Contributions of any length will be considered but, as a guide, 3000 words is the ideal length. Articles should be typed double spaced, on one side of the paper, or preferably submitted on disk in a word processing format. Hardcopy should be supplied in duplicate.

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As defence planners examine the nature of future warfare in the information age, it is apparent that new paradigms for the conduct of military campaigns are emerging. These paradigms redefine complacent thinking concerning the:

- nature of threats to security;
- constraints on the conduct of military campaigns; and
- the character and predictability of adversaries.

The Australian Government established the Office of the RMA (ORMA) within the Department of Defence in May 1999, with the challenge of “extracting the maximum value from the RMA for the ADF – be it in equipment acquisition and development, training, doctrine development or alliance relations”.

Using a collaborative approach, Project SPHINX was created to identify and explore innovative future warfare concepts and their capability implications through:

- **Concept Initiation Teams**: drawing on people from throughout Defence, innovative future warfare concepts have been developed that include potential organisational, doctrinal and technological changes to realise superiority in the six warfare categories: command, control, communications and computers; intelligence, surveillance and reconnaissance; tailored effects; force projection; force protection; and force sustainment.

- **Campaign Wargames**: the KRAIT series of seminar-style wargames set in 2025, are played at the operational/strategic level to examine campaign and warfare concepts. Competing campaign concepts are debated between red (using current warfare concepts), blue (using future warfare concepts) and coalition and interagency participants. Three KRAIT wargames have been conducted to date, with another three planned for 2001.

- **RMA Working Group**: with diverse membership from across Defence and industry, this group meets on a regular basis to discuss relevant issues, “compare notes” and workshop specific agenda items. The SPHINX Discussion Forum (on the DEFWEB intranet http://defweb.cbr.defence.gov.au/sphinx/) encourages people to generate ideas, comments, responses and papers that lead to the further refinement of the future warfare concepts.

Project SPHINX has lead to the development of robust campaign and warfare concepts relevant to Australia’s strategic context as part of the Asia Pacific region. These concepts now form the basis for collaboration within the Defence community, and also present opportunities to engage with regional and other countries.

In May 2000, ORMA and the Australian Defence Studies Centre convened a conference in Canberra: *The RMA in the Asia-Pacific: Challenge and Response*. The conference was highly successful and included participants and representatives from Indonesia, Malaysia, the US, the Republic of Korea, France, Vietnam, New Zealand, Sweden, Thailand, the Philippines and Singapore.

This special edition of the *Australian Defence Force Journal* includes articles by speakers and participants from the conference. Their articles demonstrate the potential and benefits of regional engagement and collaboration.

We hope you find the articles challenging, thought provoking, and useful in developing a conceptual understanding of the impact of the RMA in the unique Asia-Pacific region.

Chairman of the Board
*Australian Defence Force Journal*
Military revolutions over the past two centuries have tended to conform to this definition. Some examples include:
The Railroad, Rifle and Telegraph Revolution of the mid 19th century that displaced Napoleonic era warfare;
The Aviation, Mechanisation, and Radio Revolution of the early 20th century that produced the blitzkrieg form of land warfare and strategic aerial bombardment, while displacing the battle line at sea; and
The Nuclear Weapon-Ballistic Missile Revolution of the mid 20th century.

Military revolutions tend to bring about new forms of military operation. For example, the interwar period of the 1920s and 30s brought about mechanised air-land warfare, strategic aerial bombardment, and integrated strategic air defences. Prior to World War I, the world had never experienced a strategic submarine blockade.

At present, it seems highly likely that we are in the midst of an emerging military revolution, one driven by rapid advances in information and information-related technologies. Among the new forms of military operation that may fully emerge are: long-range precision strike, information warfare, “anti-access” or “area-denial” operations, space control and denial, and new forms of maritime commerce raiding and blockade.

History offers some interesting insights as to the character of military revolutions themselves, insights that in some cases clash with conventional wisdom over the future military competition:

While technology is a key element in a military revolution, it is typically not the element from which competitive advantage is derived;
Having an early lead in developing the new form of warfare that defines the revolution is no guarantee of long-term success;
Transformation paths may be diverse – relatively small, or “niche,” competitors may compete quite effectively, as may “asymmetric” competitors;
While the entire process of transforming to a new warfare regime tends to take a generation – or even longer – when the shift comes, it is manifested quite rapidly, offering little time for lagging military competitors to adapt;
Relatively small perturbations in military capital stock can produce large competitive advantages; and
The competitive dominance of the first military organisation to exploit a military revolution is typically short-lived.

Military revolutions pose challenges to national security leaders charged with strategic planning. Uncertainties abound. For example, the timing of the regime shift is often unclear. While new forms of military operation may emerge, the scale at which they can be conducted may be critical in determining military advantage. Yet it may be difficult to gauge accurately the “scale factor.” There also exists the possibility of “intra-regime shifts” in emerging military competitions. Moreover,
while certain military systems or capabilities may be identified as elements of the coming military regime, it is not often clear what specific attributes they should possess. Thus the priorities (e.g. size, range, speed, armament, armour, command and control linkages) that should be given greatest weight in designing, developing and fielding new systems and capabilities are often unclear.

Compounding the problem, important assumptions must often be made under conditions of relatively high uncertainty with respect to the basic characteristics of emerging military competitions. Will they be offensive or defensive dominant? To what extent does the scale of effort determine such dominance? Is this dominance stable or dynamic?

On the positive side, experimentation, especially through field exercises, can be an important means for narrowing the uncertainty surrounding the systems, doctrines, personnel, and force structures that will be required to operate effectively in the coming military regime. Steps can also be taken in the management of defence capital stock to narrow uncertainty and enhance organisational agility.

The defence planners’ challenge with respect to coping with the military revolution is compounded by the Asia-Pacific region’s geopolitical flux. The distribution of power in the region today is significantly different from that which existed during the Cold War. The future promises even greater change, with the rise of regional powers, such as China and India, a recovering regional power in Russia, and a self-limited regional power in Japan. The information revolution may induce major shifts in the wealth – and power – to those states best able to exploit it (as for example, the industrial revolution stimulated Great Britain’s rise to global power status). How will these changes, combined with the emerging military revolution, influence the long-term relationships and the balance of military power among these powers, the other powers in the region, and the United States – at present the world’s only global power? This important question will, no doubt, tax even the most talented strategic planners.

Dr Andrew Krepinevich is an accomplished author and lecturer on defence and national security issues with extensive executive and strategic planning experience. Before retiring from the United States Army in 1993, Dr Krepinevich served on the personal staff of three secretaries of defense. In 1997 he was appointed to the Secretary of Defense to serve on the nine-member National Defense Panel. Dr Krepinevich is a graduate of West Point and holds an MPA and a PhD from Harvard University. He is the author of numerous books and articles on defence and security matters.
Future Warfare Concepts: Designing the Future Defence Force

By Brigadier S.H. Ayling, Office of the RMA

Our national security environment is becoming increasingly complex and ambiguous. In order to optimise the ability of the Australian Defence Force (ADF) to effectively and successfully conduct military campaigns in the future, it is necessary to adopt a conceptual approach to future warfare. The design of the future ADF is not a theoretical activity, but one that must deliver affordable and practical solutions that are consistent with Australia’s strategic context as defined by Government security policy. This article describes an innovative architecture for future warfare concepts that can be used to incorporate organisational, doctrinal and technological changes into the current ADF to ensure that the objectives of Government security policy can be successfully achieved in the future.

Changing Security Environment

The requirement for a conceptual approach is clear when the changing features of our national security environment are considered in terms of constants, trends and shifts. Constants are those features that endure over time. Trends describe those aspects that are changing permanently in the long-term. Shifts describe those elements that can change temporarily in the short-term. The higher the degree of change, the greater the need for innovation to manage it.

Constants

The most enduring feature of Australia’s strategic environment is the focus on the Asia-Pacific region. Australia will act globally where necessary to protect its interests, but its prime focus remains the immediate region.

Also, the fundamental reason for the existence of our defence force remains constant. Regardless of other types of operations Australia may undertake, the ADF must be able to unilaterally defeat attacks on Australia if necessary. Similarly, regardless of any changes to the nature of the adversary, the ADF must be able to defeat the most ruthless and sophisticated adversary imaginable.

Trends

The information age is the most significant trend in Australia’s changing security environment. The nature of warfare is changing due to technological developments that are enhancing the speed, range, stealth, precision, impact and flexibility of weapons. While some military technology is only available to advanced defence forces, other applications are commercially available, giving potential adversaries access to technology they cannot develop themselves.

Most importantly, the possession of advanced technology alone does not confer an advantage. It is the combination of organisation, doctrine and technology that leads to a superior military capability. Take the example of recent conflicts. Technological superiority can lead to a stunning and decisive victory over a less sophisticated adversary, as in the Gulf War. However, as in Kosovo, an innovative adversary can attempt to counter such measures by targeting political and military weaknesses to prolong the campaign and defeat political objectives. Lastly, East Timor demonstrates that high technology warfare is not always necessary or appropriate to conduct a successful campaign.

Information technology is having huge impacts on the military in the areas of command and control, communications, intelligence, surveillance and reconnaissance. Commercially sourced information and
technology has an increasing role to play. In addition, the power and scope of information technology employed by the media ensures that the public is better informed than ever before, and that public opinion can impact on decision-makers.

Asymmetric threats to security will become increasingly prevalent. As it continues to become more difficult for nations to maintain conventional military superiority or even to remain competitive, the threat from chemical, biological and information attacks will increase. Non-state actors such as terrorists are also likely to use such unconventional means.

There is an increasing trend towards total national involvement in Defence. This is reflected in the increasing links with industry, other government agencies, non-government organisations and the community. The other side of the coin is increased Defence involvement in operations short of war, such as humanitarian relief, illegal fishing and immigration, counter-terrorism activities and search and rescue.

Lastly, one of the major trends in the emerging security environment is the increase in the number of coalition operations. There are two main reasons this is occurring. First, the need for international legitimacy is best satisfied by the participation of multiple countries in a UN-sanctioned mission, as this indicates broad support for the operation’s objectives. There is also the practical aspect that no single defence force (apart from maybe the US) either possesses or can afford to supply all the necessary military components for any given campaign.

**Shifts**

Social and political influences on the security environment tend to be shifts. That is they are temporary and can change at short notice in any direction. These sorts of shifts impact heavily on democratic governments’ decisions as to when, why and how to use military force. Two examples are government policy, which may shift with a change in government and public opinion. One key issue subject to public opinion is the willingness of the domestic electorate to tolerate casualties. The media plays a significant role in shaping perceptions and shifts in public opinion.

Another potential shift is the degree of instability in our region, especially in the inner arc, for example Indonesia and PNG.

**Future Warfare Concepts**

**Warfare Categories**

Given the changing security environment described above, concepts provide the most suitable basis for designing the future ADF. A conceptual approach allows decision-makers to focus on the contribution of certain capabilities (in the broadest sense) to the achievement of Government security policy, rather than the technical merits of individual platforms and systems. An architecture that describes the dimensions of warfare has been developed using six warfare categories. It provides an intellectual framework to guide the incorporation of organisational, doctrinal and technological changes into the ADF through the use of warfare concepts. The framework allows analysis of current warfare and aims to promote innovation in the ways we conceive of military superiority in the future, yet provide a structure that allows objective assessment of the relative priority of various capabilities.

The six categories of warfare used in the development of future warfare concepts are:

- Command, control, computers and communications;
- Intelligence, surveillance and reconnaissance;
- Tailored effects;
- Force projection;
- Force protection; and
- Force sustainment.

**Warfare Concepts**

Future warfare concepts can be specified using an *Ends, Ways, Means* methodology. Superiority in a particular warfare category
(Ends) is provided by adoption of the most suitable warfare concepts (Ways). Concepts are translated into actual capabilities through force structure, organisation, doctrine and technology (Means). It is through the Means that the Services, DSTO and Industry can generate innovative options and ideas for capability development from their area of expertise.

The concepts are based on the warfighting abilities necessary to meet the range of possible security threats in 2025. They are not necessarily discrete, stand-alone concepts, but can be used in various combinations. Nor are they of equal importance. An initial analysis identified key, enabling and supporting concepts. It is important to focus on the concept rather than the organisational, doctrinal and technological changes that enable it, as they will change over time. Indeed the aim of innovation is to cause such changes in the search for the optimal capability.

Campaign Planning

It is by placing warfare concepts into the context of campaign plans and testing them in strategic wargames that we can establish which concepts offer the best way to achieve military superiority in each warfare category. Campaign planning is the process of orchestrating a sequence of actions in time and place to achieve the outcomes required by Government. Campaign planning must be dynamic and flexible in scope to maximise the options available to commanders in achieving the desired military endstate. This planning process applies for everything from disaster relief to defeating an attack on Australia. Whatever the task, the campaign plan can be built from elements of the six categories of warfare.

This “campaign” approach incorporates actions at the strategic, operational and tactical levels of command whereas the more traditional “operations” approach tends to focus on tactical level issues. Future warfare requires this integrated approach whereby a single cohesive entity can plan and direct operations.

There are several vital aspects that are common to every campaign. Campaign planning seeks to maximise the overall combat power of the forces be they joint, combined or coalition forces. It must also address management at the three levels of command: the political-military interface at the strategic level, the allocation of forces to the theatre of operations at the operational level, and actions taken against the adversary within the theatre of operations at the tactical level of command. Campaign planning must also accommodate the influence of non-military organisations in the theatre of operations: including neutral citizens or refugees, government and non-government organisations, UN agencies and the media.

Campaign plans are developed for specific real crises where a military response is being considered (immediate planning). Campaign concepts can be developed to prepare for hypothetical crises (deliberate planning). Warfare concepts are the components of a campaign concept. Analysis of campaign concepts allows us to establish whether a warfare concept can contribute to the achievement of Government’s security requirements and to identify which technological, organisational and doctrinal improvements should prove valuable. Campaign concepts must take into account the challenges presented by the constants, trends and shifts in the security environment so as to provide a basis for the structured analysis of warfare concepts.

An objective and disciplined analysis of the campaign concepts serves to highlight capability weaknesses and can provide substantial guidance to overcome the threats posed by both current and future adversary capabilities, in order to minimise potential vulnerabilities. The orchestration of the aggregate warfare concepts serves to match strengths against weaknesses in the campaign.
concepts that will be targeted by the adversary. The philosophy of “competitive strategies” characterises this approach. This process can highlight relative priorities for capability development needs in a logical framework that remains consistent with the strategic context in which the ADF will operate.

**Concept Evaluation – KRAIT wargames**

The strength of the warfare concepts over previous attempts to enhance strategic guidance to the capability development process is that their evaluation in strategic level wargames provides some measure of objective evidence of their strengths and weaknesses. It is this objective assessment of the concepts that enables the identification of those concepts that are key to the successful achievement of a campaign. Strategic level wargames are designed to objectively debate the relative merits of both current and future concepts.

The evaluation of concepts must occur over a succession of wargames in order to form a reasonable judgement. A series of four wargames in the KRAIT series is in progress to evaluate all six warfare categories. KRAIT 99 evaluated force projection and force protection; KRAIT 00-1 evaluated intelligence, surveillance and reconnaissance and force protection; KRAIT 00-2 evaluated command and control and force sustainment; and KRAIT 00-3 will evaluate tailored effects and force projection.

In addition to the KRAIT series of strategic seminar wargames, there is a range of other wargames that could be used to evaluate the Ends, Ways and Means of the warfare concepts. The TAIPAN strategic wargame series evaluates the viability of current campaign concepts through the use of complicated, yet credible regional contingencies. The Force Structure Analysis program (not a wargame) tests various force structure options. There are also a wide variety of strategic level US wargames (Joint 20XX, AAN, Global, Global Exchange, FLOW, Dynamic Commitment) that could provide the opportunity for us to test those ADF current and future concepts that are relevant to combined operations. The evaluation of the concepts through wargames is critical to establishing sufficient evidence for their acceptance and recognition as an important input into the capability development process. Evaluation of ADF concepts in US wargames provides a further level of evidence in addition to being a valuable basis for the exchange of information and technology.

**Basis for Collaboration**

Warfare concepts provide a viable basis for strategic engagement within Defence to facilitate a truly joint approach to capability development. Collaboration with areas outside of Defence, such as industry, should also be encouraged in the search for innovative solutions. Also, future warfare concepts
provide a sound basis for collaboration with principal allies and regional friends. The need for a conceptual approach to future warfare is gaining wide acceptance in the US and regionally. The challenge now is to determine how best to collaborate on the development and evaluation of concepts, particularly those critical to the conduct of combined and coalition campaigns.

**Strategic Context**

**The Enterprise Architecture Model**

Practical benefits to the ADF warfare capability can only be gained if the development of future warfare concepts is placed in the specific context of the Asia-Pacific strategic environment, Government security policy and the capacity of the Defence Organisation to manage and fund new capabilities. The Enterprise Architecture Model offers a recognised means of representing the functions and outcomes of the Defence Organisation.

The model comprises four interconnected levels representing the policy, operational, systems and technical components of the organisation. The “policy” level represents the corporate executive level where strategic guidance and policy are determined and includes the security objectives that Defence is required to achieve. The “operational” level defines the concepts and capabilities used to achieve stated security objectives. The “systems” level develops the force structure and preparedness to achieve these objectives, and the “technical” level is made up of the underlying processes including acquisition and budget. The model seeks to link all aspects of the defence process in order to overcome the tendency to contain changes such as funding cuts in the technical and systems levels alone. The operational level provides the critical link between the policy and systems levels to redress this weakness, by using the warfare concepts to translate strategic direction into the generation of future ADF capability.

