reforms	Tactical, Organisational Administrative
17th-18th Centuries	Naval Warfare	Administrative, Social, Financial Technological
18th Century	British Financial Revolution	Financial, Organisational Conceptual
	French Revolution	Ideological, Social
18th-19th Centuries	Industrial Revolution	Financial, Technological, Organisational, Cultural
19th Century	American Civil War	Ideological, Technological Administrative, Operational
19th-20th Centuries	Medical	Technological, Organisational
20th Century	World War 1 : Combined Arms	Tactical, Conceptual, Technological, Scientific
	Blitzkrieg	Tactical, Operational Conceptual, Organisational
	Carrier War	Conceptual, Technological Operational
	Strategic Air War	Technological, Conceptual Tactical, Scientific
	Submarine War	Technological, Scientific Tactical
	Amphibious War	Conceptual, Tactical Operational
	Intelligence	Conceptual, Political Ideological
	Nuclear Weapons	Technological
	People's War	Ideological, Political, Conceptual

However, Murray then goes on to refine his claims. Most of these changes were significant and important, but not 'revolutionary' and he concludes that there appear to have been only four genuine RMAs, two of which occurred at the same time, which involved fundamental changes to warfare in the West. These RMAs were: the creation of the modern, effective nation-state based on organised and disciplined military power in the 17th century; the French revolution and the industrial revolution beginning at the same time during the period 1789-1815; and the First World War.⁹ In their magnitude these RMAs may be compared in geological terms to earth-quakes in so much that they brought with them such systematic changes in the political, social and cultural arenas as to be largely uncontrollable, unpredictable, and above all unforeseeable.¹⁰

Taking the French Revolution as an example it is of particular note as to how incremental changes in warfare can suddenly combine together with radical changes in the political and social order to create a truly revolutionary effect. Paret makes the point:

"The French Revolution coincided with a revolution in war that had been under way through the last decades of the monarchy. Soon the two meshed. Profound changes in military institutions and practice, some already firmly established under the Old Regime, others still tentative and experimental, were adopted by the Revolution, and developed further. By infusing them with its dynamic, and linking them with its frequently violent domestic and foreign policies, the Revolution expanded the scope of these innovations. The army, its requirements and values, gained new importance in French life, which eventually was reflected in the rise to supreme political power of a soldier; but already under the Convention and the Directory domestic policy and foreign expansion went hand in hand. At the same time the military revolution ceased to be a purely French phenomenon. The wars waged by a succession of French governments from 1792 on ensured that not only political and social change, but military change as well, spread across Europe."¹¹

Tilford claims that technology does not necessarily always drive an RMA and whilst it can be a part, indeed a major part of an RMA, it does not necessarily lead an RMA. Indeed the effects of improved technology or new discoveries are not always felt immediately. The possession of a technological advantage means little if there is no impetus to use it conceptually and strategically. Tilford states:

"RMAs and rapid advances in technology are not always related. The armies of Napoleon, for instance were part of a revolution in military affairs that derived from the social and political upheavals of the French Revolution. While the armies of the French Revolution coincided with the beginnings of the Industrial Revolution, the incorporation of the people into the war effort through the levee en masse was more important than anything issuing from the Industrial Revolution. Furthermore, the weapons used by the armies of 1815 were basically the same as those available in 1789 or, for the matter, in 1715. Conversely, the military-technical revolution that issued from the maturing industrial revolution at the beginning of the 20th century did not translate into a true RMA until after the first World War, although all the technological elements were available during the war; the railroad, machine guns, tanks, long-range and rifled artillery, rapid-fire rifles, electronic means of communication, and airplanes."¹²

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Tilford's point is well made, and the use of technology to achieve decisive changes in warfare relies much on the conceptual and consequent doctrinal vision of how to harness the new technologies. Thus the potential impact of machine guns, barbed wire, entrenched fortifications and heavy artillery at a tactical level was evident in the late 19th and early 20th centuries during the American Civil War, the Boer War and the Sino-Japanese Wars, but military and strategic thinkers in Europe were unable to grasp their significance to future European wars.¹³ Similarly the strategic potential of economic warfare, submarine warfare and the mobilisation of the whole nation's resources as demonstrated in the American Civil War were lost on the political and strategic thinkers of the time. Thus can those actually involved in embryonic RMAs, whether as direct participants or observers, really be able to recognise and judge the significance of developments which lead to an RMA? Indeed given their conceptual framework, which is largely based upon past experience and knowledge, is it reasonable to assume that an RMA can be perceived by those actually involved, or is it only with hindsight and the view of the historian that RMAs can be discerned? Indeed is an RMA really a construct of the historian? As Gray points out there are many examples of transformations of warfare, but only a certain few have been selected as RMAs:

"The historical point is that candidate RMAs, arguable transformations of war, or just plain old significant seeming changes in the terms and conditions of war, abound wherever one looks."¹⁴

Indeed when attempting to evaluate events which could claim to be RMAs, the bias of the researcher making the claim must also be taken into account. For example a historian with a particular interest in a particular part of history may well have a bias towards a particular supposed RMA, but organisational and cultural bias will also play its part.¹⁵ For example, Bailey claims that:

"Between 1917 and 1918, A REVOLUTION IN MILITARY AFFAIRS(RMA) took place which, it is contended, was more than merely that; rather it amounted to a Military Revolution which was the most significant development in the history of warfare to date, and remains so. It amounted to the birth of what will be termed the Modern Style of Warfare with the advent of '*three dimensional*', artillery indirect fire as the foundation of planning at the tactical, operational and strategic levels of war. This was indeed so revolutionary that the burgeoning of armour, airpower and the arrival of the Information Age since then amount to no more than complements to it – incremental technical improvements to the efficiency of the conceptual model of the Modern Style of Warfare – and they are themselves rather its products than its peers."¹⁶

Bailey's paper is lucid and plausible, however, when it is revealed that Bailey is himself a Colonel in the British Army, and an artilleryman as well, it appears that there is more than a hint of organisational and cultural bias in his work.¹⁷ There is no doubt, however, that the First World War did see a transformation of warfare as new technologies, and concepts of their employment were applied to the conduct of the war. Indeed it is possible to argue that the RMA of the First World War did not cease with the signing of the Armistice in 1918 but continued through the inter-war years with the work of Liddel-Hart, Fuller, Douhet and other military strategists, who continued to develop the conceptual use of new technologies and new ways of waging war.

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Although somewhat neglected in discussions of RMAs, the advent of nuclear weapons must also be classed as an RMA. Although, thankfully they have never been used, the threat of use of nuclear weapons during the Cold War was a major influence on the conduct of war during that period, resulting in the development and articulation of various nuclear doctrines such as Assured Destruction, Tripwire, Mutually Assured Destruction, and Graduated Response nuclear strategies. Whilst these strategies now seem relegated to the annals of history, it must be remembered that the Cold War with its ever present threat of nuclear war was a major influence on the development of military capabilities and strategic and doctrinal thought, and although nuclear war was never fought, the impact of nuclear weapons on military affairs must surely qualify this period as an RMA.¹⁸ Indeed thinkers such as Brodie argued that after 1945 the nature of military affairs had changed fundamentally in so much that the task of the military was to prevent wars, not to fight them.¹⁹

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History then gives us no clearer definition of what constitutes an RMA and if anything emphasises that an RMA is not a precise phenomenon which has a clearly identifiable start and end, or indeed that its impact can be recognised without the benefit of historical analysis. However, the common elements of an RMA appear to require some form of change to take place be it technological, economic, political or social, combined with the recognition of the potential effects of that change upon military affairs, and subsequent adaptation of concepts and organisations concerned with the whole spectrum of military affairs. The problem facing today's researcher is therefore how to decide whether an RMA is taking place or not given the imprecise nature of the subject. Indeed the very problem of thinking outside an existing analytical framework to envisage how changes of whatever nature may effect the future conduct of military affairs is in itself a major challenge. Mahnken and Watts sum up the dilemma thus:

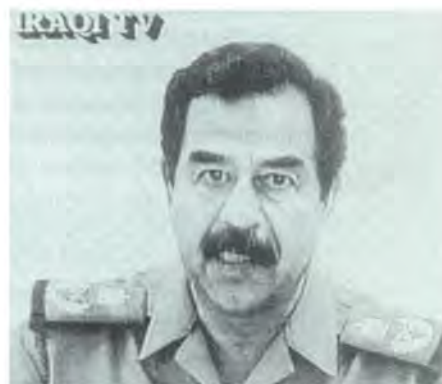
"Today, however, we can perceive only dimly transformation and the features of the military regime it might produce. In part, this is because the kinds of innovations that might one day transform the character and conduct of warfare depend less on technology per se than on achieving a good fit between technology, operational concepts, doctrine, and organisational changes. Precision strike and information warfare are simply the two most plausible ideas put forward so far in trying to understand how war might change in the decades ahead. Thus the central tendency of the RMA debate is not some specific prediction like the disappearance of armored breakthroughs, but rather the hypothesis that new, far more powerful methods of warfare may be in the offing."²⁰

THE CURRENT RMA DEBATE

The catalyst for the debate over whether there is a current RMA was undoubtedly the Gulf War of 1990/91.²¹ In this conflict the technological superiority of the coalition forces, led and dominated in numbers, organisation and doctrine by the United States, shattered the Iraqi army, driving it from its occupation of Kuwait. However, the seeds of the technological victory of the coalition in the Gulf had been sown back in the 1960s and 1970s when satellites, computers and laser guidance had all been developed and to some extent tested in the lesser conflicts of the Cold War. However, the Gulf War can be seen as the culminating point of all these developments. The victory of the coalition was not due solely to its technological edge. It was the first opportunity that the United States had to put into practice its doctrinal Air/Land Battle concept which it had developed as an antithesis to its perceived failing in the Vietnam war.²² Thus its manoeuvrist approach to the conflict was as much a factor in its victory as its possession of advanced superior military technology:

"The 1991 Gulf War is commonly viewed as the first real 'electronic war'. The sight of cruise missiles and smart bombs roaming to their destination with pinpoint accuracy has created a widespread impression of an uneven match between a high-tech superpower and a hapless, ill-equipped, and backward Third World army. Yet much as it is common, this popular perception is largely misconceived. The key to allied success lay not in overwhelming technological superiority-for the Iraqi Army was a far cry from the technologically backward force portrayed by many accounts of the war. Rather, the allies' astounding victory represents the triumph of an advanced manoeuvre-oriented operational doctrine over an archaic attrition-oriented one."²³

Thus the fusing together of incremental technological advances together with the recognition of the potential effects of those changes upon military affairs, with a subsequent adaptation of doctrine suggests that the Gulf War was indeed an identifiable



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point at which it could be concluded that an RMA was in progress. Aside from the merely technical advances which were employed to great effect, the Gulf War seemed to once and for all lay the ghosts of the American experience of Vietnam. In many circles military power was now seen to be an appropriate instrument to use in international affairs, and more importantly the cost in human terms, particularly American human terms, was seen to be low. War fighting was swift, decisive and affordable. Additionally the end of the Cold War reduced or indeed removed the threat of regional conflicts escalating to nuclear Armageddon between the superpowers. This perhaps is one of the key changes in military affairs since the end of the Cold War. The military instrument has gained a new utility and acceptability in the psyche of the Western nations. However, the Gulf War was exceptional in many respects and the unique geographical, political and climatic conditions which overwhelmingly favoured the United States and its technological advantages over Iraq, seem to be conveniently forgotten when analysing the effects of the Gulf War. Nonetheless there has been a distinct shift in thinking concerning the utility of the military instrument.

In these changes in both technology and attitudes towards military affairs three distinct, but inter-related areas of development can be identified. These are: the development of information war, the development of a 'system of systems', and conceptual and doctrinal changes; all of which are underpinned or overshadowed (depending on one's perspective) by United States dominance of these three activities and the subsequent peculiarly American approach to military affairs.

Information war is not a new phenomenon, it is as old as warfare itself. Essentially it involves degrading an opponent's information system, whilst enhancing one's own information system. The US Air Force have a much more detailed definition: 'Actions taken to achieve information superiority by affecting adversary information, information-based processes, information systems, and computer-based networks while leveraging and defending one's own information, information, information-based processes, information systems, and computer-based networks.'²⁴ In the past information warfare has been limited by the ability of opposing sides to collect, interpret and disseminate information. Advances in technology have so increased this capacity, that some writers argue that the realm of information or 'cyberspace' can be counted as one of the main arenas in any future conflict.²⁵ Stein argues that information war may indeed replace conventional armed force as the main military instrument and that information war should be seen as a war winner in its own right and not merely an adjunct to the traditional use of force:

"It would be a strategic mistake of historical proportions to focus narrowly on the technologies; force the technologies of information warfare to fit familiar, internally defined models like speed, precision, and lethality; and miss the vision and opportunity for a genuine military revolution. Information warfare is real warfare; it is about using information to create such a mismatch between us and an opponent that, as Sun Tzu would argue, the opponent's is defeated before his first forces can be deployed or his first shots fired."²⁶

The key to success in information is the control of the means of communication. Increasingly this equates to the control of space and the satellite technology which enables instantaneous communication around the world, and the ability for anyone with a global positioning system (GPS) terminal to know their exact location in the world to within tens of metres. Thus the control of cyberspace is seen as an essential element in a current RMA, and whilst information warfare would be waged largely, but not entirely, through the communication nets of a society or its military, it is fundamentally not about satellites, wires and computers, but influencing human beings and the decisions they make.²⁷

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Returning to the Gulf War, it is noticeable that the United States and its allies went to the battlefield with a total dominance of Earth orbits, and marshalled unprecedented space-dependent military capabilities to help it achieve victory. The Iraqi leadership, conversely, approached war in such a conventional fashion that it did not even exploit the space-based information potentially available to it. Thus this unchallenged advantage in space has persuaded American military analysts that such global hegemony, in terms of surveillance, may be taken for granted, or indeed is a key to future victories.²⁸

If the developments in information warfare are indeed linked together with more conventional military force then a new system of war fighting is possible, as the British Ministry of Defence foresees:

"The biggest change in the conduct of future military operations is likely to come not from weapons alone but from the application of information technology to military command and control. There is a growing body of opinion, particularly in the US, that we are approaching a 'Revolution in Military Affairs' in which we will see a step change in military capabilities resulting from the synergistic combination of long-range precision weapons with networks of advanced sensors and data processors. Radically improved capabilities in the field of information processing and communications systems will increase situational awareness (knowing where hostile and friendly forces are, and where they are not) by combining information from all available sources and rapidly distributing it to those who need it, thus permitting more effective and efficient use of our forces. Smart long-range precision weapons will enable us to attack targets accurately from distance, thereby reducing our own and civilian casualties."²⁹