**The Operational Level**

The operational level of the enterprise architecture model describes both immediate and deliberate planning. That is, the orchestration of campaign plans for current operations and the development of campaign concepts to address plausible future contingencies. As described above, campaign concepts can be based on the common framework provided by the six warfare categories and can address joint, combined or

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**Australian Defence Organisation**

(Enterprise Architecture Model)

- Strategic policy and military strategy
- Capability and operational plans
- Force structure and preparedness plans
- People, budget, acquisition and doctrine

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Policy

Operational

Systems

Technical

Deliberate and immediate planning
coalition forces together with inter-departmental agencies. Analysis of the future warfare concepts through deliberate planning can seek ways of redressing current capability weaknesses to counter predicted threats to ADF capability out to 2025.

Previously, Defence has tended to rely on immediate planning at the tactical and operational levels of command, and the flexibility and versatility of our commanders to meet warfare contingencies as they arise. As the nature of warfare changes and budgets become more constrained, it is vital that more attention be given to deliberate planning to ensure that the capability development process results in the capabilities the ADF needs to meet Government’s security objectives. The intention is to maximise the overlap between deliberate and immediate planning so that the degree of advance preparation is as high as possible. It is recognised that the degree of overlap between the two will vary for different military response options depending on the complexity of the task. However, the point remains that expanding the use of deliberate planning through the application of future warfare concepts and campaign concepts and the definition of a substantive operational level of Defence enterprise architecture is an essential step in the development of superior future warfighting capabilities.

Military Response Options

The Australian Military Strategy (AMS) provides a deliberate planning tool based on current strategic guidance, adversary capability and the security environment in the foreseeable future. The AMS expresses the warfighting options available to meet the strategic objectives of Government. The AMS is comprised of Military Strategic Objectives (MSO) which can form the basis of the “contract” between the Government and Defence to provide the scope of likely circumstances in which the Government will commit force and the potential constraints that will be imposed. The MSO are reasonably generic in order to comprehensively cover all plausible security challenges and will be enduring over time. They can be further defined as specific Military Response Options (MRO) to meet particular crises and articulate the various campaign requirements necessary to achieve the MSO. The MRO are defined by campaign concepts at any given point in time and so will evolve as constants, trends and shifts lead to changes in the strategic environment and the level of threat. Another way of looking at this is to say that the optimal organisational, doctrinal and technological means for achieving warfare concepts will change over time as the strategic context changes. An achievable outcome of the operational level architecture is the generation of a practical transition strategy to guide the necessary changes between the ADF force-in-being, the programmed force, and the future force.

Conclusion

Future warfare concepts are an essential step in the design of the future ADF. The nature of warfare is changing, a trend complicated by the influences of the information age on the size, shape and affordability of military forces; the responsibilities of governments and global organisations; the demands of democratic societies; and realities of economic and monetary pressures. The Australian strategic context requires a conceptual approach to allow the opportunities and realities of the information age be grasped, and incorporated into affordable ADF military capabilities to meet the expectations of Government and the Australian people. The approach must also incorporate ideas and innovations that are generated from a wide base, not only from experts within the Australian Defence Organisation but from the government, financial, business and consumer sectors of the population. The approach must be sustained by
fresh innovative solutions to challenges for the future, to avoid complacency or inferiority in capability planning.

The design of the ADF of the future can be based on a logical approach that comprises six categories of warfare:  command, control, communications and computers; intelligence, surveillance and reconnaissance; tailored effects; force projection; force protection; and force sustainment. Warfare concepts for each category can be specified using an *Ends*, *Ways*, *Means* methodology providing a common architecture in which innovative ideas can be represented and analysed. The *Ends* is the superiority over the adversary in each warfare category. The *Ways* is the range of possible future warfare concepts that can potentially achieve the endstate and the *Means* is the potential organisational, doctrinal and technological changes that translate the warfare concepts into capabilities for the ADF. By aggregating warfare concepts into campaign concepts relevant to Australia’s strategic context, decision-makers can focus on the broader capability implications in terms of the ADF’s ability to meet Government security objectives rather than the technical merits of individual platforms.

This goal can be achieved through the effective definition of the “operational” level of the enterprise architecture model. Better definition of the “operational” level is dependent on a disciplined approach to the deliberate planning of campaign concepts that meet the scope of military response options necessary to achieve the broader military strategic objectives defined by Government security policy. Evaluation of alternate campaign concepts through strategic wargames and the analysis of current operations provides an objective assessment of the suitability of the *Ends*, *Ways*, *Means* specification for each warfare concept. The wargames can replicate the challenges of joint, combined or coalition operations being conducted in situations with inter-agency involvement, against the probable actions of sophisticated and ruthless adversaries. The outcome of the evaluation is a warfare concept that can inform and reliably guide the incorporation of selected organisational, doctrinal and technological opportunities from the information age to enhance the military capability of the ADF.

Failure to design the future ADF to adequately meet the challenges of the 21st century will increase the risk of failure in operations. The development and evaluation of future warfare concepts to guide capability development will meet this challenge.

Brigadier Steve Ayling is currently Director General Military Strategy in Strategy and Ministerial Services Division, ADHQ. He was promoted to Brigadier and assumed his appointment in March 1999 following a short appointment in Army Headquarters – Future Land Warfare Branch. From September until November 1999, Brigadier Ayling was detached to Strategic Command as the Director General INTERFET Branch, where he was the Australian Military Coordinator of the multi-national force that operated in East Timor.

Brigadier Ayling graduated from the Royal Military College, Duntroon in 1975 and was allocated to the Royal Australian Corps of Signals. He completed the British Army Telecommunications Engineering Management Course at the Royal School of Signals, Blandford Forum in the UK, and after several communications staff and regimental appointments attended the Pakistan Army Command and Staff College, Quetta in 1986.

Brigadier Ayling has commanded 103 Signal Squadron 3rd Brigade and the 2nd Signal Regiment, and served on the Directing Staff at the Australian Army Command and Staff College. He deployed to Cambodia in 1992 as Commander of the Australian Contingent to the UNAMIC and the UNTAC Missions. In this appointment he was also Commanding Officer of the Force Communications Unit (FCU) and Chief Signals Officer on HQ UNTAC. The FCU comprised Australian Army, RAAF, RAN and New Zealand Defence Force personnel.

On his return to Australia as a Lieutenant Colonel he attended Joint Services Staff College followed by a staff appointment in Joint Communications Electronic Branch Operations Division HQADF prior to his promotion to Colonel on appointment as Director of Plans-Army. He attended the US Army War College in Carlisle, Pennsylvania, graduating as a member of Academic Year 1998.

Brigadier Ayling was appointed a Member of the Order of Australia (Military Division) in 1993 for services as a Commanding Officer 2nd Regiment and Commander of the Australian Contingent UNTAC.
The Rapid, Decisive Operation: A Construct for an American Way of War in the 21st Century

By Colonel David J. Ozolek, US Army (Retired)

The new century is confronting the United States with a set of national security challenges for which we are not yet fully prepared. A changed geostrategic situation generated by the end of the Cold War has resulted in an age of instability and the emergence of a new and different spectrum of threats that are extremely difficult for our legacy capabilities to address. Dramatic technological developments in the information, biological, and space sciences offer extraordinary opportunities for the advancement of military science and, equally, present significant dangers to our security. Together, this geostrategic change and the proliferation of advanced technologies have reconfigured the battlescape in which military operations in the 21st century will occur.

In the 1990s, we were introduced to the challenges we will face in the 21st century. In operations the United States conducted in Haiti, the former Yugoslavia, and Somalia, we were given a glimpse of the types of contingencies that we can expect in the first part of this century. We learned that our overwhelming capabilities for conventional major theatre war may not provide the tools we need to succeed in this environment. Although we ultimately accomplished most of our objectives in these operations, our successes were neither as rapid as we had planned, nor always as decisive as we would have liked. Our challenge is that of building the capability to bring such contingencies to a rapid and decisive close, while at the same time not losing our ability to prevail in the event of a major theatre war.

The United States Joint Forces Command (USJFCOM) is experimenting with a new construct of Rapid Decisive Operations (RDO) for addressing these types of situations. It aims at enabling success at acceptable cost in a limited conflict with a competent regional power. An RDO is an operation that achieves rapid victory by destroying the coherence of the enemy’s war-making capabilities through the precisely distributed application of the full range of joint and national capabilities in an early, direct, and multi-dimensional strike against the enemy’s critical functions. The objective of the operation is to incapacitate the enemy by destroying its ability to conduct coherent operations and breaking its will to fight. It is a new paradigm for operations in which we, not our adversaries, dictate the terms by which we will fight. We prevail by asymmetrically assaulting the enemy with all the elements of national power, from dimensions and directions against which the enemy has no counter. We use the synergistic application of the full capabilities of the nation to inflict an awesome, shocking application of national power that paralyses the enemy’s ability to act. It precludes its options, seizes the operational and strategic initiatives, denies it any opportunity to achieve its objectives, and generates in the enemy a sense of inevitable failure and defeat.

Our objective is to use to advantage the technical, operational, economic, and integrating capabilities unique to our nation (and a few of our closest political and military allies) to confront the enemy with such a complex and overwhelming set of asymmetrical challenges that it quickly realises it cannot resist. As a result of our operation,
the enemy is left with the clear understanding that it has only two options: 1) concede immediately, or 2) face ultimate destruction in detail.

The asymmetric advantages we will exploit in this fight include our ability to:

- **Dominate the information environment** so that we gain a degree of knowledge superiority that allows us to exploit the conditions of the battlespace, while limiting the enemy’s ability to understand the situation.
- **Control the sea** and to come from the sea. No other nation in the next decades has the capacity to create a credible challenge to our ability to control the maritime domain.
- **Control the air** and to strike from the air. Although the enemy will attempt to deny us use of the air through advanced air defence system, we alone possess the capability to conduct operationally significant air operations.
- **Conduct significant operations from and in space.** Other powers will attempt to apply existing space-based capabilities (such as leveraging third party commercial assets), but we alone in the next decades will have the capability to shape the space dimension of the battlespace.
- **Use stealth technology** to deny the enemy knowledge and understanding of our actions.
- **Conduct rapid global force projection** and deep operational reach.
- **Apply integrated precision effects** in the conduct of effects-based operations.

The RDO concept provides a joint context for the application of current and emerging sea, air, land, space, and information systems in a coherently joint rapid and decisive operation. The integrated nature of RDO will assist the Service force providers with planning and refining their programmed and envisioned forces. RDO concept development and experimentation will demonstrate not only how well Service concepts and systems work, but more importantly, how well they work together in a common joint environment.

The RDO concept also calls for greater interaction among the Department of Defence and the other departments of government. It acknowledges that in 21st century warfare, defeat of the enemy’s *warfighting* capabilities alone may be insufficient to generate the decisive effects required. Instead, we will have to defeat its *war-making* capability. This requires striking at not only the enemy’s military means, but possibly also the political, production, distribution, financial, and information systems that support it. We will use appropriate and proportionate kinetic and non-kinetic, lethal and non-lethal means from across the departments to generate the precise and specific effects required to disrupt the synergies that enable the enemy to operate coherently.

The Rapid Decisive Operations concept is a body of joint operational principles that extends across the first decades of the century. Although it exploits revolutionary capabilities, it does not depend on any specific technology. In RDO concept development and experimentation, we will explore how we can apply this new operational paradigm as our technological capabilities change across time. We will determine how we need to enhance our current forces for operations in this decade, and how those forces need to evolve in order to successfully conduct an RDO in the decade that follows.

Our current force was designed primarily to fight and win a major theatre war against a military peer competitor. Since the fall of the Soviet Union, we have re-sized the Cold War force into a smaller, but not different, version of itself. Most of our Cold War doctrine, including our principles of operations and force design, remains in effect. Following our convincing demonstration of major theatre war capability against Iraq in 1991, it is unlikely that we will face a major conventional challenger in the next few decades. No single
nation currently has the economic infrastructure and technological base to field a force capable of competing in major theatre war against us. The likelihood of an alliance of nations emerging with the consensus on ideology, interests, and approach needed to put together such a force is even more remote. Although major theatre war remains the greatest threat to our nation’s interests; the likelihood of such a conflict is slim.

We also maintain a significant capability to conduct low-intensity operations. We have “lighter” forces that can dominate low-intensity operations such as stability operations or humanitarian assistance. Although these forces are capable of quick response and success on the low end of the operational spectrum, they do not have the lethality and tactical mobility necessary to succeed against a sophisticated regional power.

What is likely and dangerous, however, is the emergence of a number of regional powers that can develop a competent military capability by accessing the sophisticated military technology available in the global marketplace. Such a power could achieve, within an acceptable cost and in a very near timeframe, a level of military capacity that could give them the ability to exploit the current limitations of our legacy force and achieve an operational-level victory against us. Such adversaries have been learning from our recent operations and adapting into increasingly dangerous threats. We need a joint force that can achieve rapid and decisive victory over the threats we can reasonably expect to encounter in the next decades. The success of that force needs to come from its operational proficiency; not from the overwhelming national resources it has available and can consume.

The RDO is a concept for projecting sufficient national power across global distances to militarily incapacitate, in days or weeks, a capable regional power that may have:

- A numerically superior combined arms force;
- The “home field” advantage;
- The capability to deny us access through asymmetric means that may include:
  - Theatre missiles;
  - Integrated and mobile air defences;
  - Weapons of mass destruction;
  - Mines and sophisticated forms of coastal defence;
- A modern, distributed, and effective C4 system;
- A competent Information Operation capable of attacking our national and coalition will to fight;
- A significantly different value system that accepts a willingness to inflict and sustain significant military and civilian casualties;
- The capability for adaptive learning and no constraints on the time required to achieve success.

This enemy will attempt to defeat our force by drawing us into a prolonged, slow, and indecisive operation. It will focus on denying us access to the theatre of operations through the use of asymmetric anti-access systems. It will attempt to draw us into a costly land battle of attrition. Its objective will be to inflict major casualties on our forces in order to cause us to doubt our ability to win. It will target the willingness of the American people to stay the course. Our imperatives become rapid access, highly efficient operations, acceptable cost, and early success.

To succeed in this environment, we must mitigate some of the current limitations to conducting rapid and decisive operations. These include:

- Insufficient capability for rapid strategic deployment resulting from a force too heavy to move for the limited number of strategic lift (sea and air) platforms available.
- Less-than-optimum capability to conduct coherently joint operations that synergise,
vice deconflict, the full range of joint and national capabilities

- Dependency on extensive logistical support from forward bases that may not be available.

- Insufficient capability to mitigate asymmetric access-denial systems such as theatre ballistic missiles armed with weapons of mass destruction, or mobile, integrated long-range air defence systems.

- Cold War, attrition-oriented doctrine that cannot achieve decisive results rapidly enough to meet the political realities of the 21st century.

- A constraining set of political-military realities that include:
  - New dynamics for strategic decision-making;
  - Expectation of victory in weeks, not months;
  - A requirement for zero American casualties;
  - A desire for near-zero collateral casualties and the infliction of only precision, limited destruction of the enemy;
  - A necessity of retaining the political, moral, and ethical “high ground” in operations.

The RDO will differ significantly and fundamentally from the way we currently conduct a campaign. The power of information superiority systems available today and those expected to emerge throughout the decade will enable radical changes in the way we can conduct operations. By fighting for, achieving, and exploiting information superiority, we can reduce the risks that are today associated with bold action, and we can dramatically increase the pace, coherence, and effectiveness of operations. However, to exploit the power of information and knowledge, we will have to change several of the fundamental principles that govern today’s operations.

For much of our post-World War II military history, the primary function of the joint force headquarters in any operation has been to deconflict the operations of its Army, Air Force, and Navy components. Deconfliction ensured that the greatest number of targets were engaged, duplications were eliminated, and elements from different services (often lacking interoperable command and control systems) did not interfere with each other’s operations. Under this deconfliction construct, Service component commanders retained a high degree of independence of action. However, in many ways, multiple concurrent campaigns were conducted, only loosely connected to a common goal.

In the 1990s we achieved a considerably higher degree of joint action by establishing mechanisms for synchronising, vice deconflicting, the actions of the Service components of the joint force. Functional component commanders began to direct dimensionally similar elements (air, ground, sea) from multiple services to achieve the common, joint, dimensional objectives defined by the joint force commander. Effective (yet sometimes cumbersome) joint control mechanisms, such as Joint Target Coordination Boards, served as operational-level synchronisation centres for applying the capabilities of the joint force across the joint operational area. However, the ground, sea, and air components still often perform as separate entities within the campaign, often competing for limited key resources such as strategic lift.

In RDO we strive for a level of jointness above synchronisation of effort. Coherent jointness means that operations are planned joint from the beginning. All assets are considered joint assets, regardless of the Service that provides them. There are no obstacles to any element of the joint force immediately supporting or being supported by any other element of the joint force. Operating elements of the joint force are organised according to purpose and function, not according to Service or even dimensional lines.
The mission of joint functional component commanders expands from one of integrating dimensionally similar assets from different Services, to one in which they integrate, as required, even dissimilar assets from different Services, to achieve specific operational effects. For example, in RDO, the construct of close air support to enable ground manoeuvre and engagement could be complemented by a construct of close ground support to enable air manoeuvre and engagement.

In today’s operations, we strive to ensure that commanders develop a keen sense of situational awareness. Situational awareness means the ability to identify the locations and actions of friendly, enemy, and all other entities that materially affect the conduct of the battle. It also requires the ability to analyse and understand the physical characteristics of the battlespace and the advantages of critical terrain features. Commanders and planners use this awareness of the terrain and the relative capabilities of friendly and enemy capabilities to anticipate enemy courses of action, and to enable the focus of joint efforts where they best and most directly contribute to achieving objectives. Intelligence Preparation of the Battlespace (IPB) identifies likely or potential enemy courses of action and indicators that can confirm enemy activities. IPB provides the tool by which commanders can “read the battlespace” as the operation unfolds, gaining a decision-making advantage by having pre-planned options available for rapid execution as indicators confirm the enemy is executing the potential courses of action the IPB process defined.

However, our “stove-piped” intelligence systems and the relatively “primitive” sensing and fusing capabilities of our legacy force make this an unreliable and risky way of operating. Our current doctrine (Joint Publication 3-0) warns: “commanders and planners should carefully consider the information upon which decisions are being based. Where possible, multiple or redundant sources of information from various dimensions should be employed in the decision-making process.” The result is that commanders mitigate the risks that come with bold action by taking more deliberate steps to develop the situation before committing to decisive action. This includes such cautionary measures as leading the advance with small elements that confirm suspected enemy locations and then assist the subsequent employment of decisive force against them. The requirements to verify, expand, and then assess and develop information require time and resources that constrain the velocity of the operation. We trade time for reducing the risks that come from our limited current capabilities for generating situational awareness.

In Rapid Decisive Operations, we move from merely developing Situational Awareness to exploiting Battlespace Understanding. Information Superiority enables us to mitigate risk by providing commanders and planners with an accurate, comprehensive, timely, and shared view of the battlespace. The capability for Battlespace Understanding comes from the combination of near-real time and detailed information collected by a networked system of advanced sensors, and the capability to fuse that information into a common and comprehensive understanding of the battlespace. This understanding includes not only the awareness of the terrain, location of military elements, and potential enemy courses of action provided by IPB, but also an operational net assessment of the enemy’s intent, actions, and vulnerabilities. It integrates the political, cultural, economic, and information realities of the enemy into an understanding of the situation from the enemy’s perspective, avoiding the “mirror-imaging” that sometimes clouds our ability to appreciate how the enemy will react to our efforts.

The success of today’s operation is often measured in the amount of enemy materiel, infrastructure, or personnel destroyed as a
result of our attacks. We focus primarily on
destroying the enemy’s physical ability to
conduct war. Our principal targets are enemy
combat formations – ground manoeuvre units,
air squadrons, fleets or flotillas. We support
these efforts with attacks on enemy support
functions by engaging enemy C2 locations,
supply points, and air defence sites. The
construct is that by physically damaging
significant numbers of key enemy elements,
we can defeat them by reducing a number of
combat elements below a certain threshold of
effectiveness, or we can destroy the balance by
reducing certain essential supporting functions
below their ability to control or sustain the
force.

The keys to successful attrition warfare are
numerical superiority and the application of
overwhelming force. We teach that our
attacking forces must have a 3:1 or better
numerical advantage in order to succeed. This
leads to situations as we saw in the Kosovo
Campaign of 1999 when we determined we
would need multiple ground divisions in order
to succeed against the number of Serbian
ground manoeuvre elements present in
Kosovo. The result is we require unacceptable
amounts of time to build up the overwhelming
capabilities prescribed by our current doctrine
as necessary to ensure success. In recent years
we have begun to appreciate the advantages
that qualitative superiority and joint action
brings to the fight, but we have not yet
completely divorced ourselves from the idea of
needing overwhelming numerical superiority
to achieve success.

In the RDO, we replace reliance on
numerical superiority and overwhelming force
with focus on the velocity of the operation and
the application of precision effects. Our attack
is more than force-oriented; it is oriented on
the coherence of the enemy’s force. We rely on
the qualitative superiority of our asymmetric
advantages and our coherently joint approach
to attack the synergy that holds the enemy’s
capabilities together. A construct of nodal
analysis and complex targeting identifies the
connections among enemy capabilities and
destroys them. As required, we can continue to
attack enemy formations and functions in
detail, but they are not our primary targets. We
identify through detailed analysis that which
the enemy holds in highest value and deny
those either through destruction, isolation, or
suppression. Success is measured not in
magnitude or scope of destruction, but in the
degree of effect achieved on the enemy’s
ability and willingness to continue the fight.

The types of forces involved in these
operations will derive their effectiveness (and
survival) from superior knowledge, mobility,
precision stand-off capabilities, and the ability
to integrate the capabilities of the joint force,
not from armoured protection and volume of
firepower alone.

Because of the mass necessary to win the
primarily land-centric battle we anticipated in
Cold War, Central Europe, we developed a
force structure in which all units were
configured for rapid integration into the
principal fight. We built a relatively
homogenous “general purpose” force designed
for the battle in Central Europe. When lesser
contingencies developed, we organised an
expeditionary force for the particular task at
hand, defined the mission of that force,
conducted the reorganisation and training for
the mission, and executed the operation when
ready. We called this principle task
organisation. At the conclusion of the mission,
the elements involved returned to their place in
the Cold War order of battle and re-configured
and retrained themselves for their primary
mission. Since these contingencies were seen
as having minor risk compared to the central
battle, we could accept the cost of time,
training, and re-configurations necessary for
task organisation.

However, the operational requirements of
our early 21st century environment cannot
accept the costs associated with ad hoc task
organisations. The necessity of rapid response
does not allow for extended re-organisation and training for the deploying force. Constrained budgets, multiple global requirements, and limited force structure make extended configuration and re-configuration unacceptable. We can no longer accept the inefficiencies of the construct of task organising major Service headquarters into Joint Task Forces on a mission-by-mission basis. Instead, RDO proposes that we form joint operational-level headquarters as our primary operational-level structures.

Historically, our operations have been largely symmetrical in nature. We expected to fight an enemy whose way of fighting was similar to our own. In legacy operations, we strove to achieve dimensional superiority through dimensional means. Our fleet rolled back the enemy’s maritime assets and cleared the sea; our air forces rolled back the enemy’s offensive and defensive air capabilities and cleared the air; our ground forces defeated the enemy’s ground forces in a series of engagements that led to the decisive clash among like elements. The joint force headquarters at best synchronised, or at worst deconflicted, these symmetrical clashes. As our concept of jointness matured from deconfliction to synchronisation, we began to identify advantages to asymmetrical support within operations. We developed concepts for Joint Suppression of Enemy Air Defenses in which we augmented the aerial capabilities of the joint force with support from ground or naval fires to mitigate the enemy’s air defence capabilities. However, these early asymmetric joint operations were conducted primarily on the tactical level. At the operational level, functional component commanders normally continued to put their primary focus on defeating their enemy sea, land, or air counterparts.

In the RDO, we create favourable asymmetries at the operational level. We use our maritime dimensional superiority to exploit opportunities ashore. We use our aerial elements as not only fire support, but also manoeuvre elements in their own right. We employ our ground elements, in conjunction with all the other elements of the joint force, against enemy air defence, theatre missile, and air bases – not just enemy ground forces - to shape and open opportunities for engagement from other dimensions. We employ decisive sea and air-based effects against enemy ground combat elements, as enabled by our ground elements. The decisive battle is not seen as a titanic, final clash of ground elements, but instead the total joint force’s distributed and comprehensive attack on the enemy’s coherence.

Another fundamental difference of RDO is that we move from today’s concept of linear operations to a construct of distributed operations. The measures we use today to plan and control operations consist of such tools as Lines of Communications, Fire Support Coordination Lines, Forward Lines of Troops, Lines of Departure, etc. Lines are essential for deconflicting the battlespace to keep our forces from interfering with each other. Stepping over a line can cause significant disruption to the linear flow of our operations. We follow a line (or axis) of advance that links together “decisive points.” We debate the merits of “interior” and “exterior” lines. Because of our limited ability to visualise the battlespace, we proceed linearly through the area of operations, ensuring no gaps in our formations that an undetected threat might be able to exploit. We teach mutual support as a key operational construct. We keep our elements physically close enough to be able to provide immediate support when unexpected situations arise.

In RDO, we think in terms of networked and distributed operations. The high degree of battlefield understanding we achieve from our information superiority efforts allows us to manoeuvre through space and time in ways not previously possible. We can take actions that our old paradigm would consider
unacceptably risky. We don’t have to open and sustain lines of communication – we create or exploit time-definite opportunities in the battlespace that can meet our needs. We don’t worry about physical connectivity between and among manoeuvre elements. Information connectivity is more important. Our current construct of mutual support is replaced by a construct of network support. Any of the elements in the joint force can receive near-instantaneous support from any other element in the joint force, not just neighbouring, similar elements. The links among elements in the battlespace are as important as the elements themselves. Operations take place in four (physical space + time), and even five, dimensions (a battlespace in which the knowledge domain becomes a manoeuvre dimension).

The result is a construct of a truly distributed battlespace in which the networking of opportunities shapes the construct of the operation. Friendly and enemy dynamics are seen as systems of systems that generate the synergies upon which war-making capability depends, and the networks that tie them together. The connections that give them their coherency become the true centres of gravity for effects-based operations.

In linear operations, seizing and holding terrain has always been an imperative of most operations. We have a military folk axiom that states “Never pay for a piece of terrain twice with soldiers’ blood.” In RDO we would re-write that axiom to state “Never pay in blood to hold on to a piece of terrain you no longer need”.

In RDO, terrain is a means to an end, not an end in itself. It is of value only for the time it contributes advantage to the force. Battlespace Understanding tells us where and when terrain is of time-definite value. We exploit our superior mobility to get to it before the enemy can understand its value and react to the situation. Instead of establishing enduring support or other operational locations, we create and occupy “sanctuaries” only for the time-definite period that we need them. At the end of their usefulness, we collapse them and invest no further resources in retaining them. We subsequently re-use the assets to establish new sanctuaries at other places and times in the battlespace.

The time-definite aspects of terrain also apply to the effects we generate on enemy capabilities. We are constantly shaping and re-shaping the battlespace as the situation evolves. We use a variety of means to create time-definite effects, which we can reverse when we need to. For example, instead of destroying bridges across major obstacles, we may use non-kinetic means to deny the enemy use of the bridge for a specific period of time. At the end of the defined time, the effect disappears and the bridge becomes available to us. The orientation of our effort is on the enemy’s coherence. Terrain is seized only when it provides a tactical or operational advantage and is held only as long as it produces that advantage.

Our current processes are primarily sequential. We analyse the situation, develop courses of action, decide, issue orders, prepare, move, etc., in a sequential basis. No one would think of moving before the order to do so is prepared. This methodology is firmly rooted in our joint and Service doctrine as the deliberate planning process. Crisis action planning provides for a few shortcuts, but still requires largely sequential steps. The sequence requires considerable time. We repeat the process at each level of command, as the order moves down the operational hierarchy, burning up large quantities of precious time as intent progressively rolls downhill.

In RDO, we use advanced information management capabilities, such as collaborative planning tools and the Common Relevant Operational Picture (CROP), to compress the amount of time necessary to move from awareness to action. Collaborative tools enable multiple levels of command to plan
simultaneously in order to avoid having to pass the plan through each level before proceeding on to the next. The CROP provides all levels with a common understanding of the situation. Because we have an accurate and shared understanding of such key elements as the location, capabilities, and status of all of the elements of the joint force, movement can begin while planning is underway. The net result of advanced information management tools is the dramatic compression of the time necessary to begin the decisive operation.

Over the next four years, US Joint Forces Command will conduct several major experiments that will explore alternative means for enabling this new way of fighting. In 2002 the Command will execute a major field event called “Millennium Challenge” that will employ several of the Services’ exciting new concepts in a coherently joint operation. These elements include the Air Force’s “Aerospace Expeditionary Forces”, the Army’s “Interim Brigade Combat Teams”, the Navy’s construct for “Network-Centric” warfare, and the Marine Corps concept for “Ship to Operational Manoeuvre”. The purpose of the experiment will be to assess the effectiveness and interoperability of these concepts in meeting the requirements of an RDO. The results of the experiment will identify remaining issues that must be resolved to give the US forces the capability to conduct Rapid Decisive Operations in the second half of this decade.

In 2004 a subsequent experiment dubbed “Olympic Challenge” will examine RDO in the 2015 timeframe. This experiment will explore what revised or additional capabilities will be required for a successful RDO against those capabilities potentially in the hands of regional threats in the next decade.

The Command appreciates the importance of potential allied contributions to these efforts. It recognises that such operations are unlikely to be successful unless conducted in a multi-national context that leverages the capabilities of a coalition. As a result, the Command is issuing invitations for participation in the RDO concept development and experimentation campaign to selected allied and coalition partners.

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Impact of RMA on Command and Control – An SAF Perspective

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In the last few years, a tremendous volume of discussion has been generated both in academic and professional military circles over the impact of a Revolution in Military Affairs.

A decade ago, CNN brought vivid images of the high-tech weaponry used in Operation Desert Storm into our living rooms and fired the imagination of military planners and operators around the world. The contribution of precision weapons to a military operation was observed on an unprecedented scale as was the effervescent presence of the media. The lightning pace of the successful operation and the low number of Allied casualties stood in marked contrast to the protracted conflict between Iran and Iraq of the earlier decade characterised by indecisive outcomes and high casualties.

Half a decade after Desert Storm and amidst huge drawdowns in Western military Research, Development & Acquisition expenditure, all of us saw a different revolution. The Internet revolution was driven not by military but by commercial initiatives. We in the military have had to quickly familiarise ourselves with a whole new vocabulary in the last five years comprising such terms as Moore’s Law, “point-and-click”, “cookies” etc. The military has also recognised the value of “dual-use” to offset the reductions in military R&D budgets, but has begun to grapple with the new challenges of dealing with threats coming via the information frontier.

In the decade after Desert Storm, we have also begun to note the increasing challenges to military operations in a globally-connected, uni-polar world:

- The influence of global media on political agendas and military objectives.
- The increasing linkage between the perception of vital national interests versus the acceptability of military casualties.
- The need to balance the real interests of nations operating as parts of UN-sponsored coalitions versus an evolving set of perhaps not-so-universal principles of international conduct.
- Uncertainty over the shifts in centres of economic, political and military power and the preparedness of the world’s existing major powers to contain, counter or engage them.

What RMA?

With these as a backdrop, let me begin by asking whether we really have a common notion of what the RMA really entails, and whether we have seen all the drivers unfolding. The popular press would like to simplify this to a technology-based revolution, in step with the Internet revolution gripping many societies. In Singapore, the talk is on “Old Economy” versus “New Economy”. Without an “e-strategy”, businesses feel they will have no competitive advantage in the brave new world of the Wireless Application Protocol (WAP).

The reality, I believe, is that the RMA is being shaped by the confluence of several currents of change - technological, social, political and economic in nature. Certainly, the potential for a new war-form to emerge based on technological innovation has been brewing for several decades but it is the coincidence of
many other factors which has propelled discussion on it to the forefront. Fifty years from now, we will probably have much greater consensus over when the RMA started and when things stabilised. In the meantime, the dilemma many of us face is whether and how to organise around information and exploit the information dimension.

I will now go onto the impact of the RMA on the SAF and its C2 concepts. I would like to clarify that I will be speaking largely from an Army perspective, though the doctrine of integrated warfare between the Services is central to our thinking. The term “RMA” whilst familiar to us is not defined for the purpose of development within the SAF.

The RMA and the SAF

The impact of technology-inspired change for the SAF has perhaps not been as unsettling as we see technology as a key enabler to offset our other resource constraints. There has also been less to tear down and break apart because we are still in the process of change. Our Air Force and Navy are both relatively young, having been established as separate Services only after the establishment of the SAF itself. For the Army, every two to three years – the duration of service for our fulltime NSmen – we have an opportunity to introduce new organisational structures and equipment at relatively lower pain to the system. Domestically, a very techno-savvy population has served as an added catalyst for riding the waves of change. The advent of widespread, international professional discussion on RMA has therefore served as a valuable input as the SAF considers how to incorporate precision weapons and information operations into our operational doctrines and force structures. The evolution of new command and control concepts for the SAF is a product of how we wish to fight and what we have to fight with.

Operational Doctrine

The SAF’s mission is to deter aggression, and should deterrence fail, to secure a swift and decisive victory. The consequence of this mission focus is for the SAF to develop a spectrum of capabilities which enable us to deter aggression across the spectrum of conflict. The armed forces has also to be prepared to support undertakings other than war, such as the evacuation of our citizens from Cambodia and our recent INTERFET participation in East Timor.

In order to prosecute operations to achieve a swift and decisive victory, the SAF believes it must be prepared to fight fully integrated across the various physical theatres of conflict. This entails active cross-Service participation to achieve our military objectives, be they on land, in the air or at sea. A physically crowded area of operations like Singapore demands that each Service does not attempt to duplicate another’s core assets. Our Air Force, for example, operates all aircraft, and we do not have separate air corps for the Army or Navy. The command of forces remains the purview of the Service best positioned physically or informationally to control them in operations. The Joint Staff in the SAF serves in operations as a coordinating HQ to allocate shared assets and facilitate better integration between Services as opposed to a command HQ which determines how operations should unfold on land, in the air or at sea.