However, this application of technology hardly represents an RMA, rather it is the enhancement of existing ways of doing business. If these technological advances are to be fully exploited to produce a true 'revolution', they must be used to fundamentally alter the way in which military affairs are conducted. One visionary of this is Admiral W A Owens of the United States Navy who

conceptualises a 'system of systems' in which all the military capabilities of a nation (in this case the US), including information warfare capabilities and conventional war fighting capabilities, would be drawn together to create an integrated higher order military instrument capable of utilising and exploiting all spectrum of activity relevant to the conduct of military affairs. He asserts that it requires a joint perspective, that frees individual services with vested interests from sterile debates about individual service requirements and focuses on far more important issues such as the character of armed forces in total, and the manner in which they can work synergistically to increase their overall military capability. In short, the system of systems is fundamentally a joint military entity, and only the co-ordinated interactions of all the services can produce it.³⁰ Similarly Betts argues that:

"Rolling along in what some see as a revolution in military affairs, American forces continue to make unmatched use of state-of-the-art weapons, surveillance and information systems, and the organisational and doctrinal flexibility for managing the integration of these complex innovations into "systems of systems" that it is the key to modern military effectiveness. More than ever in military history, brains are brawn."³¹

However, the ability to integrate all the elements of military affairs in a system of systems requires fundamental changes to conceptual and doctrinal thinking. Bracken argues that the underlying forces behind the new military capabilities are the rapid advances in computer technology and communications, and the rapidly declining cost of both. He argues that these forces have already fundamentally changed civilian corporate organisations in ways not seen since the creation of the mass bureaucracy in the 19th century. If these developments are to be incorporated into the military affairs spectrum, then changes of comparable magnitude will have to occur in all those organisations involved in military affairs. Therefore the most fundamental notions of hierarchy, span of control, response time, and centralisation must be re-evaluated, and it is likely that dramatic transformations seen in commercial organisations will produce a similarly dramatic impact in the military sphere.³² However it is not apparent that these changes are being made or indeed contemplated by those organisations involved. Restructuring of the military affairs organisation or 'process redesign', in the current terminology, is required in the whole of the defence establishment, not just in those areas of forces which actually engage in combat. Bracken claims that in the case of the United States it has highly capable field forces, but a defence macrostructure that resists change and is over departmentalized with each service maintaining independent support, depot, intelligence, and logistic centres.³³ Until there is a recognition that new technologies may require new concepts about how military affairs are conducted then there cannot be revolutionary advancement:

"Technology alone, however, does not constitute an RMA. A fully exploited RMA requires that technology be effectively fleshed out by doctrine and organisation. Elements of the US military have begun to do this. But the military, civilian policy makers, and legislators need to expand their thinking about how the nation plans for, organizes and wages future high-technology warfare and what the implications are for deterrence and the use of forces. Attaining the full benefits of a potential RMA will be a challenge in the current environment."³⁴

All the developments which might suggest that there is indeed an RMA are almost totally dominated by the United States. As the only world superpower it enjoys an unprecedented technological and economic lead over its rivals. Thus the development of an RMA is so far a peculiarly American phenomenon. Tilford argues that there is currently an RMA which 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 defence budgets. The RMA entails a fundamental change in who, how, and, perhaps even why wars are fought, and is driven not only by new technologies, but by new operational concepts, new tactics and new organisational structures. He argues therefore that the impact of what he claims is “the current confluence of social, political, economic and technological forces on American society and the armed forces” may equal or exceed what occurred during the 1960s and 1970s during the turmoil associated with the war in Vietnam.³⁵

Thus if there is an RMA occurring then it is an American led RMA, and based upon American concepts of how and why military affairs are conducted. This peculiar American view of the RMA must be shaped by the unchallenged hegemony in the international system of the United States and the lack of any challengers to this sole superpower position for the next 20 to 30 years. However, as previously discussed the ‘American Way of War’ is also influenced by its own historical experience, its societal and cultural perceptions, and the experiences of its current military and political leaders. Thus the perception, and indeed the desire that war should be, and can be, swift, decisive and affordable is a key factor in the development of the RMA. As Caldwell states:

“In short, the American vision is to win quickly, decisively, with overwhelming force: send our troops in with massive quantities of high-tech firepower and maximum logistical support to defeat the opposition quickly while simultaneously minimizing casualties through exploitation of our technological superiority. Near bloodless conflict – neat clean and fast.”³⁶

THE RMA MYTH

There is concern in many circles about a blind faith in the ability of technology to radically alter the conduct of military affairs. Van Ripper and Scales argue that overconfidence in the microchip is a real danger to those involved in the development of doctrine and strategy. As already discussed the

technical solution and consequent substitution of advanced technology for conventional military capabilities reflects a peculiarly American faith in science’s ability to engineer simple solutions to complex human problems, even though the practical military effects of technological supremacy over the past half century have been equivocal at best. The possession of such technical supremacy could not prevent Holland’s defeat in Indonesia, France’s defeats in Indochina and Algeria, America’s defeat in Vietnam, the Soviet Union’s defeat in Afghanistan, or Russia’s more recent defeat in Chechnya. This historical experience demonstrates that technological superiority does not automatically guarantee victory on the battlefield, still less at the negotiating table, and that technological innovation alone does not fundamentally alter the conduct of military affairs.³⁷ These sentiments are echoed by Emmett:

“The Vietnam War proved that high-technology does not in itself win wars. Military effectiveness depends on the ability to exploit *all* the many facets of warfare, including terrain, morale, the national will, logistics, lines of communication, training and quality of generalship, as well as technology’.³⁸

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Although technology in itself may not be a change agent in the conduct of military affairs, can its application to all those areas which Emmett identifies result in it becoming a major change driver and thus the foundation for an RMA? Again the evidence seems to suggest that unlike other activities, military affairs or war is such a complex business that even the technology of the late 20th century is unable to bring order to the confusion of the battlefield. Van Ripper and Scales again argue that history demonstrates that ambiguity, miscalculation, incompetence, and above all chance will continue to dominate the conduct of war. In the end, the incalculables of determination, morale, fighting skill, and leadership far more than technology will determine who wins and who loses.³⁹

“For those placing unbridled faith in technology, war is a predictable, if disorderly, phenomenon, defeat is a matter of simple cost/benefit analysis, and the effectiveness of any military capability a finite calculus of targets destroyed and casualties inflicted. History paints a very different picture. Real war is an inherently uncertain enterprise in which change, friction, and the limitations of the human mind under stress profoundly limit our ability to predict outcomes; in which defeat to have any meaning must be inflicted above all in the minds of the defeated; and in which the ultimate purpose of military power is to assure that a trial at arms, should it occur, delivers an unambiguous political verdict.”⁴⁰

Despite the foregoing arguments that technology per se cannot be viewed as a major change driver for an RMA, is there any recognition that the application of technology to the conduct of military affairs may be a major driver of an RMA? Stein argues that the armed forces of the United States have recognised that information technologies might be the major driver of future warfare, but as yet they have not articulated the strategic vision or identified the higher-order changes needed to make the impact of technology realise its potential on the conduct of future war.⁴¹ Biddle similarly argues that technology itself is not the driver of change, but the application of technology which is the driver of change. Thus the Gulf War demonstrated that rather than a revolution through information dominance and precision strike, the revolution will come through the ability to exploit the mistakes of the other side through technological superiority. Emmett similarly argues that it is not information warfare per se which will drive an RMA, but the exploitation of the capabilities which new technology brings that will drive an RMA. He also cautions that the recognition of the potential of information warfare may have been too rapid and consequently flawed:

“The core power of Information Warfare lies in the realm of the human mind. Information is power, but it is no substitute for military power. Information is an important factor on the battlefield, but it is one of many. Information is a part of the military revolution, but it is not the cause. The hasty embrace of an immature idea has sapped intellectual strengths and distracted military leaders at a time when a balanced perspective on all the many threats and potentialities of the military revolution was essential. In the name of Information Warfare, a great edifice of information systems is being built. Only time and the trials of conflict will tell whether its construction is robust, or the strategic equivalent of a glasshouse.”⁴²

In a similar vein Libicki claims that the attractiveness of the new technological solutions makes them appear to be the panacea for all the ills of military affairs, and perhaps a more practical and less romantic or idealised vision of what the new emerging technologies can, and more importantly cannot, do for the future conduct of military affairs is what is required:

"If understood correctly, information warfare would lose (sic) its sex appeal or media attention; and it would disappear from Presidential Decision Documents and grand national strategy. But it would grow up and go to work."⁴³

Blank argues that it is essential that a state's political leadership and elite must be able to restructure its defence industry, strategic leadership, policy process, and related organisations to realise any potential RMA. This radical restructuring process must however, clarify what aspects of the RMA and vision of future war and associated operational concepts are too strategically risky or beyond a state's foreseeable capacity. In other words the changes must be achievable and sustainable. Secondly he argues that even under conditions of technological superiority, failure to undertake organisational and social innovations or restructuring guarantees that the impact of superior technology will be blunted, if not negated. In other words, no technology can make up for basic errors in making or implementing strategy. Thirdly it must be recognised that organisations, systems and processes should also be viewed as a form of applied technology for warfighting purposes. Only if effective military, political, and defence industrial structures are built can states obtain the force multipliers inherent in the new technologies and consequent RMA. Fourthly technological superiority, in the form of superior platforms and weapons, means little without organisational superiority, and without organisational superiority superior weapons and technology will only have tactical significance.⁴⁴

Even then, if the significance of a change in the conceptual framework in which military affairs are considered is recognised, there seems to be a general consensus that this is not taking place, or if it is then it is taking place slowly. Bracken argues that the development of current military organisations, systems and processes in the United States is not so much taking place as part of an RMA, as merely using improved and new technologies to enhance existing capabilities and structures. Essentially the military posture for the next 20 years is conceptualised implicitly in terms of the contemporary situation, rather than in terms that reflect both the changing character of war and the technical and military transformation taking place in the world. Similarly M T Owens argues that whilst a great deal of effort is being directed to the ability to collect information and achieve information dominance the true significance is being lost in the conceptual process. He claims that:

"Information is not so much a medium to be dominated as it is an input that initiates the process that provides structure to actions. Much of the discussion concerning information dominance confuses *data*, the lowest class of information, with *knowledge* and, more importantly, *understanding*. Possessing a mass of data does not mean that the decision-maker understands their significance or what to do with them."⁴⁵