Capability and Force Structure Development

Our capability and force structure development has evolved to incorporate the need to balance our growth in terms of three main capability areas:

Manoeuvre. To have dominant manoeuvre capabilities requires us to be able to position our forces in strategic and critical points to achieve positional advantage. On land, the Army is organised with both light but highly mobile forces and mechanised forces with greater punch. The development of manoeuvre capability in our force structure combines agile direct firepower with staying power as expressed in protection and sustainability.
Firepower. The focus of our firepower developments is on being able to attack high pay-off targets with surgical precision from a stand off position. We see this as a means of achieving economy of force whilst promoting survivability of our forces by minimising exposure to direct engagements only where it counts for the purpose of achieving positional advantage.

Information. Our focus here is to develop capabilities to facilitate our speed and freedom of action, whilst undermining the enemy’s decision cycle and ability to attack ours.

Development in these areas is not bounded within each Service, but in the areas of precision firepower and information operations there is a great impetus to pool efforts across all three Services. We believe that the real operational pay-off is achieved not from individual units and platforms, but the ability to leverage and integrate across Services to achieve a systemic capability, regardless of the operations manager.

Implications on C2

Tactical. Superior numbers in platforms such as tanks, new planes and ships cannot be translated into operational advantage unless they can be integrated into a unified, flexible and effective fighting system. The key enabler for the effective command and control of the three capability pillars is an information structure providing comprehensive awareness through:

- Better sensors;
- Seamless electronic messaging system;
- Automated data fusion and info processing;
- Automated location and status reporting;
- Intelligent Decision Support;
- Effective Info Dissemination System; and
- Secure, wide area communications

Optimal pay-off, however, is achieved only if we can systemically leverage our information advantage with a quick decision-making process, complemented by a responsive array of agile manoeuvre capabilities and precise firepower means.

Operational. The concept of information warfare targeted not at materiel but at the decision-makers has widened the military’s potential scope of operations. At the same time, the rise of on-the-scene global media reporting represents a strong independent conduit of information transfer. Consequently, our C2 structures and processes will have to evolve to take into account the influence of information flows and the media on military operations as demonstrated in Vietnam, the Gulf, Somalia and more recently Kosovo. In particular, Commanders and Staff must consider and plan for the possibility of unfavourable news reports being blown out of proportion in the international arena, directly or indirectly shaping the political will and consequently the military effort.

Strategic. The emergence of the infosphere as a potential axis of attack has also raised the question of whether it is a unique environment best managed as part of a Service HQ’s operations, centrally “commanded” from the Joint SAF level, or whether in fact it demands a new kind of national defence agency.

At every level of war, we anticipate that the RMA has major implications on military operations and consequently on its command and control. The issues which we are still examining include the following, which I will present for discussion.

Military Doctrine

Information Overload. One of the chief concerns expressed by our commanders is how to deal with information overload. The promise of better sensors and C2 information systems does not necessarily address how commanders, given a higher ops tempo, more assets to employ, and the prospect of round-the-clock operations will be able to digest and decide on the best course of action. Given the time sensitivity of certain critical items of information, there is a related question of
whether new C2 info systems should be designed based on a philosophy of information push or pull. Info push threatens to overwhelm the commander whereas the worry over info pull is whether the commander will know when and where to pull. One thing we are clear on is that the education and training of commanders must evolve to equip them to operate in the new environment.

**Flatter Structures.** Coupled with the promise of technology-enabled wider spans of control, there is a question of whether and to what extent we can de-layer our structures. The problem is that whilst the tools may be improving, the pace and complexity of decisions may also be increasing. A flatter structure also suggests the need to create greater redundancy in the remaining HQ layer to avoid it becoming the critical point of failure. We have noted that globally, larger, more established armed forces are also treading carefully in answering this question.

**Uncertainty and Reserves.** Recently, Alan Greenspan, the US Federal Reserve Chairman, spoke about how information technology had improved the efficiency of operations so much that companies could significantly reduce the amount of stocks which they used to hold to cater for uncertainty. Similarly, the stockpiling of military logistic reserves might be reduced given better information on their rates of consumption. With better tactical information available to commanders, however, it remains to be seen whether they will choose to act more boldly through quicker action or by reducing the amount of tactical reserves held during any phase of the operation. Unlike business, the key variable faced by military commanders is the extent of enemy action to undermine their information advantage.

**Shift from Direct to Indirect Forms of Combat.** The introduction of the telegraph enabled armies to exploit artillery not as a direct fire weapon but as an indirect support weapon, out of range of the enemy’s small arms. The subsequent introduction of radio communications overcame the vulnerability of lines being cut at a critical juncture of the battle, and enabled more reliable C2 of indirect fire. The introduction of the tank enabled a new kind of mobile, survivable artillery to enter the battlefield. Presently, the increasing lethality of anti-tank weapons coupled with the need to balance protection with mobility, is fuelling a new rethink as to the role of tanks and the future of direct fire in the battlefield. With better battlefield sensors and precise, stand off weapons, could we see the land battle shift towards one where indirect fire engagements become dominant? The comparison I make is to the naval theatre, where all engagements are out of visual range, and long-range anti-ship missiles operate with a host of electronic measures and counter-measures. The very design of tanks may evolve to become highly mobile, thinner-skinned platforms firing precision-guided beyond-line-of-sight munitions, and sporting a host of electronic counter-measures and support systems, rather than as highly protected, gun-based systems. For this to become a reality, sensors will have to overcome the traditional limitations posed by foliage, relief, clouds and urban terrain, which distinguish the land theatre from the sea. C2 doctrine and systems will evolve very differently if this is indeed the expected trend of the future.

**Technology**

A key challenge for C2 is in managing the technology seen as essential to its future effectiveness in the battlefield. The challenges stem from recent trends to adapt commercial technology for military C2 applications.

First, we note that commercial standards are changing so quickly that it is often difficult to decide on a particular standard for SAF-wide implementation. Adopting Microsoft Windows as a de facto standard, for example, would appear to address interoperability issues but also renders us more vulnerable to commercial risks such as if the US Government
were to force a break-up of the company, leading to a loss in future supportability.

Secondly, commercial vendors design on the basis of short product life cycles to promote market share, but this is inevitably a nightmare for military planners who require stability.

Thirdly, commercial standards are not necessarily designed with military applications in mind. For example, whilst they may be ideal for use in an office, desktop environment, they are generally memory and bandwidth hungry and pose a challenge for wireless applications. Their robustness against info attack may also not be a prime consideration, forcing significant modification if we wish to use them for military applications.

We have to weigh the problems of adopting commercial standards, however, against the problem of trying to develop applications unique to the military. Other than cost, supportability is a real challenge, as the military has to compete with the dot com world for the services of its software developers. Maintaining compatibility with commercial equipment is the other challenge, since there is little incentive for equipment and chip manufacturers to consult with the military before implementing new designs.

Meeting the C2 Challenges

Whilst there are many challenges to be met in gearing up C2 for the demands of the future, I would like to close by speaking about how we are dealing with them.

At the strategic and operational level, we have initiated efforts to examine new C2 structures and processes to manage information operations both within the military and with other agencies. This is likely to take some time given the continuing rapid pace of change, and the large number of agencies involved.

At the tactical level, we have set in motion studies to examine the impact of information push and pull in a tactical environment, in order to lay the groundwork for the design of future C2 processes and systems. At the same time, we are also looking closely at how to incorporate new sensors into the C2 process so that they actually contribute to better decision-making rather than overloading the decision-maker. We have set in motion a series of experiments also to gauge the usefulness and contribution of new planning and decision support tools for tactical HQs. The real challenge appears to be in supporting the information needs of commanders in conducting the battle when they are on the move, rather than tied to a static HQ location.

In equipping, we have adopted a policy of cascading C2 systems to avoid block obsolescence, with the implication of managing more than one generation of systems at the same time. As we are now developing the second generation of tactical C2 Info Systems, it remains to be seen what the consequence of this policy will be on future interoperability and support.

Lastly, in conceptualising future fighting systems, we are raising the level of thinking from platforms to unit sets. In the past, we might have added on new sensors and C2 systems to existing structures. As part of our long-term planning, we are now allowing much more interplay between the design of force structures, our fighting platforms and C2 systems. We anticipate the exponential growth of smart devices, and see our future tanks and soldiers as distributed intelligent nodes operating as a complete system which allow us to maximise the impact of precision guidance, remote sensors, autonomous systems and battlefield robotics. Whilst the exterior of fighting vehicles may look similar, we expect there to be a discernible shift from a preponderance of mechanical-based systems to “wired” systems leveraging fully the electronic spectrum.

The continuing challenges that Singapore faces will affect the SAF. As a small and resource-scarce nation, how do we mobilise
our limited resources to realise our vision for an effective defence capability? The critical linchpin is the quality of our people. We will continue to invest in the quality of our personnel by focusing on training and education to enhance their skills. The SAF will then be able to reap the benefits of high quality performances and returns from a high quality force.

Conclusion

The challenges of evolving C2 for the emerging warform of the 21st century are complex and not limited to the military per se. We have to consider both the opportunities afforded by technology and the pressures of an uncertain geostrategic environment, tailored to our own domestic and economic situations.

Almost a century ago, J.F.C. Fuller wrote: *Our present theory is to destroy personnel, our new theory should be to destroy commands. Not after the enemy’s personnel has been disorganised, but before it has been attacked, so that it may be found in a state of disorganisation when attacked.*

Extracted from J.F.C. Fuller’s memorandum *“Strategic Paralysis as the Object of the Decisive Attack,”* May.

We now have an opportunity to acquire the technology enablers to make Fuller’s “new” theory practicable. How much longer it will be before it becomes widespread is anyone’s guess as the pace of change cannot be discerned accurately from the direction of change. Factors such as cost, conservatism and conversance with technology will affect the pace of development.

From an SAF perspective, the RMA is both real and evolving. Our specific approach to riding the waves of change meets our unique requirements, but we believe that we will share many things in common with other armies as we all grapple with the challenges of the Revolution in Military Affairs.

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The RMA, C2 and Coalition Operations

Captain Xavier Rolin, Office of the Preparation of Future Military Operations, French Joint Staff

RMA is a process, which, starting from emerging technologies, drives to a revolution in the military domain, after these have been taken into account in concepts, doctrines and organisations transformations.

In the past, underlaying technologies which made the revolutions possible, were readily available to many countries. But in each case, only one country transformed the essential elements of its armed forces in such a manner as to achieve a dominant and decisive advantage in warfare.

Actually, for an RMA to be possible, there must be a very large synergy between the scientific and technological level of the industrial community, the intellectual level of people, energies and financial resources mobilisation, and the innovative capacity of a nation.

These synergies are hardly achievable within a nation. Are they achievable in a coalition environment, between nations with different politic and economic objectives, and different defence environment? The question is therefore: how to make an RMA process emerge between coalition partners? Can it be global or focused on selected objectives? What are the conditions of success?

Coalitions are characterised by the diversity of nations and forces that work together. A coalition is a temporary group of nations who choose to agree to expend resources to reach a particular goal in a given timeframe and geographical area.

But, in such a situation where vital interests are not at stake, intentions and motivations of one or the other may be much different. Agreeing on the coalition’s goal does not mean that coalition members agree on the best means to achieve that goal. Political parameters are important and present at each level of the command structure, from the strategic level to the tactical level.

So one must admit that any RMA process cannot apply from only a technical approach, but must take into account political constraints and other national factors. One must also admit that a prudent and selective approach will be easier to manage than a global one.

The key issue for coalition operations is an efficient C2 organisation with interoperable communication and information systems. As RMA is coming mainly from information revolution, C2 is the right domain, for its importance and its relation to information, to make a coalition RMA process emerge in a selective approach.

But C2 interoperability and cooperability, meaning the successful bridging between coalition partners of differences in doctrine, organisation, concepts and culture, require far more than the ability to exchange information among the CIS of the coalition partners. They also require a degree of organisational coherence and compatibility.

The variety of organisational issues and the relevant solutions suggest the term “command arrangement” is more appropriate than the classic “command and control” when military operations other than war are conducted. The term “command arrangement” recognises that military forces within coalitions will only take direct orders to the extent they are consistent with the agreements made by their governments and that the other actors (international organisations and non-governmental organisations for example) cannot be given orders at all, but rather must be persuaded to cooperate with military organisations. Organisational forms should be matched to the type of mission assigned. In
other words, no single organisational type should be presumed to be ideal for warfighting and peace support operations. Moreover, the suitability of organisational forms is partly dependant on the technological capabilities possessed by members of the coalition with respect to communications, data collection and processing, information handling, and the exchange of knowledge. The fact that commercial practice has demonstrated both structural changes (flattening of organisations) and functional changes (elimination of some functions, integration of others), as information technologies have developed and their applications have matured is seen as suggestive of changes than can be anticipated in military coalitions.

But not all technical feasible organisational forms are either practicable or desirable. Both cultural and economic factors need to be considered. Moreover, doctrinal issues may need to be resolved before some nations can find effective and efficient ways for their military establishment to work effectively together.

So current organisational C2 solutions, as geographical or functional separation, liaison teams, and combined headquarters, even if they are not the most effective in a modern combat, will be often the only achievable solutions. But RMA could help to leverage those solutions and explore alternative organisational approaches, through, for example, exploratory experimentations.

C2 architectures actually will have to adapt themselves to different situations, to different nations, facing different security and releasability policies. So one can hardly define standard organisations and architectures relevant to any circumstances for any coalition operation. So a coherent RMA program can hardly be built for various nations which are not strongly associated in a shared structure, as an alliance.

But a set of convergences and common understanding can be found to leverage efficiency with RMA process within a coalition environment.

**Coalition Common Understanding**

- coalition operations are not alliance operations; vital interests of nations are not at stake.
- coalition operations will be mainly peace support operations, even if high intensity operations must be envisaged for short periods during crisis:
  - C2 interoperability will be the key factor of military efficiency;
  - Interoperability level in C2 systems must be coherent with information exchanges requirements commonly agreed ; those exchanges will depend on releasability policy of each nation;
  - An other key factor will be the convergence of all releasability policy on a minimal standard policy acceptable in any coalition;
  - C2 architectures will be driven by IER, and consequently by releasability policies;
  - Political constraints on the decision cycle reduce the speed of this cycle. C2 architectures and technical solutions must be coherent with this constraint.
- Convergences on orientations
  - The key issue, where an RMA process is valid, is C2;
  - RMA process must help to shape flexible architectures, adaptable to different coalition situations;
  - Technologies issued from an RMA process in C2 must offer technical solutions accessible to all nations, and commonly agreed standards;
  - Limited technological transfers must be granted by most advanced nations to others to reach an acceptable RMA mean level;
- Convergences on releasability policy must be looked for to allow a minimum information sharing, so that
a minimum coherent coalition common operational picture can be built.

- Security will be the cornerstone of interoperability. Convergences must be found to agree on coalition security levels acceptable by all.
- Small experiments focused on selected aspects of interoperability and cooperability, as shared awareness, coherent coalition planning, could help to explore C2 improvement.

Cooperability is becoming more difficult because of the different rates at which countries are adopting and assimilating new technologies, as well as of different cultural approaches that influence how militaries adapt their concepts of organisation, doctrine, education and training to exploit the new technological capabilities. The achievement of greater cooperability, through improved C2, needs to build upon advances in information technology on offer. Most of the advances in information technology are products of the commercial sector and are widely available throughout the world. Developed for the mass market, information technology is more affordable than heretofore. These factors make the application of advanced technology to the challenge of coalition C2 issues more achievable, even for restrained budgets.

So the emergence of an RMA process focused on C2 can be envisaged, based mainly on commercial technologies. Experimentations could help to test architectures and interoperability solutions. But cooperability depends on security and releasability issues. A high level focus on coalition military operations in each nation’s security structure would allow a greater concentration of effort in addressing means of enhancing C2 in coalition operations.

Captain Rolin was commissioned into the Navy in September 1969. His early years were spent in Polynesia on a supply ship, and on the French Atlantic coast aboard an anti-submarine frigate. He attended the signal officer course in 1975. Thereafter, he was appointed Signal Officer on various warships stationed in the port of Brest, then Company Commander in the naval academy, and Signal Officer on the cadet training ship Jeanne d’Arc. He went on to command Quartier Maitre Anquetil, a coastal anti-submarine warship in 1984. He attended the naval war college in 1986. After a tour as Executive Assistant to an admiral in the naval staff in Paris, he was appointed Commanding Officer of an anti-submarine frigate in Brest, and was promoted to captain in 1991. He became Executive Assistant of the admiral in command of the French Atlantic zone in 1992, and took command of le Primauguet, a new anti-submarine frigate in 1994.

Captain Rolin attended the high military studies course from September 1996 to July 1997. He is now appointed on the joint central staff in Paris, in a high level studies cell, in charge of C4ISR.
The ASEAN members had, in relative terms, spent substantial amounts on arms acquisitions until the economic crisis of 1997. Fundamentally, arms spending in South-East Asia reflected a change from counter-guerrilla warfare to a more conventional emphasis. It was noted that there was a tendency to acquire hi-tech weapons. In addition, the region is also undergoing an economic and technological transformation, with advances in Information Technology (IT) making for new and radically different ways of doing business. This has led to speculation that South-East Asia might also be embarking on the path to a Revolution in Military Affairs (RMA).

But what would constitute an RMA for South-East Asia, and how would we be able to identify it? What would constitute the elements of an RMA? Would a shift from counter-insurgency warfare to conventional warfare constitute an RMA in South-East Asian terms? After all, it does represent a very different way of war fighting for the South-East Asian armed forces.

This article does not attempt to define the RMA at any great depth. Functionally, it can be defined as any development or cause that would make South-East Asian armed forces operate radically different from the way they are doing now, and which will at the same time, enhance their effectiveness dramatically. It takes as axiomatic that today’s RMA would involve distributed information networks, enormous computing power, real time information gathering and distributed command and control systems.

Evaluating regional RMA developments in South-East Asia is difficult because no substantial literature on the subject exists. Neither is there any coherent body of doctrine readily available by which to judge whether this sub-region is putting in place the elements of an RMA, or how regional armed forces perceive the issue. As such, this article attempts to address the issue of a South-East Asian RMA by asking three basic questions:

What nature of threats can South-East Asian states expect to face?

What will be the nature of future war in the region?

Can the RMA (as defined in current literature) make it easier or more effective, for South-East Asia to combat these threats?

It then analyses Information Technology (IT) developments in South-East Asia, since IT literacy is one important element which contributes to an RMA. The article argues that an RMA is essentially about human beings and how they think wars can be won, and not merely about material resources. The main question for South-East Asia is therefore not whether the elements for an RMA are, or are not, being emplaced, but what the RMA can do to address the threats that confront South-East Asia. In other words, apart from the material resources available, are South-East Asian armed forces thinking of radical new ways of conducting, fighting and winning wars? Is there a sufficient body of innovative thinking

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"We failed then – as we have since – to recognise the limitations of modern, high-technology military equipment, forces, and doctrine in confronting unconventional, highly motivated people’s movements”.

– Robert S. McNamara.
and thinkers to make an RMA happen? People and their thoughts (strategy, doctrines), not machines, make an RMA happen. For that, we have to understand their threat perceptions, force structures, and most important, the strategic objectives and doctrines of the 10 ASEAN members. Such an approach of identifying the objectives of grand strategy, supported by appropriate doctrines, would help us understand whether any move towards an RMA is taking place.

A military embedded in society will reflect civilian developments. Hence it is also necessary to analyse IT skill levels as well as Research and Development (R&D) spending. The conclusion is that the IT revolution is not really embedded in South-East Asian societies. For example, a PC is still a comparative rarity in Myanmar, Vietnam, Cambodia, and Laos. In Malaysia, Indonesia, Thailand and the Philippines, computer literacy is confined to urban areas only. Only in Singapore is a PC culture well entrenched. The number of researchers and the expenditure spent on R&D in South-East Asia is also not particularly impressive.

Overall, South-East Asia is still preoccupied with regime security and legitimacy, and with establishing a strong state. Moreover, all these states, with one exception, do not consider themselves as facing any imminent external threat. In other words, the RMA is of minimal utility today to South-East Asia. The exception that proves the rule is Singapore because of its unique history and geo-strategic position. As such, there are no conscious attempts in the region to work towards a Revolution in Military Affairs. This is because the RMA is still a little irrelevant to the needs of the sub-region. Regime security still remains the primary paradigm for South-East Asia. As such, there are no indications at all that, apart from Singapore, that the ASEAN countries are considering doing things differently from what they have been doing over the past decade.

**ASEAN Defence Doctrines & Strategies**

Conventional defence doctrines and strategies in the region still remain vague and ill-defined despite relatively ambitious programs to acquire modern, sophisticated weaponry. This is because defence against external threats has not been the priority of ASEAN, except in the case of Singapore. This general neglect of conventional defence strategy and doctrine is accounted for only in part by the fact that many ASEAN governments had to face various insurgency threats between the 1950s and early 1980s. For instance, Indonesia which had a clearly articulated “external” defence doctrine and strategy, put a premium on national or internal security before external defence. This preoccupation with internal (usually regime) security is because the six core ASEAN members arguably are still weak states.

As post-colonial creations, their primary problem and preoccupation was with state-building, i.e. to consolidate the state internally. External defence was deemed relatively unimportant because of two factors. The first was the relative stability provided by the US security umbrella during and after the Cold War. Equally important, the sanctity of state boundaries has been increasingly deemed inviolable by the international community after the Second World War. This “territorial covenant” has ensured that state boundaries, with very few exceptions, have not changed through the use of force.

For these reasons, South-East Asian states see domestic threats as more pressing and immediate. Thus, these states will always put regime security before the defence of national borders. External defence is therefore unlikely to be given greater priority over domestic imperatives such as economic growth in the wake of the 1997 financial crisis. Despite the primacy of the internal threats, ASEAN spent relatively large amounts of money on conventional armaments in the 1990s to ensure the loyalty of the armed forces by
catering to their perceived institutional and equipment needs. At the same time, there was also the hope that the acquisitions of modern weaponry would also contribute to defence against external enemies in the more multipolar post-Cold War world. Finally, defence modernisation had been affordable for the ASEAN countries until 1997 because of their rapidly growing economies.

However, while an ASEAN military doctrine remains a myth, the old ASEAN members do share a common security doctrine based on the concept of non-interference and comprehensive security. Economic development, freedom from external interference in their domestic affairs, and the preservation of domestic stability are regarded as equally, if not more, important than military force for national survival.

This article focuses on three ASEAN members – Indonesia, Malaysia and Singapore – because:

- They form a natural ASEAN geo-strategic unit or “core”. Malaysia and Singapore’s defence have been described as indivisible, while Indonesia sees Malaysia as a “natural” strategic partner (for geo-strategic reasons).
- These three countries constitute what has been termed by a number of Indonesian defence officials as ASEAN kecil (which can be translated as “little ASEAN” or “inner ASEAN”). ASEAN kecil is apparently an Indonesian proposal for the common defence of Indonesia, Malaysia and Singapore.
- As post-colonial states, Indonesia, Malaysia and Singapore also represent contrasting approaches to the problem of reconciling national defence with internal security.
- All three countries emphasise “comprehensive security” in one form or another, with non-military defence being considered as important as military defence. The defence doctrines of these countries are ostensibly based on the notion of total people’s defence, i.e. mobilising the entire population for the defence of the country. Interestingly enough, none of these countries can be regarded as mono-ethnic.
- They are all, to a greater or lesser degree, maritime nations faced with the problems of maritime defence and security.

Indonesia, Singapore and Malaysia provide very interesting contrasts in terms of geo-strategy, and the defence strategies and doctrines developed as a result. Indonesia is the largest archipelagic nation in the world, while Singapore is the smallest South-East Asian nation. Malaysia is a classic example of a nation divided by a body of water. Indonesia bases its external defence on a guerrilla strategy of defence-in-depth, fundamentally because it cannot afford a large conventional military force. Tiny Singapore had little choice but to adopt a strategy of forward conventional defence. Malaysia, because it sees the external security environment as essentially benign, in contrast, prefers to give priority to domestic and regime security rather than spend scarce resources on building up “excess” military capability. As a consequence, while both Singapore and Indonesia have very clearly enunciated defence doctrines and strategies, that of Malaysia remains somewhat nebulous. Nevertheless all three states lay great emphasis on the domestic dimension of security. Even Singapore, which has been described as one of the most heavily defended pieces of real estate in the world, has in recent years been paying more attention to the concept of total or comprehensive security. Overall therefore, the notion of comprehensive security remains fundamental to the defence of ASEAN. In this sense, if there is an ASEAN defence doctrine, then it is that of comprehensive security based on national resilience.

ASEAN and Domestic Insecurity

Mohammed Ayoob argues that insecurity is the “defining characteristic of Third World states”. This is the direct result of their late
entry into the international system of states, and hence, their late attempts at state-making rather than nation-building. Thus, these Third World states, including the majority of the ASEAN members, are beset by the problems of:

- Lack of internal cohesion.
- Lack of unconditional legitimacy.
- Easy susceptibility to internal and interstate conflicts, and
- Easy permeability by external actors.

These are all internal or domestic problems which contribute to most Third World states being weak states, with still no congruence between nation and state. It is, in fact, the international system which empowers many of these states by recognising them as sovereign states. The international system therefore gives Third World regimes legitimate or juridical control over well-defined boundaries. What are the threats facing post-colonial states such as the ASEAN members? The danger of sovereign borders being physically violated by external aggressors seems increasingly unlikely because of the post-Second World War trend to stabilise international boundaries. Jackson and Zacher term this trend to regard international boundaries, however arbitrarily drawn by former colonisers, as sacrosanct and inviolate as the “territorial covenant”. The key elements of the “territorial covenant” are:

- Only existing interstate borders are legitimate and legal.
- If borders are to be changed, all states affected by the change must give their consent.
- Change of borders by force is illegitimate and illegal.
- The only recognised nation-state (sic) is the political nationality defined by state juridical boundaries.
- Colonialism is illegitimate and illegal.
- Secessions are to be discouraged by the members of the society of states (author’s emphasis).

These international norms guarantee to a great extent the integrity of state borders from external aggressors. States by and large are not in any serious danger of having their borders revised by external aggressors. Existing territorial borders are safe because international norms enforce the notion of the sanctity of international borders.

However, international norms are less stringent with regard to secession, i.e. changes to borders from within a state except to discourage it. It is noteworthy that the majority of post-colonial states are multi-ethnic. But this does not affect the legitimacy of their borders “which define the population as a political entity” rather than in ethno-religious terms. The end of the Cold War may have encouraged secessionist movements, as witness the breakup of the former Soviet Union and Yugoslavia, but it can be argued that the sanctity of interstate boundaries remain essentially untouched. In the context of ASEAN, secession has been a major problem for Indonesia, while Malaysia is not entirely free of the spectre of potential secession. Like nearly all post-colonial states, the political boundaries drawn by the former imperialists of South-East Asia were:

...drawn for purposes of administrative convenience or as a result of territorial trade-offs among imperial powers (and) cut across ethnic, tribal, religious and linguistic ties; dismembered established political units; and linked more than one pre-colonial political entity in uneasy administrative unions....Most new Third World states, therefore, found themselves facing challenges of either a secessionist or an irredentist character.

The secessionist/irredentist legacy of colonialism is exacerbated by the stresses of modernisation. A number of ASEAN regimes remain relatively narrowly-based, authoritarian and quasi-democratic in character. This makes them appear less than legitimate to sizable segments of their population, and vulnerable to internal challenges because they “preside over artificial colonial constructs”.

The Spectre of External Intervention

If one defines legitimacy as meeting the four criteria of shared norms and values, conformity with established rules for acquiring power, proper and effective use of power, and consent of the governed, then the majority of ASEAN countries do not enjoy unconditional legitimacy. While external military intervention is deemed quite unlikely, the lack of unconditional legitimacy makes the ASEAN members vulnerable to indirect and “soft” or ideological intervention. The Western test of “good governance”, specified in terms of democracy, human rights and a free market economy, therefore threatens many South-East Asian regimes by potentially delegitimising them even more. This latter threat is seen as more dangerous than outright military attacks.

This fear of external interference is reflected in one of the key founding principles of ASEAN – that of non-interference in domestic affairs by outside powers, including even (or especially) close neighbours. This fear of external interference is in turn, a reflection of the general lack of unconditional legitimacy among the ASEAN regimes. Ethnic and linguistic ties between the various South-East Asian nations, and the presence of historical tensions, makes it easy for countries to subvert and destabilise their neighbours. Thus ASEAN developed the concept of national and regional resilience to deal specifically with the problem of maintaining domestic, and moving outward, regional stability. One key tool for ensuring internal stability was the concept of non-interference by outside powers. These fragile regimes felt that their states could be easily undermined and their authority challenged by outsiders, hence they worked at a modus vivendi to ensure that they would be left alone to manage - or mismanage - their own states. The realisation of their fundamental vulnerability, it is argued, is the principal reason why ASEAN elevated the “unexceptional” international norm of non-interference to the status of virtually an ASEAN doctrine.

The history of the ASEAN non-interference principle in practice is marked more by real politik rather than any internationally accepted norms of morality. When it comes to choosing between non-interference and morality and justice, the choice has invariably been in favour of upholding the principle of non-interference. For instance, when Indonesia forcibly annexed East Timor in 1975, the issue was put before the United Nations General Assembly as a hostile resolution. All the ASEAN members except one, supported Indonesia. Singapore’s representative, however, abstained, perhaps reflecting Singapore’s own perceived weakness as a small state flanked by two larger Malay neighbours. However, Singapore subsequently changed its position and supported Indonesia’s annexation. The fear of a potential regional hegemon in this instance, was out-balanced by the perceived need to ensure that non-intervention, both direct and indirect, would remain an ASEAN core value. Thus the need to ensure that ASEAN remained cohesive more than outweighed any advantage of censuring Indonesia for annexing a Portuguese colonial relic. It was clear too, that Singapore was unlike East Timor in that it was a truly sovereign state, had external alliance linkages, and that potential aggressors would find Singapore to be a distasteful “poison shrimp”.

When the Pol Pot regime embarked on a bloody pogrom in the mid 1970s, ASEAN did not condemn Cambodia. However, when Vietnam invaded Cambodia in December 1978 and ejected the Pol Pot regime, the ASEAN leaders were quick to condemn Vietnamese aggression. The invasion of Cambodia by Vietnam brought into sharp focus the vulnerabilities of weak states to external intervention. The concerted opposition of ASEAN to the invasion was the result of the collective fear that such a precedent in the region should not be allowed at all. Apart from
the security implications of the balance of power shifting in favour of Vietnam in mainland South-East Asia, and the threat it posed to Thailand, the Vietnamese invasion of neighbouring Cambodia was seen as setting a dangerous precedent. Similarly, ASEAN willingness to accept Myanmar into the association, despite Yangon’s poor human rights record, reflects its real politik approach. Yangon’s human rights abuses, are after all, part of an attempt to ensure the survival of the State Law and Order Committee (SLORC), and therefore purely an internal affair. This ASEAN stand is understandable if one accepts the assertion that “the sanctity of national sovereignty is the most sacred [ASEAN] corporate value”.

For much of their history, the ASEAN members have grappled with very serious problems of nation-building and national consolidation. This has made them inward-looking in terms of security. As relatively weak states militarily, the ASEAN members especially have relied on a variety of non-military instruments to deal with external threats. These instruments included military alliances and/or alignments; adopting policies of non-alignment and other foreign policy and diplomatic initiatives. As a result, all five original founding members of ASEAN subscribe to the concept of comprehensive security and national resilience, though to varying degrees and with differing emphasis on its components. Instead of depending on pure military power, ASEAN has depended on diplomatic initiatives to keep hostile military powers away from its borders. The South-East Asian Zone of Peace, Freedom and Neutrality (ZOPFAN) concept was an attempt to keep South-East Asia for South-East Asians. The “ASEAN way” of managing security was, however, effective in managing sub-regional tensions only because there was a security umbrella provided by the US which looked after the main external threats to the region.

The Dis-Utility of Military Power

Most ASEAN members today may be described as militarily unambitious states. They do not need vast military power to meet their regional ambitions. They only seek limited power to deter relatively weak neighbours. Their military objectives are strictly limited. This applies even to Singapore, despite its quite formidable (by regional standards) conventional military capability. However, because of the changes in the regional security architecture – including a more unpredictable regional order – after the end of the Cold War, ASEAN's attitude towards arms acquisitions and military power has perceptibly changed over the last 15 years. ASEAN members have responded by using a twin track approach – contingency planning for defence and diplomatic engagement. ASEAN contingency planning is not based on threats, but is pegged to economic growth. Defence spending in ASEAN ranges from a low of about 1 per cent of gross domestic product (GDP) in Indonesia to a high of 6 per cent in the case of Singapore. Most countries typically spend 3 to 4 per cent of their GDP per annum on defence. It is only within this contextual framework of ASEAN military power that we can understand the external defence doctrines and strategies of the ASEAN members.

Given all the above considerations, it is obvious why the majority of the original ASEAN members have but paid token attention to their external defence capability. Their priority is internal security and/or regime maintenance rather than protecting the nation from external aggression. The ASEAN emphasis on the internal/domestic dimension of security is reflected in the ASEAN concept of national and regional resilience, which links economic development directly with stability. ASEAN members were therefore expected to look after their own domestic constituencies by ensuring economic growth and development.

As a result of all these factors, the ruling elites generally consider it more important to
concentrate resources on state-building and regime-strengthening. Until and unless the present international system shows signs of breaking down, South-East Asian states are unlikely to spend scarce resources on upgrading the military to take on tasks above and beyond its primary responsibility of ensuring domestic and/or regime security.

The ASEAN NEXUS: Indonesia, Malaysia and Singapore

Only two countries of the original ASEAN six – Singapore and Indonesia – have clearly articulated defence doctrines. Doctrine may be defined as the “fundamental principles by which the military forces guide their actions in support of objectives. It is authoritative but requires judgment in application”.19 The same applies to strategy, which may be defined as the “art of directing military activity in war”. It is significant to note that it was Suharto’s New Order (Order Baru) Government which first emphasised economic development as the basis of security. Suharto recognised, after years of high defence spending by the late President Sukarno, that a focus on external defence was not only costly, but could economically weaken and undermine the legitimacy of the regime in power. Hence he concentrated on delivering the basic economic goods to the people to keep levels of satisfaction up and levels of dissension down. This approach was subsequently conceptualised as the notion of national resilience. This concept was eventually adopted by the rest of the ASEAN members, hence leading to what has been termed regional resilience.