Several writers urge caution against embracing technology as an answer to the problems inherent in military affairs whilst ignoring the requirements to conceptualise how new technologies may be employed and educating those responsible for their employment. MT Owens again claims that it is not technology itself which holds inherent dangers for the RMA but rather 'technocentric thinking' or the belief that an edge in technology itself is enough to produce an RMA. Technocentric thinking, he argues, can lead to a dangerous de-emphasis of other factors critical to success in war, such as appropriate force structure, readiness and training to exploit emerging technologies, and indeed a misplaced belief that information technologies will, by themselves, improve decision-making on future battlefields.⁴⁶ He argues that the key to improved decision-making comes with education and that no matter how good the technological ability to collect, collate, and distribute

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data this will achieve little without educating present and future commanders with an eye towards knowledge and understanding.⁴⁷ Tilford goes even further in his warning and raises the spectre of Vietnam to drive home his point that technology is not a panacea to the problems of waging war:

“War is, and in the information age is liable to remain, a bloody, horrific, and passionate undertaking. The bottom line is always victory, and that sometimes comes at an exorbitant price in human suffering and resources. The Defense Department’s general managers, and the services’ manager generals, did not serve the nation well when they took the world’s premier Industrial Age military to war (and defeat) in Vietnam. In the RMA we must ensure against raising up a leadership composed of techno-work managers.”⁴⁸

A recurring theme which arises in the discussions about the current supposed RMA is the ability of technology to eradicate what Clausewitz described as the ‘friction’ of war. In Clausewitz’s own words the friction of war is summed up thus:

“Everything in war is very simple, but the simplest thing is difficult. The difficulties accumulate and end by producing a kind of friction that is inconceivable unless one has experienced war.”⁴⁹

However, the new technologies, it is implied, will eliminate or greatly reduce this friction. For example with satellite communications and imagery, GPS, remote sensors, Precision guided weapons, and secure and instantaneous visual, oral and electronic communications, commanders will be able to know exactly what their combat forces are going, more importantly what the opposition forces are doing and be able to rapidly communicate their intentions and instructions to all who need to know. Similarly the political leadership will

no longer have to delegate responsibility for combat operations to the generals in the field, but will be able to directly influence and control the military response in accord with their political goals. However in the 1990/91 Gulf War when the coalition forces had total command of cyberspace, in a theatre of war almost perfectly suited for military operations friction still persisted:

“Scrutiny of Operation *Desert Storm* reveals that Clausewitzian friction persisted at every level of the campaign. Even for the Coalition, general friction had operational and strategic consequences, not merely tactical effects. Moreover, none of the specific frictional impediments documented, from adverse weather and faulty intelligence to the American army’s doctrinal infatuation with synchronization, would be unfamiliar to Clausewitz or Scharnhorst.”⁵⁰

Watts argues that the emphasis on technology ignores a fundamental element in military affairs namely that war is a human activity, which brings with it the human sources of friction, perception and uncertainty, which technological advances are unlikely to eliminate. Therefore it is difficult to see why this human source of friction will diminish in future war.⁵¹ Watts also suggests that no matter how fast data can be generated and passed it still requires processing and interpretation by humans, all of which will take time, during which situations will change, possibly invalidating some if not all of the data previously generated. Thus even with the enormous advances in information systems and related technologies now widely expected to occur in the decades ahead, the temporal problems of distributing and acting upon critical information during the conduct of military operations alone seems sufficient to ensure not only the future persistence of general friction, but to raise doubts about the possibility of greatly reducing its overall magnitude.⁵²

...RMA is not free or cheap, and the development of new technologies must be paid for from within a finite national budget against the competing claims of other sections of the economy

A further consideration of the supposed RMA is that of cost. Even for the United States the RMA is not free or cheap, and the development of new technologies must be paid for from within a finite national budget against the competing claims of other sections of the economy. When this financial limitation is viewed against the absence of any major threat to the hegemony of the United States in world affairs, is there the impetus for the United States to drive forward any RMA? There is a risk inherent in following new solutions in any situation. Admiral Owens makes the point that it is possible for the United States to identify a wide range of current capabilities, forces, and equipment programmes that will be less important when the new system of systems is in place. By reducing them marginally now it would

release the resources necessary to accelerate the acquisition of the new system of systems capabilities. However, is the United States prepared to take the risk of reducing the resources currently committed to systems that ultimately will not be needed in order to acquire more quickly the capabilities that will make them unnecessary?⁵³ Such a course of action requires tremendous faith in the ability of the new systems to deliver what they promise, with the possibility, however remote, that existing systems may be required in the interim period. There is perhaps prudence in caution.