Indonesia also provides an interesting ASEAN case study because of the role of the Armed Forces of the Republic of Indonesia, or Angkatan Bersenjata Republik Indonesia (ABRI). ABRI’s role was not merely national defence, but it saw itself as the primary custodian of a unitary Indonesia, i.e. to prevent Indonesia from breaking up. In this sense, this was the heart of ABRI doctrine. Hence ABRI’s role was as much political as military. While President Suharto came to power via the military by quelling the so-called putsch of September 1965, he adroitly steered away from being entirely dependent on the military for his continued dominance of Indonesia. Suharto, ASEAN’s longest-serving leader, had been primarily concerned with regime security and survival. To ensure his continued hold on power, he fostered, and exploited, economic development as a means of regime legitimation. As such, ABRI saw national security in quite different terms from President Suharto himself. After the ouster of Suharto in 1998, ABRI’s name was changed to Tentera Nasional Indonesia (TNI).

ABRI’s attempts to suppress domestic dissension during Suharto’s last days in power proved futile. But its attempts to prevent East Timor from breaking away, and its tough stance against Achenese secessionists, illustrated that it was attempting to follow its strategy and doctrine of preserving a unitary Indonesia. At present, Indonesia is being riven by centripetal forces, and the TNI is more concerned with restoring law and order than in grand designs of war.

The development of Singapore defence doctrine and strategy is synonymous with the survival and political dominance of the ruling People’s Action Party (PAP). Singapore defence doctrine, seen in this light, is fairly straightforward. It is essentially about mobilising society and all its resources to ensure the survival of the miniscule city-state. Like many city-states in history, Singapore has little natural strategic endowments. It has no strategic depth, no natural resources, and a very limited manpower base. To compound its difficulties, it sees itself located in a strategic environment which could very quickly turn hostile and unfavourable to the island republic.

Singapore’s defence doctrine initially emphasised mobilising its citizens for the external defence of the city-state in the mid 1960s. It achieved this by emphasising the
external dangers to threatening national survival, and hence the need to establish a credible defence force. Two decades later, after having built up a credible deterrent capability, Singapore’s defence doctrine took on a more comprehensive approach by addressing the issue of domestic cohesion. This was because the earlier perceived military threats to Singapore had already receded, and the continued existence of the nation was no longer in doubt. However, the PAP embarked on a re-mobilisation campaign in the mid 1980s, this time with the aim of endowing Singaporeans with the values and identity synonymous with the aspirations of the PAP. The aim was both to ensure regime continuity, and to make sure that Singaporeans did not become over-complacent and “flabby” regarding the success and survival of the city-state.

Of the three countries studied here, it can be said that Singapore is the only one which has seriously implemented the concept of total defence. In this, the ruling People’s Action Party was helped by the perception of imminent threat, and this concept of survival became the “linchpin of Singapore’s internal cohesion and its intangible independence”. Thus it was able to reconcile domestic social order and external vulnerability by subordinating the former to the latter. Singapore was therefore able to introduce national service in 1967, both to build up its armed forces, avoid the strain of maintaining a large standing armed forces, and to socialise the various ethnic groups to promote multiracism and tolerance.

Singapore’s external defence doctrine then was essentially that of deterrence, based on the strategy of forward defence and lightning fast strikes at any potential aggressor. It seemed natural to turn to Israel, both for doctrinal and training advice. The strategy and doctrine formulated by Goh Keng Swee, one of the PAP’s most able organisers, envisaged the: ... capacity for the lightning destruction of any potential aggressor launching a first strike, and a citizen-soldier system operating throughout the whole population, as in Israel.

The Singapore Armed Forces (SAF) became a highly capable, and technically sophisticated force, for two reasons. The first was the already highly technocratic administrative service, many of which members were incorporated into the PAP ruling regime. The second was the technocratic bent of the PAP elite itself, such as Lee Kuan Yew and Goh Keng Swee. Thus, they emphasised technological solutions to Singapore’s defence problems. More important, however, technology was seen as the key to overcoming Singapore’s lack of strategic depth, and its limited human resource. Weapon systems were carefully chosen for their effectiveness, taking into account both maintainability and the strategic environment. The result is that the SAF has become probably South-East Asia’s most capable conventional force, also establishing in the process a mini military-industrial complex.

Singapore external defence doctrine and strategy has apparently undergone little change over the decades. The SAF and its equipment is not displayed during Singapore National Day merely to impress observers. It is still intended to send a clear signal of Singapore’s determination to “launch a swift and decisive response against any foreign threats to its vital national interests”. Indeed, the whole notion of a pre-emptive strike – using offensive counter-air operations and the seizure of territory – is still central to Singapore defence strategy. Together with a clear strategic objective, Singapore is also conscious of its small population concentrated on a small island. As such, it would consider an RMA to offset its demographic weaknesses.

Malaysia provides a revealing contrast to both Singapore and Indonesia. Of the three countries, its military doctrine is the vaguest and least well articulated. While Malaysian
military doctrine pays token tribute to the notions of “forward defence” and “people’s defence”, there exists no guideline for their effective implementation. Military doctrine is, in fact, handled individually by each of the three Services although the Malaysian Armed Forces is working on a joint doctrine. This state of affairs, it is argued, is largely because external defence is accorded relatively low priority by Malaysia. The emphasis, instead, is on the concept of comprehensive security, i.e. the establishment of domestic stability, order and cohesion. The primary instrument for effecting these aims is economic development.

It is also a reflection of the fact that domestic security is often equated with regime security. As a consequence, force development in Malaysia often takes on a peculiar logic of its own. Force development is as often meant to secure the regime as to ensure the security of the nation from external threats. While Malaysian politicians tend to stress Malaysia’s defensive self-reliance, the truth is that Malaysia had, on the contrary, traditionally relied on an alliance strategy for its external defence. Alliances ranged from the very explicit Anglo-Malaysian Defence Agreement (AMDA) to the looser, consultative Five-Power Defence Arrangement (FPDA), and finally, to an implicit reliance on the US security umbrella. Malaysia demonstrates clearly the emphasis placed on regime security and non-military means of defence. The Malaysian doctrine of comprehensive security clearly spells out the importance of domestic stability to be achieved through economic progress. It was a “butter before guns” approach which underplayed the importance of military power in the defence of Malaysia.

Overall, it is clear that Indonesia and Malaysia tend to give precedence to economic progress and domestic security instead of external defence. Singapore, being a highly technocratic island state, has already established very effective control over all sources of domestic dissension. Hence, it sees external conventional defence as essential for preserving the nation. Nevertheless, even Singapore feels the need to remobilise its citizenry by emphasising comprehensive security, which in Singapore parlance, is known as “Total Security”. Indonesia, Malaysia and Singapore therefore reflect different, yet similar, approaches to defence. Indonesia relied on an essentially guerrilla warfare strategy and doctrine for its external defence. This is, in large part, because of its size which gives it strategic depth. Singapore, precisely because it has no strategic depth, has no choice but to adopt an avowedly conventional defence strategy based on forward defence. Malaysia has traditionally relied on extra-regional powers to underwrite its external defence, preferring to spend its limited resources on strengthening the regime and ensuring the latter’s continued hold on political power. At the same time, it is telling to note that all three countries pay great emphasis on the non-military aspects of security, which is encapsulated in the ASEAN notion of national and regional resilience. Thus, while there are differences in defence strategies, it can be argued that virtually all the ASEAN core members share a similar doctrine in their emphasis on the non-military aspects of security. Most ASEAN members fit into one of the three models, or somewhere in between the extremes represented by Indonesia and Singapore.

Impact of RMA

Given this background, what can the RMA do for South-East Asian states? It seems obvious that nothing much has changed over the last decade and, except for Singapore, an RMA would not address the key security problems of the region. South-East Asia is still preoccupied with regime legitimation and economic development, especially after 1997, together with a number of “threats other than war” such as piracy, illegal migration, and narcotics running. Myanmar, Cambodia, Laos
and Vietnam all have various degrees of domestic political and economic problems. These new members of ASEAN are relatively underdeveloped, and lack the IT infrastructure for an RMA.

While the rest of South-East Asia might be relatively better developed, it is difficult to imagine what an RMA can do to further the strategic objectives of these countries. There are no indications that military elites are thinking of new ways of conducting wars, or using IT and information dominance as a weapon against potential enemies. If anything, it is business-as-usual.

Malaysia has not changed its assumption that the country will face no serious external threat for at least the next decade. Its priority therefore is still on economic development, and to make Malaysia an industrialised country in the next few decades. Indonesia’s domestic problems are too well known to be worth repeating here. In a nutshell, its security problems are primarily internal, with internecine clashes in Ambon and Moluku, and a separatist war in Aceh. It is difficult to imagine Indonesia investing billions of dollars on RMA resources to solve the Acheh problem, for instance.

One difficulty encountered while researching this article was simply the dearth of information on the significant use of IT, and IT policy, in the military. For instance, the Royal Malaysian Navy’s IT Master Plan, approved in 1996, has entered its second stage encompassing office automation and “applications development throughout RMN bases and ships”.27

Today, South-East Asian armed forces are no longer the cutting edge innovators for the nation that they were 40 years ago. The civilian sector would, instead, provide a better indicator of the prospects of an RMA.

The South-East Asian countries are still not very “wired”. Singapore, not surprisingly, belongs to the upper categories. Given this situation, it is hard to imagine that South-East Asia is on the threshold of an RMA, or that the armed forces will embrace the concept wholeheartedly.

NOTES

2. “Internal security” in this article refers to domestic stability and the continued survival of the state in certain instances, as in the case of Indonesia and Singapore. It is also used synonymously with regime security and survival. Most of the other ASEAN states place a premium on regime security rather than domestic/national security.
3. “State” here is defined as a “structure of domination and coordination, including a coercive apparatus and the means to administer society and extract resources from it”. In this definition, a state does not require political legitimation. A “nation-state” is a political community whose territorial and juridical boundaries coincide with the boundaries of the nation. “Regime” is the organisation at the centre of political power, and it determines who has access to that political power. “Government” is defined as the actual exercise of political power within the framework of the regime. The Government would therefore control all those people and institutions, including the military and bureaucracy, that are in control of state power. See Muthiah Alagappa (ed), Political Legitimacy in South-East Asia, Stanford University Press, Stanford, 1995, pp.26-27.
5. Indonesia won its independence from the Netherlands in 1949 after a four-year struggle. Both Malaysia and Singapore were granted independence as part of the British divestment of Empire process. Malaysia became independent in 1957. Singapore was briefly federated with Malaysia from 1963 to 1965 before becoming a totally independent nation in 1965.
7. Mohammed Ayoob defines state-making as involving three functions: . External war-making: The expansion and consolidation of the territorial and demographic domain under a political authority, including the imposition of
order on contested territorial and demographic space. Internal policing: The maintenance of order in the territory where, and over the population on whom, such order has already been imposed. Taxation: The extraction of resources from the territory and the population under the control of the state essential to support not only the war-making and policing activities undertaken by the state but also the maintenance of apparatuses of state necessary to carry on routine administration, deepen the state’s penetration of society, and serve symbolic purposes.

War-making is obviously not high on the agenda of ASEAN state-making, since juridical borders are already well-established and well-defined under the international system of states. Policing and taxation are the major functions of ASEAN state-making. Mohammed Ayoob, op. cit., pp. 22-23.

10. Mohammed Ayoob, op. cit., pp. 34, 35.
14. There is a paradox here. Any ASEAN member condemning Jakarta’s invasion would have been regarded as interfering in the internal affairs of Indonesia although East Timor was never part of the Netherlands East Indies. From Jakarta’s perspective, East Timor is regarded as well within the Indonesian sphere of influence, and vital to the former’s security.

18. First mooted in 1968 by Malaysia’s second Prime Minister Tun Abdul Razak, the original idea was to persuade China, the US and the Soviet Union to become the guarantors of a neutralised South-East Asia. China demurred. The concept was adapted and refined by the ASEAN Foreign Ministers in 1971 as the Kuala Lumpur Declaration, 1971. The ZOPFAN concept contains “ground rules” covering political co-existence, non-interference in the domestic affairs of nations, as well as a nuclear weapons-free clause in the ZOPFAN region. See B.A. Hamzah (ed), The Zone of Peace, Freedom and Neutrality (ZOPFAN): Revisited, Friedrich Ebert Stiftung & Institute of Strategic and International Studies (ISIS), Malaysia, Kuala Lumpur, 1991, pp. 6-8.

21. The conscription National Bill, and the reservists’ New Enlistment Bill, were introduced in 1967.
23. It has been argued that senior members of the Singapore civil service merged with, and even supplanted, the political leadership. Similarly, there has been an increasing trend to co-opt former senior officers of the SAF into both the civil administrative structure as well as the corporate sector. See Cho-Oon Khong, “Singapore: Political Legitimacy Through Managing Conformity”, in Muthiah Alagappa, Political Legitimacy, op. cit., pp. 117-119.
24. The Sheng-Li holding group of companies is at the heart of this complex, and has under it government firms manufacturing, assembling or upgrading naval vessels, ordnance, artillery, armoured fighting vehicles, military aircraft, and military electronics.
Embracing the Revolution in Military Affairs

The Chinese military research learned the concept of RMA quite early when they noticed that the Soviet military circles started to discuss revolution in military technological affairs in the 1970s. At the time the US defence analysts also caught up with this Soviet term which made them nervous. They thought that the USSR was sending out signals that it had obtained some superiority over the US due to its scientific and technological breakthroughs. Only later did the US discover that the Soviet research on revolution in military technological affairs was actually aimed at studying the innovations in US military thinking, which were stimulated by the great leap forward in hi-tech discoveries. The systematic study of the linkage between technology and military affairs in both superpowers resulted in a foresighted prediction that revolution in information technology would fundamentally transform the way the war was pursued.\(^2\)

RMA has been brought to prominence only recently by the military actions in the 1990s, such as the Desert Storm and the Kosovo War, which revealed the new dimensions of battlefield combat. However, as the first group of eager learners, the Chinese seriously studied the discussion of RMA in the US and USSR. Since the 1980s they have published a large number of articles on RMA, anticipating that something revolutionary may soon happen in military science and armed conflict. Immediately after the official adoption of Deng’s “people’s war under modern conditions” in the early 1980s, the Central Military Commission (CMC) launched a nationwide campaign to study how the PLA would fight in the turn of the century. In 1987 a strategist in the PLA Academy of Military Science stated that a qualitative change in military science was in the making. This change was stimulated by the development of hi-tech conventional armoury, such as laser and fixed energy weapons systems, whose
effect was increasingly approaching that of nuclear weaponry. In a keynote speech to the PLA’s first all-Services conference on the future war in 1986, General Zhang Zhen, the second in ranking in the PLA in the 1990s, said he believed that if the PLA could not foresee the developmental trend of military science, it would be further left behind. Since the mid 1990s the concept of RMA has attracted enormous interest in the rank and file of the PLA, which witnessed the prototype application of RMA ideas by the US in real wars. In a sense China is fortunate to have been exposed to such international events and technological revolution at a time when its leadership is under minimal ideological constraint. This unprecedented level of political relaxation has permitted PLA researchers to take a realistic approach to the study of new wars. Now it has actually become a vogue for PLA soldiers to talk about RMA. Andrew Marshall, Stephen Blank, Martin Libiki, and others have been quoted frequently.

Such a PLA zeal to learn RMA has surprised many Western analysts. “Surprised” in a way that RMA is an invention by the advanced military powers but is now embraced so eagerly by China whose technological foundation can hardly sustain any real PLA attempts to put RMA into practice, let alone its current equipment to frustrate any enemy’s invasion. The number of people in this school of thought is the smallest among the three. Yet their argument cannot be entirely dismissed: the US defeat in Vietnam and the Soviet disgrace in Afghanistan showed that the form of people’s war is not without its logic in the defence of a continental country. The US is fearful of casualties. Therefore, the usefulness of people’s war has not been exhausted against a land war threat of the superpower even in the hi-tech era. Certainly, the influence of Long Marchers is continuously dwindling because even people in this school have realised that what China may face in a future war is not an invasion on its land mass but either lightening air and missile surgical strikes or sustained air and missile bombardment, as seen in Kosovo in 1999.

At present the majority of PLA generals still belong to the school of hi-tech warfare. Led by powerful military leaders such as Admiral Liu Huaqing, former vice chairman of the CMC, (retired in 1997), these senior officers man the key PLA positions and run its daily affairs. This school of thought concludes that China has not yet entered information age and so it has not had a solid technological foundation for practicing RMA. Their view is similar to the prediction of US analysts that RMA can happen in China only after the

reservations about RMA, as they insist that the concept is far away from the PLA’s reality. Currently there are three schools of thought in the PLA, each debating with the other two over what should be the best strategic guidelines for China’s future military modernisation. The first school of thought is that of “people’s war”, supporting either the Maoist original version or the Dengist revision. The people of this school of thought are remaining Long Marchers who still exert influence in the PLA and their close associates in active service. They believe that given the present backwardness of the country’s military technology, the PLA has no choice but depend on people’s power and its current equipment to frustrate any enemy’s invasion. The number of people in this school of thought is the smallest among the three. Yet their argument cannot be entirely dismissed: the US defeat in Vietnam and the Soviet disgrace in Afghanistan showed that the form of people’s war is not without its logic in the defence of a continental country. The US is fearful of casualties. Therefore, the usefulness of people’s war has not been exhausted against a land war threat of the superpower even in the hi-tech era. Certainly, the influence of Long Marchers is continuously dwindling because even people in this school have realised that what China may face in a future war is not an invasion on its land mass but either lightening air and missile surgical strikes or sustained air and missile bombardment, as seen in Kosovo in 1999.

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RMA and the Three Schools of Thought in the PLA

Within the PLA, however, it is quite clear that many influential PLA generals entertain
second decade of the next century. In addition to timing, this school also differs to the school of RMA in that the latter takes a more integrated view on the features of Information Warfare (IW). More importantly, people in this school do not envisage an urgent need for a fundamental overhaul of China’s armed forces in the foreseeable future. They agree to some restructuring of the PLA, giving more emphasis on the development of the specialised services, such as the Air Force and Navy. Yet they dismiss the idea of establishing digital Army divisions and constructing digitalised battlefield as relevant to China’s military modernisation. For instance, they believe it is too early to think of preparation for replacing the current C3I system linking the CMC, seven military regions and a number of war zones with a new integrated five-dimensional C3I system (land, sea, air, space, and electronic space) that removes the current functional divisions of command between geographical locations and different services. In other words this school of thought stresses only individual aspects of IW, although it acknowledges the changing patterns, modes and processes of hi-tech wars. China’s current national defence strategy bears the name of this school of thought whose specific features are discussed in the later section.

In contrast, the RMA school of thought theoretically tends to aggregate all the features of IW and analyses these features in a forward leaning manner. The number of true believers of RMA in the PLA is small and clearly many of them are simply copying the minds of their US colleagues without a real grasp of the nature of the concept. These enthusiastic supporters of RMA are those war planners in the headquarters of PLA specialised services and the academic staff in PLA education and research institutions. It is they who have spearheaded the study of advanced Western military ideas and convinced PLA top brass that times have changed. They are young, well-read, visionary, and anxious to create a new PLA that is more professional than revolutionary. They favour China’s modernisation but reject its wholesale Westernisation. They entertain strong nationalist feelings but oppose closed-doorism. More interestingly, they see communism as irrelevant to China’s goal of self-strengthening but accept the Chinese Communist Party (CCP) as the vehicle for the realisation of that national goal. Painfully conscious of their country’s present state of military backwardness, they seem to harbour a suppressed ambition which may explode in hawkish rhetoric concerning China’s sovereignty disputes. Looking into the future they will wield increasingly more influence within the PLA and even over national politics as a whole. Partly this is because they are strategically positioned in PLA headquarters at various levels with a promising upward career ahead. In PLA tertiary institutions they are teaching the future PLA leaders and forging useful personal networks with them. More importantly, their views on RMA are based on their understanding of technological development in the new century and this has won them firm support of the Chinese leader Jiang Zemin who, as a foresighted technocrat himself, is very enthusiastic about RMA. This has been the fundamental reason for RMA becoming so popular in the PLA, as those RMA advocates get better chances of promotion with Jiang’s blessing. It is safe to predict that when these people are in senior commanding posts in the new millennium the future development of the PLA will be guided more visibly by the ideas of RMA.

The significance of the debate among the three schools of thought is that before technocrats took over the leadership in the CCP and military, technology was only one of the changing variables in the formulation of national defence strategy. The generalists-dominated leadership had a natural tendency of belittling the role of technology, as reflected by Mao who eyed nuclear bombs as paper
tigers. Now the technocrats have a real grasp of the technological revolution and consciously direct the military decision-making process based on the current and future technological innovations. This has eventually resulted in the Party’s new political line of transforming the PLA from a quantitative to qualitative military, formally discarding a long PLA tradition that identified strength with large numbers of infantry soldiers. As one senior PLA theorist commented: It is inevitable that a military has to evolve from drawing physical strength from numbers (tineng) to relying on technological hardware (jineng) to becoming eventually a military of intelligence (zhineng).  

However, what should be mentioned here is that it is a mistake to believe that the three schools of thought have created deep cleavages in the PLA. The PLA has a general consensus that information age has arrived, and the technological breakthroughs in the world have profoundly altered the way of fighting. All PLA personnel agree that China needs to catch up with this change. At the same time they take useful elements of each school to fit in the changed time. The idea of people’s war is regarded as still valid in some circumstances, e.g. in a territorial conventional war against an invading enemy. The hi-tech strategy school of thought is designed to deal with limited regional hi-tech wars, the main type of action China is preparing for. In a war as such the PLA will rely on its hi-tech capable elite units, especially the specialised services to carry out war plans. At the moment this is probably all the PLA can do with its limited amount of hi-tech hardware. In the future when China has achieved solid technological foundation and the PLA has overcome its current equipment vacuum, it will be better able to implement the ideas of RMA, utilising advanced military satellites, miniaturised super computers and long-range precision weapons to digitalise its armed forces. So the RMA school of thought is for now rather a philosophical blueprint than a practical roadmap for China’s defence. It is only growth in China’s comprehensive national strength that can make RMA a real guide for the PLA’s war preparation and thus unify the thinking of its high command.

Understanding and Sinifying RMA

For the time being the PLA has worked hard to understand the effects of RMA on the military establishments. In 1998 the PLA National Defence University convened a major workshop on RMA. The participants tried to work out a definition of RMA. They agreed that RMA was made up of five revolutions: military thinking of the officers, military technology, military equipment, strategic theory and force structure. They also agreed that the core of RMA was fast development of information technology which spearheads RMA. In a way the workshop has played an important role to systemise the PLA’s effort of learning RMA. Indeed, the PLA’s effort in this regard has caught attention of an American professor at the Armed Forces Staff College who commented: “the Chinese defence analysts appear to be at the cutting edge of the implications of information war for traditional institutions such as the military.” What exactly has the PLA learned from RMA? Major General Chen Youyuan, Director of the Officers Training Bureau in the General Staff Department, summarises the key features of the RMA, as understood by the PLA. According to him, RMA is profoundly altering the world military in the following areas:

- RMA is changing the components of the armed forces, especially for the campaign formation between different Services;
- RMA is introducing new combat means;
- RMA is generating much larger combat space;
- RMA is creating new modes of operations;
- RMA is inventing new methods of combat engagement.

All this in turn propels the military to make theoretical breakthroughs so as to accom-
modate these new developments in technology and combat operations. In his view the PLA has, together with other major military powers, entered an existing era of new military thinking, new military ideas and new military concepts. Thus whoever fails to follow RMA will be beaten in the future.14

In studying RMA, PLA thinkers have indeed come up with a number of new ideas that they want to incorporate into their planning for the long-term modernisation of the Chinese armed forces. Among other things the following are some of their findings:

- **Strike from long distance.** New sophisticated terminal guidance systems and precision weapons have made beyond vision attack possible. This will minimise human engagement and greatly reduce casualties. PLA researchers have noticed the US’s new concepts of combat such as “disengagement and indirect assault”, and “concentrated firepower but dispersed manpower”. They accept the claims by US military experts that in the distant future tank battles, aircraft “dog-fight” and exchange of fires by warships’ big guns will become history.15

- **Small-sized battle formation without compromising the strength and outcome.** Crack force structure and simple-layer C3I systems are more suitable for IW which is characterised more by combat between hardware/software than between personnel. Digitalised and precision ammunition have multiplied the fire power of campaign units. Therefore, a small hi-tech force can overpower an army ten times more numerous. Digitalisation is particular is a key indicator of a military of the future. It provides a high level of battlefield transparency to the side which has the means of multi-dimensional intelligence acquisition.

- **Linkage between superiority in information and victory of an operation.** Information technology has not only become an indispensable means for better command and communication, it has also constituted an effective weapon to be used to kill the enemies directly. Combat between opposing militaries is first of all between their capabilities to gather, process and analyse information. So combat engagement begins long before soldiers shoot at each other and it may have become physically invisible. That is to say attacks at the enemy’s defence nerve centres can be achieved without using aircraft, warships and missiles. They can be carried out simply through computer virus and software bombs to paralyse its C3I systems. Superiority in information technology amounts to superiority in combat operation.16

On the other hand, the Chinese are not only learning RMA, they are trying to sinify it according to their own tradition, current practice and future needs. In other words they are injecting Chinese characteristics into RMA.17 By the definition of Professor Zhu Guangya, China’s top defence scientist, RMA is the product of socio-economic and technological development. It is the organic and timely combination of advanced weapons systems, new military theoretical guideline and suitable force structure. This combination can generate qualitative change in the employment of military power.18 The key to sinifying RMA is the PLA’s understanding that it will be doomed to failure if the inferior military mechanically copies the RMA-induced new force structure and combat patterns of the advanced opponent. It should have its own RMA ideas and practice that suits its situation as a strategically defensive force with inferior weaponry. In other words to many PLA strategists RMA should not simply be a technological privilege endowed only to a superpower.19

The Chinese believe that RMA is still in its formative years with its initial phase extended to 2030.20 Therefore, it is difficult to see its full
potential in releasing powerful energy embodied in the combination of the new technology and force structure. To the PLA, however, it is easier to talk about catching up than really to do it. One precondition for the success of catching up is to have a correct understanding of what RMA means, especially, of what it means to the Chinese military modernisation. Even with a proper understanding achieved, the Chinese leadership still confronts a tremendous task in research on how to apply the understanding in the policy-making process. Political consensus does not mean automatic removal of the bureaucratic barriers, existing vested interests and budgetary limitations in restructuring force components, re-sequencing weapons R & D and equipping priorities, and re-formulating specific war plans.

In order to meet the challenge of RMA the Chinese armed forces have worked out a number of principles of learning RMA. First, the PLA is instructed by the CCP leadership to further emancipate the minds of its officers and men and constantly upgrade its war-fighting theories. Major General Chen Youyuan argued that although RMA is driven by the revolution in military technology, new technology itself will not automatically produce theoretical guideline for the PLA’s war preparation. Without new combat theory technology cannot win the war by itself. Moreover, new theory will not be invented without a fundamental change in the mentality of PLA senior officers.21 In fact, RMA is seen as not only bringing pressure to bear on the PLA, but also opening up new opportunities for it: RMA provides a best stimulant for the PLA to shake off its historical burdens rooted in the revolutionary ideology and old military strategies.

Secondly, the PLA makes it an urgent task to broaden it horizon and follow closely the major military powers regarding their new theories and practice. The PLA now believes that the recent limited hi-tech wars have provided good cases of study for China to understand the logic, operation features and combat patterns of its potential adversaries. These should serve as the useful reference for the PLA to work out counter-measures. At the same time the PLA should use these cases as a guide to develop its own combat theories and principles.

Thirdly, the PLA believes it should study IW carefully in order to learn its merits and, simultaneously, find its points of weakness. This is crucial for the PLA which will for a long time rely on inferior weapons to fight powerful enemies. One important learning mission the PLA has set up for its research institutions is to study thoroughly the Kosovo War. They have analysed how the NATO air attack was hampered by the bad weather and difficult terrain; why the Yugoslavia’s integrated air defence system could not shoot down a significant number of invading aircraft and why the NATO forces failed to inflict a high level of casualties onto Yugoslavia; and what lessons the PLA could draw from this one-sided warfare which may just mirror a similar situation in which the PLA will have to struggle to survive in the future. In the final analysis, to most PLA generals RMA is no longer a theoretical concept but a type of warfare China has few counter-measures to handle. Yet this predicament even further highlights the need for the PLA to study the ideas related with RMA.

The Nexus of RMA and Humanitarian Military Intervention

For China it is theoretically not too late to catch up with this crucial developmental trend but time is running short. If the Kosovo War proves anything, it is the West’s trigger-happy interventionism in world affairs. This new interventionism is dependent on its superior weaponry which makes it possible for RMA concepts to be implemented, as indicated by the unprecedented zero combat casualty.22 The Kosovo War can be a watershed event in
contemporary world history. In a way it was just the first in a long list of similar cases where such intervention may be repeated again and again. Indeed, global interventionism is an inevitable brainchild of the end of history mentality. It takes a whole decade to be in form and may become an historical trend in the future. As a philosophical notion it is crystallised in Tony Blair’s thesis of the Third Way that gives major powers natural rights to intervene in other countries’ internal affairs, if there is a humanitarian disaster there.23

To the Chinese the connection between political intervention and military intervention is dangerous for its national security. The RMA has become the actual mechanism to put this theoretical concept into practice in the real world politics. The logic is quite clear in this connection: if the West has set an ultimate political goal for mankind based on the realisation of democracy, it cannot achieve this goal without a level of military intervention because many countries do not accept this goal automatically. Economic intervention in the form of sanctions is not powerful enough for the endeavour. The West believes that to some countries only through military intervention can the goal of democrtisation be accomplished.

Humanitarian military intervention is a particular content of this political objective: restricting dictators’ freedom of military choices and deploying peace-making and peacekeeping forces on the ground of war-torn countries. This political employment of arms requires a different type of warfare: long-range and pinpoint attack at the enemy’s military targets, total control of the air, and suffocation of the opponent’s military capabilities, and so on. The key to success of RMA type of intervention is to minimise the Western personnel casualties and losses of civilian lives of the opposite side. If the civilian losses are heavy, then the just nature of the humanitarian interventionism becomes difficult to justify. RMA makes it possible to achieve a human rights objective without waging an all-out war on the ground and thus makes it possible to wage an interventionist warfare relatively easily on the part of the West. In other words because in the past there was not a proper type of warfare against the authoritarian regimes, all the West could do was either conduct a massive war or just watch helplessly.

Therefore, international interventionism is based on technological superiority and military dominance in hardware. Politically speaking the larger the gap in the balance of power, the easier is the process of an interventionist war. However, it is risky to indulge in a mentality of using the RMA type of warfare to resolve human rights problems. Such a mentality causes tensions to regional security, as trigger-happy interventionist actions are not based on the fully developed RMA superiority that can be employed politically to achieve the desired effects, as seen from the Kosovo War. A lot of people get killed in such an intervention. “Everything is under control” is just wishful thinking.

China and most regional countries are opposed to the concept that human rights is above national sovereignty and they believe that the Third Way can be disruptive for the regional security order. So they responded to the Kosovo War with criticisms: it was viewed as the testing ground for the Third Way thesis to be translated into power play by the West. Then international relations will be defined and served by might.24 Indeed, China’s reaction to the Kosovo War had much to do with the leadership’s concern over China’s own ethnic tensions. Tibet, Xinjiang and Taiwan all have potential to experience what happened in Yugoslavia and invoke outside interference. Anti-China forces in the three places all enjoy external support. Stability in Tibet is maintained largely by force. Taiwan’s future with China is particularly uncertain. China does not want to fight a war with Western powers in these areas. Therefore, outside
involvement of the Kosovo type there would be a nightmare for the Chinese people.

The reality is that the superpower has a political obligation to assist Taiwan under the TRA and it has actually worked out concrete military contingency plans to intervene in case of an armed conflict in the Strait. In recent years the US arms sales have a distinctive purpose of intervention: to keep Taiwan’s military technology more advanced than the PLA’s in order to prevent Taiwan from yielding to the PRC’s pressure. This trend has been deepened with the humanitarianist zeal. The new challenge to China’s military security posed by the US in a possible Taiwan war is that the intervention is to be more operationalised. For instance, if the US coordinates the combat activities of the Taiwanese armed force through its advanced C4ISR systems in the Pacific, the PLA will suffer greater human and materiel losses. If Taiwan is admitted into the TMD network, China’s missiles will have to be further improved to achieve the same level of effect. More dangerous for the PLA is the possibility of the US imposing various direct military measures to restrict China’s likely actions in the Strait. These may include blackout of the PLA’s C3IRS networks, and disruption of its computer systems. When the conflict escalates, the US may blockade the movement of the Chinese warships in international waters. It may also impose a no-fly zone in the Taiwan Strait to prevent China from launching air raids on Taiwan’s military facilities. The US may even select some PLA command and control hubs as the targets for surgical strikes. Watching how the Chinese Embassy was bombed, this could not be excluded altogether. These are the worst case scenarios but the pressure is real. The use of force and the prospect of being attacked have both loomed large in the second half of the 1990s.

Injecting RMA into the Hi-tech Defence Strategy

The PLA’s embracing of RMA has provided a timely guideline for it to improve its new national defence strategy, both in theory and in practice. This is a major attempt to sinify RMA according to its own defence requirements. Now PLA generals have been convinced more than ever before that winning a hi-tech war relies on hardware superiority, sound tactics and a suitable force structure. They have also realised that Deng’s “people’s war under modern conditions” fomented confusion regarding the basic direction of the PLA’s development. Conceptually, it has become self-contradictory, conflating two very different strategies of relying on population power (luring the enemy into the heartland and engaging it in a protracted people’s war) on the one hand and on firepower (modern conditions, namely withholding the enemy in key war directions by the professional armed forces) on the other. The doctrine of active defence, the concrete form of Deng’s strategy, which was designed at the beginning of the 1980s to withhold a Soviet land attack through positional warfare, seemed to have been out of step with the evolution of international affairs. Then the strategy of fighting a limited regional war, formulated in the second half of the 1980s in dealing with China’s border disputes, was regarded as providing no long-term guide for the PLA to address its security concerns and practical needs for weapons systems. That is to say that China as a major world power cannot base its military modernisation simply on considerations of the potential conflicts in the South China Sea or along its borders with Asian states.