COUNTERING THE RMA

Let us suppose that despite the less than enthusiastic view of the RMA in the proceeding part of this essay that a technology driven RMA will occur, and that the armed forces of the industrial age will be replaced in some states by the armed forces of the information age. Such an information age force will probably have the ability to exploit space based sensors and platforms, act upon real time information from a variety of electronic sources, deliver weapons with pin point accuracy to selected specific targets, all causing minimum casualties and collateral damage to the enemy, whilst incurring no or few casualties themselves. Faced by such an opponent the industrial age forces will have no option but to recognise their hopeless position, and will, in all probability, concede defeat without a shot, or high energy beam, being fired by either side. Such a vision of future conflict is the American dream. However, there are several flaws to this vision and the question which must be examined is whether a technology driven RMA can be countered by those forces who may oppose an information age force.

The first point to reiterate is that the suggested current technology driven RMA is a Western, essentially American, led RMA. Thus information age forces are likely to be formed in the likeness of the American Way of War. What the proponents of the RMA do not fully address is the applicability of the RMA to the lesser levels of conflict other than interstate military to military limited war and to those actors who are fighting what Freedman identifies as 'wars of necessity' rather than 'wars of choice'. He defines these as:

"Wars of necessity are prompted by direct threats to the survival of the state. With wars of choice there are no direct threats to primary, truly 'vital' interests: secondary interests may be at stake, and life may be more difficult if they are not secured, but the state will survive if no action is taken."⁵⁴

Thus the RMA seems to be developing around only the wars of choice concept whereby information age forces composed of a professional all volunteer military which is relatively isolated from the remainder of society, will only fight the wars which they choose. Freedman summarises it thus:

"It fits in with the assumption that, for the moment at least, Western countries can choose their enemies and are not obliged to fight on anybody else's terms. Invitations to war need only be accepted on certain conditions: public opinion must be supportive; the result must be pre-ordained; and the conflict must be structured as a contest between highly professional conventional forces. Military commanders must devise strategies that not only keep their own casualty levels low, but also respect the expectation – bordering on moral presumption – that fire will be directed with precision and only against targets of evident military value. Such views are suitable for political entities that are not fearful, desperate, vengeful or angry and that can maintain a sense of proportion over the interests at stake and the humanity of the opponent. They are not necessarily the views of those whom Western states might confront in combat."⁵⁵

The RMA may therefore only be applicable in certain well-defined situations. That is not however, to confine the advances in military capability which an RMA promises simply to the situations described above. In any level of conflict the gathering and processing of data to provide intelligence is a key element to the successful conduct of operations, therefore the application of new technologies will have benefits at all levels of the spectrum of conflict, but it will not necessarily revolutionise military affairs at all levels.

One of the great failings of the proponents of the RMA is to assume that only the West will benefit from an RMA

One of the great failings of the proponents of the RMA is to assume that only the West will benefit from an RMA. What is constantly overlooked is the inevitability that technology will transfer, and an opponent need not have the full spectrum of the latest technological capabilities to counter an information age force.⁵⁶ The inevitability of technology transfer to other states is vividly described by Stein:

"It's a smaller world, and our potential opponents can observe our technologies and operational innovations and copy ours without them having to invent new ones for themselves. Remember, the biggest centre for developing new computer software is not Silicon Valley but Madras, India. What will they sell and to whom? Finally, and to return to an earlier point, if the US military approaches information warfare merely as a force multiplier and adapts bits and pieces of technology to just do our current way of warfare a bit better – if we "digitise the battlefield" for an endless rerun of mechanised desert warfare – the real danger will be that someone else will refuse to play the game our way."⁵⁷

It is not only technology transfer which can counter the RMA. The ability of other states to develop their own technologies or indeed employ existing technologies in totally new conceptual ways is also a possibility. Bracken argues that with the growing economic capacity of many countries, there is a danger that a large, wealthy (in terms of gross national product [GNP]) state could convert 10 to 20 percent of their GNP into modern forces that will use strategic concepts never used before. Should a state with such capabilities emerge then dealing with such competitors cannot be based on

A future anti satellite, or ASAT, wielding adversary of the United States might be capable of leveraging a victory out of otherwise hopeless military circumstances

existing US operational doctrines.⁵⁸ Similarly Lambakis points out the vulnerability of relying on space based satellites to perform military functions. A future anti satellite, or ASAT, wielding adversary of the United States might be capable of leveraging a victory out of otherwise hopeless military circumstances. By striking down, disrupting, or neutralising US imagery satellites, the enemy could blind critical intelligence sensors. By denying US forces segments of the GPS constellation, the enemy could make troop movements and logistics more difficult, particularly when troops lose the ability to navigate without GPS through lack of practice, and may render weapons that rely on mid-course guidance useless or unreliable. Although the United States is not likely to encounter any enemy skilled in counterspace operations for the remainder of this century (unless the enemy is Russia), space is rapidly becoming America's Achilles' heel.⁵⁹ Bracken may however, be too optimistic in his assessment of

the potential threat. It is not just satellites which are vulnerable but the whole system of down-link from satellite to earth and up-link from earth to satellite which can be attacked with simple weapons. Similarly the technology to jam satellite information is already commercially available. Aviaconversia, a Russian company, displayed a prototype jammer at the 1997 Moscow Air Show, capable of disrupting GPS over a 120 mile radius and priced at US\$4,000 (£2500).⁶⁰

Bracken also cautions against assuming that only the United States has the capability to learn from and exploit an RMA. The ability of military and political organisations to learn from others should not be underestimated. Such organisations will learn from the United States, from its own exercises and development work, and from the failure of others. He argues that failure is a particularly compelling learning mechanism. The lack of success of the Argentines in the Falklands and the Iraqis in Kuwait could be interpreted in terms of the inability of these countries to administer modern forces to maximum effect. Or these failures could be seen as the catalysts for innovation and new thinking in other organisations. It would certainly be presumptuous to infer that only the advanced states could master modern military technology.⁶¹



...the withdraw of American Forces from UN operations in Somalia and its subsequent hesitancy to commit troops to Haiti as a result of the deaths of 18 soldiers in Somalia is an example of the flimsy basis upon which future information age armies may be committed to action

Even if an opponent of an information age force cannot employ elements of RMA technologies, it can use other methods to challenge them. Whilst an opposing force may face certain defeat if engaged in an all out war against the an information age force, if, following on from Freedman's proposal, it has the ability to affect the conditions in which that information age force has chosen to engage in the conflict, such as low casualty rates, then it could cause it to withdraw from the conflict. For example the withdraw of American Forces from UN operations in Somalia and its subsequent hesitancy to commit troops to Haiti as a result of the deaths of 18 soldiers in Somalia is an example of the flimsy basis upon which future information age armies may be committed to action:

"The Somalia debacle, precipitated by the loss of 18 US soldiers, and the Haiti fiasco, caused by the fear that a handful of US troops might be killed while defeating that country's military dictatorship, sufficiently exposed the current unreality of the great power concept. In pride or shame, Americans might dispute any wider conclusion from those events. They would like to reserve for themselves the special sensitivity that forces policy to change completely because 18 professional soldiers are killed (soldiers, one might add, who come from a country in which gun-related deaths were last clocked at one every 14 minutes). But in fact the virtue or malady, as the case may be, is far from exclusively American."⁶²

This is asymmetric war. Freedman defines asymmetric warfare as:

"When two combatants are so different in their characters, and in their areas of comparative strategic advantage, that a confrontation between them comes to turn on one side's ability to force the other side to fight on their own terms... The strategies that the weak have consistently adopted against the strong often involve targeting the enemy's domestic political base as much as his forward military capabilities. Essentially such strategies involve inflicting pain over time without suffering unbearable retaliation in return."⁶³

The political effects of an incorrectly targeted weapon or malfunctioning weapon can be out of all proportion to the physical results they achieve

Asymmetric warfare offers both the ability to attack not only the moral and philosophical basis upon which information age force is committed, but also practical 'low-tech' methods of countering the technological advantage which it possesses. For example a billion dollar stealth aircraft can be put out of action by a fifty dollar assault rifle or a ten dollar grenade unless it is protected against determined terrorist attack in secure base areas when not actually flying. Aircrews and technicians essential for the execution of an information age operations can be attacked by terrorists many hundreds of miles from the operational areas, and the images of their dead bodies beamed into the homes of the information age force almost instantaneously by satellite news channels. Precision guided weapons are only as good as the targeting information which they receive, this can be confused by concealment, dispersal and deception. The political effects of an incorrectly targeted weapon or malfunctioning weapon can be out of all proportion to the physical results they achieve. Satellite and internet news pictures of dead 'enemy' children may call into question the whole basis upon which the information age force is committed, as can the deaths of information age force personnel or their allies through 'friendly fire' incidents. Precision guided munitions may be a double edged weapon, and this potential weakness can be swiftly exploited by an opponent with rudimentary access to modern communications systems.

CONCLUSIONS

On the evidence available it appears that there is no compelling argument to suggest that an RMA is occurring, although there appears to be the potential for an RMA. A more realistic assessment suggests that there is currently a period of technical innovation in military affairs which has the potential to dramatically change some aspects of military affairs at some levels of conflict. This technical innovation in military affairs, could then go on to develop into full blown RMA, but the revolution is not with us yet.

Notwithstanding this, the concept of an RMA is attractive to those who wish to move away from the squalor of war, and the vision of a technical solution to all the problems faced by those involved in military affairs is a compelling one. However, on the basis of this assessment that vision seems flawed. The RMA is certainly not the panacea for all the problems faced by those involved in military affairs. It is based upon a peculiarly Western concept of war fighting and may well only be of utility in certain well-defined situations. This is not to suggest that the application of new technologies will not have benefits at all levels of the spectrum of conflict, but it will not necessarily revolutionise military affairs at all levels. A failing of the current RMA thinking is the assumption that only the West will benefit from an RMA. What is constantly overlooked is the inevitability that technology will transfer, and that other states will develop their own technologies and doctrines together with the capability to learn from and exploit the RMA, and develop asymmetric strategies, to counter some of the technological advantages which an RMA promises.

However, a revolution takes place not only in the laboratory, or the battlefield but also in the minds of men, and the concept of how military power can be used and what it can be used for is what will drive a revolution as much as anything else. Those who dismiss the RMA as a myth would be well reminded that myths are generally based upon hard facts and experience, and there is no harder experience than war.

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