So for some time at the turn of the 1990s, China was experiencing a vacuum in national defence strategy. Fortunately for the PLA, the Gulf War erupted and supplied the Chinese a concrete image of what future war would be like, and more importantly, what future war the PLA had to fight. Jiang Zemin summarised his grasp of the future military affairs during
his inspection tour to the PLA National University of Science and Technology in 1991 that any future war would be a war of hi-tech, a war of multi-dimensions, a war of electronics, and a war of missiles. The PLA had to be ready for such a reality.\(^2\) Since then Jiang has worked very hard to build a consensus within the top civilian and military leadership on China’s national defence strategy in the information age. In 1992 the CMC approved such a new strategy, tentatively defined as fighting a future war under hi-tech conditions, which, while remedying the traditional doctrinal defects, laid the groundwork for force restructuring, general training and formulation of updated “war game” plans to counter-measure China’s potential threats.

What is the relationship between Deng Xiaoping’s doctrine of fighting a people’s war under modern conditions and the post-Deng strategy of fighting a future war under hi-tech conditions? The latter has clearly evolved from the former but brought it much closer to the political and security reality of the information age. Both envisage active defence to hold an enemy’s invasion at bay rather than luring it into the heartland. Both prefer advanced military hardware to human resources and call for building a high-quality standing army. Both highlight the need of launching combined military operations in contemporary warfare, emphasising the decisive role of the specialised services, especially the Air Force.

Yet drawing on the crucial elements of RMA theory, the hi-tech strategy differs from Deng’s strategy in several important respects. First, the former calls for establishing a linkage between active defence and forward defence, which may mean power projection beyond the country’s land borders. This is a radical departure from Deng’s active defence, which was confined basically to territorial defence in a form of positional warfare around major cities. Deng’s defence is “active” only compared to Mao’s passive people’s war.

Forward defence is the key to the new strategy, as it recognises that in a hi-tech war the enemy can strike from a long distance, a key content of RMA. For instance, the PLA repeatedly quotes the example that the advancement of military technology in the 1970s, as seen from the development of long-range precision weapons, allowed NATO to attack the Soviet second and third echelon formations from afar, thus denying its initiative of launching a large scale conventional war. Previously NATO could only plan for a war of attrition against the preponderant Soviet ground force. The PLA has noticed that with RMA unfolding the defining line dividing the front and rear has become more and more academic. This has forced the PLA to enlarge greatly its strategic depth, which, according to PLA war planners, should not be restricted to within Chinese borders. For example, air and missile defence should be stretched even beyond the enemy’s first line air base.\(^2\) To the PLA expanding defence depth may not prevent the enemy’s long-range attack, like what happened in Kosovo. Yet if the enemy can be effectively engaged in the outer defence line of the country, the PLA may at least pose a greater threat to the enemy, secure precious early warning moments and thus reduce the personnel and materiel losses on the defensive side. Moreover, in geo-political terms this forward defence can take the form of forward deployment in areas subject to overlapping territorial disputes. As an expression of sovereignty claims, this entails the permanent stationing of PLA units in, and regular military exercises around, these areas. In some extreme cases, this even entails a demonstration of war brinkmanship to protect China’s vital national interests such as its sovereignty integrity.

Secondly, the hi-tech defence strategy is largely an offensive oriented strategy reflecting the PLA’s shifting emphasis towards the “active” versus the “defensive” side of war preparation. In a way this is a reverse of Deng’s doctrine. The PLA was quick to learn
immediately after the Gulf War that hi-tech wars will not be fought along fixed defence lines. The line between battleground frontier and its depth will become very thin. Trench warfare will be rare. According to this change, some PLA strategists argue that China’s post-Cold War military guideline should be changed from Deng’s yifang weizhu fangfan jiehe, or “defence as overall posture, offence as the supplement”, to linghuo fanying gong fang jiehe, or “adroit response based on a combination of offensive and defensive capabilities”. Offence is now understood as capturing the nature of information warfare: the evolving hi-tech hardware is highly biased toward a fast offensive strike because technological innovation has increasingly blurred the boundaries between offensive and defensive weaponry. Indeed, RMA is about how to maximise the offensive effects. Digitalised battlefield, electronic soft kill, and pinpoint elimination of the enemy’s key targets all indicate that it is the offensive side that can seize the first initiative of the war and has the best chance of success. The offensive posture and pre-emptive strike are especially crucial for a weak military at the beginning of a hi-tech war.30

In practice the post-Cold War uncertainties have required the PLA to enhance rapid reaction capabilities to cope with new sets of events, expected or unexpected. Under some circumstances active defence can mean pre-emptive offensive campaigns to neutralise an imminent threat.31 PLA strategists argue that a country’s need to protect its territorial integrity dictates a forward posture. Take Taiwan as an example. Here the Chinese are politically and diplomatically reactive to the efforts of the independence movement on the island. Militarily, however, the PLA has to develop the capability powerful enough to deter any such attempt by the Taiwan authorities. If this fails, it has to launch an offensive operation. Inevitably the PLA has to formulate its detailed invasion plans based on available offensive weaponry. More importantly, this propensity to employ military forces is closely linked to the concept of military deterrence at various levels of possible armed conflict. A strategy of deterrence against foreign invasion differs from that of safeguarding national sovereignty. Generally, a defensive oriented military strategy cannot make the latter credible. This is especially true when the political forces for splitism have the support of a hi-tech military.32

Third, as RMA envisages changing forms of action in the not too distant future, China’s post-Deng defence strategy also leaves large space for adjustment in absorbing new technologically induced innovations in military modernisation. Politically, the strategy is forward-leaning as well. Its hi-tech focus aims mainly at defence against strategic concerns, namely the major military powers. At the same time the strategy is flexible in principle, catering to different scenarios, from major hi-tech wars to small-scale border conflicts. This is the response of China’s armed forces to the country’s changing security environment in the post-Cold War era. Militarily, China’s post-Deng defence strategy is not just a change in doctrine. It is forward-looking, as it is geared to preparation for action in the new century. Therefore, it prescribes concrete measures for weapons programs, force organisation, campaign tactics, and research priorities, which do not aim at equipping the PLA in the next few years but at the frontiers of hi-tech breakthroughs some decades from now.33

What is the significance of this new military thinking ahead of the present time? To RMA advocates establishing a right direction of development may be more important than immediate availability of advanced hardware for the PLA’s future. They point out that the importance of RMA does not lie in how to develop hi-tech equipment but in how to utilise it. Without a sound strategic theoretical framework, even if the PLA acquires
sophisticated weaponry in the new century, it cannot not be used scientifically to realise its full potential. They illustrate one example to prove their point: in the 1930s France and Germany had similar numbers of tanks. While tanks were scattered in the French Army, they were concentrated in the elite Army divisions in Germany, making them unstoppable in ground battles. The different deployment methods produced vastly different effects in the war, giving birth to a new revolution in military affairs. This example has convinced the PLA that national defence strategy, weapons development and force structure are the trinity of one entity to make the armed forces powerful. Without either its modernisation will be led astray.

Putting RMA Ideas into Practice

Although the Chinese leadership has no illusions of how far the country is away from realising its RMA dream, it does not give up trying. Indeed, it has made small steps in following the direction of RMA in its drive of defence modernisation. At the moment what the PLA can do is not much but it believes it is important to lay a solid foundation, both in theoretical and materiel terms, for the day when the country is finally capable of translating its RMA blueprint into reality. Below are a few initiatives that the Chinese are doing in putting RMA ideas into practice.

Asymmetry Warfare: the Missile Threat

The PLA sees missile attack as a very useful weapon of asymmetry warfare with which a weak military deals with a strong one. The efforts to increase conventional missiles of China’s Strategic Missile Force (SMF) has thus been a top priority in the PLA’s preparation for an RMA type of war. Maintaining a relatively high level of missile threat is regarded as the only feasible means to compensate China’s inferior offensive capabilities. As the PLA’s other punches by the Navy and Air Force are weak and short, employment of conventional missiles becomes one of its few deterrents against a major power. For instance, at the initial stage of a war across the Taiwan Strait, the PLA will unlikely engage the opponent in an aerial dog of war or a naval sea battle. This may not just be due to the PLA’s shortage of the fourth generation aircraft and modern warships. Launching pinpoint missiles is less threatening politically and strategically than direct personnel engagement. At the same time it reduces the human losses for the PLA, it creates a higher level of psychological effect. Moreover, missile launches are more manageable, as they can be stopped promptly. This is advantageous for the mainland in that it can scale down the escalation of war and save China from direct confrontation with the superpower. Yet concentrated use of missiles can paralyse the carefully selected military targets of the enemy.

Accordingly, the SMF has in the past few years made serious efforts to formulate a new set of guidelines and concepts for future missile warfare. This includes research on improving the terminal accuracy and on countering the tactics and style of a potential enemy’s attack. The importance of these efforts is elaborated in a research report of the PLA National Defence University:

"The PLA’s conventional missiles will be used exclusively against the enemy’s key military targets which the weapons of other Services cannot reach. These targets include the communications hubs, weapons delivery platforms, and most practically the aircraft carrier battle groups. Since these systems are under heavy protection, the demand for the conventional missiles is thus very high. Moreover, how to use these missiles is a matter of military art involving the optimum timing and smart selection of targets."

Secondly, the use of conventional missile units of the SMF has been highlighted by the PLA’s emphasis on united warfare. Traditionally, however, the SMF has largely confined its war doctrines and training
programs to itself, given the nature of nuclear weapons and warfare. United campaigns involving the SMF with other Services have never been a priority in the PLA’s war preparation. Technological improvement of conventional missiles has made the SMF a useful tactical offensive force and thus made it possible for it to join other Services in likely war scenarios. For instance, the missile attack against enemy’s C4IRS centres and airfields is seen to be conducive to the Air Force’s efforts to achieve air superiority. Since training for united campaigns is currently prioritised for the joint exercises of the Army, the Navy and the Air Force, the SMF has been ordered by the CMC to formulate protocols for its participation. In effect the officers from the SMF are required to join the headquarters of united campaigns in each war zone, a departure from past practice. Now the SMF’s coordination in such war efforts is seen as crucial to whether a war can be won.

The missile firing by the conventional missile units of the SMF in the March 1996 military demonstration against Taiwan, codenamed “Strait 96 Number One”, was the first known case of the SMF’s active participation in a large united campaign exercise at the level of Army groups with a participation of 60,000 soldiers, including those of the Air Force, the Navy and the SMF. The early timing of missile firing in relations to other Services in the exercise seems to indicate that ballistic missiles would be used in the initial stage of a conflict in preparation for air strikes and amphibious landings. Moreover, during the exercise the missiles were fired from at least two widely dispersed units. This may be a deliberate design by the SMF to test its command, control and communication effectiveness.38

Parallel to the PLA’s efforts to enhance its missile attack capabilities is China’s own TMD program. To China TMD is a grave threat to its military security in that it is a weapons system that may potentially neutralise part of China’s strategic deterrence. The TMD system is regarded as an integral component of the RMA type of war of mass destruction. Politically, TMD is, like SDI, a symbol of the extension of the SDI Cold War. It signals a redefined power relationship in the Far East. An effective TMD cannot leave any geographic holes in its network.39

Psychologically, TMD further worsens the traditional security dilemma. A workable TMD certainly widens the gap of military balance in favour of the US-led alliances. When one side in the race is losing its strategic deterrent capabilities, it will easily panic. Its impulsive reaction will be to increase its arsenal of attack missiles in a hope that even if some of its missiles are neutralised by the enemy’s TMD shield, at least a decent number of missiles can still penetrate through the network. Thus the TMD initiative serves as a trigger to uplift the arms race in both qualitative and quantitative terms.

TMD stimulates the PLA missile development in several aspects. First, it requires the PLA to increase its missile stock substantially in order for it to launch a saturate attack. One important step in this regard is the quickened pace of developing cruise missiles that are better capable of penetrating the enemy’s missile defence. Secondly, it galvanises the PLA to lift the general level of missile technology so as to evade the TMD interception. This requires a number of key technologies: enhanced electronic warfare capability, e.g. installation of sophisticated guidance systems such as IR/laser imaging guidance and active/passive guidance systems, and ECCM and on board jammers; stealthy features; advanced solid fuelled motors and composite ramjet engines.40 Thirdly, TMD forces the PLA to increase the speed of its missiles and develop more supersonic missiles in order to outpace the interceptors. From the military point of view the PLA is in fact not too much concerned about a TMD network because at the current technological level, it is
a lot more expensive and demanding to develop a workable missile defence system than simply to add the number of missiles. PLA analysts put the ratio to be 5 to 1 and come to a conclusion that China is capable of sweeping any missile defence systems in the Far East with its concentrated launches. This is especially true in the situation in the Taiwan Strait. The short geographic distance can give the armed forces in Taiwan only a few minutes of early warning time against incoming cruise missiles, causing people to ask a serious question of whether TMD is reliable. The decision of the Korean Government not to join the US-Japan TMD R & D presents a practical example of this tyranny of distance for missile defence.

Setting the National Goal for Hi-tech Research

RMA has become a driving force for the development of science and technology for China. The Chinese leadership rightly concludes that without a sound technological foundation there is no point of talking about RMA. China’s hi-tech base is currently quite thin. Only in limited technological areas has China reached world level, such as its space industries. The market reform has created opportunities for gradually strengthening this weak foundation, as China’s rapid economic growth makes the research for hi-tech weapons more affordable than before. However, the Chinese recognise the fact that it is too early to seriously contemplate the narrowing of technological gap with the West. This is the reason why China feels vulnerable with the RMA type of warfare. On the other hand, China’s technocrats-turned leadership has made it a state policy to enter the hi-tech race with the major powers, although the policy does not put gun above butter. They have not failed to notice that the US technological race with the USSR helped it to achieve a superior position in the post-Cold War world economic competition. The new understanding is that defence related hi-tech has always led to scientific and technological revolutions. The applications of military information technology can be wide-ranging and profitable.

Since the beginning of the Cold Peace era, China has confronted new challenges to its military and economic security, now seen as built upon a scientific and technological competitive edge. Therefore, the civilian and military leaders share the same policy objective in placing hi-tech development as the top national priority. This determination has been further hardened by NATO’s bombing of the Chinese Embassy in Yugoslavia in May 1999 and has won wide public support. In concrete steps, it has been decided that in the next few decades concentrated national efforts will be made in boosting China’s defence technology as quickly as possible. As a result R & D and weapons programs have increasingly focused towards research of military space network, fixed-energy and laser equipment, electronic weapons and super computer. Logically, this demands a continuing and sizeable increase in military budget, for hi-tech driven military modernisation is bound to be expensive. Indeed, more funds will be allocated in the R & D of hi-tech weapons, including new generation of nuclear and convention missiles, aircraft and naval vessels.

Making Military Research Closer to New War Scenarios

One logical outcome of China’s embracing of RMA is a major re-sequencing of the PLA’s theoretical and applicable research priorities. In the past PLA researchers were inclined to study the PLA’s war history. For instance, a large proportion of the research projects in the PLA Academy of Military Science were devoted to continuous evaluations of the PLA’s successful campaigns between 1927 and 1953. In 1993 Jiang Zemin instructed the PLA research bodies to shift their research focus from the past to the present. More concretely, he decided that over 60 per cent of research...
projects had to serve the PLA's immediate needs (e.g. restructuring and weapons programs), practical war plans (e.g. specific force redeployment and employment against specific enemies), and likely military operations in the future (e.g. detailed theatre campaign objectives and protocols). He emphasised the importance of research on the way in which personnel and weapons are related in the information age, especially in a situation where the PLA has to use low-tech hardware against some particular hi-tech opponents.\(^{43}\)

Consequently, the PLA's research on major practical issues (zhongda xianshi wenti) and its theoretical exploration of the RMA have been combined together under the post-Deng hi-tech military strategy. In recent years the CMC has ordered the PLA to employ advanced means to improve its research on RMA. One important effort is to use computer simulation systems to reconstruct major hi-tech operations of the major powers in their recent limited wars. One specific research project is to study how to employ asymmetry warfare against an overwhelmingly powerful enemy, such as concentrated use of conventional missiles against the aircraft battle groups. To make research and training closer to hi-tech warfare, textbooks in the military institutions have been completely rewritten in the last few years and since 1993 a comprehensive training reform has been carried out to drill soldiers not only to learn hi-tech wars but also to learn how to fight specific hi-tech enemies.

**Initiating Qualitative Force Restructuring**

There is no doubt that by now both Chinese civilian and military leaders have firmly accepted the central theme of RMA that in the information age victory of a war is predominantly dependent on the quality of technology rather than quantity of soldiers in uniform. With this consensus the PLA has speeded up its efforts to build a qualitative military by initiating large scales of force reductions. The Army was ordered to let go 500,000 personnel in 1997. Already its size is the smallest since the founding of the PRC but further cuts are likely to follow beyond this round. Sooner rather than later its total strength will drop below two million. Meanwhile the specialised Services continue to enjoy priority for modernisation. Enormous efforts have been made to strengthen the second strike nuclear deterrence capability, create offensive air power and develop a blue water Navy.\(^{44}\)

Concrete restructuring progress has been made to match the PLA with the world trend of RMA, although the progress is slow, to the point of annoying party leader Jiang Zemin. So far the most visible change in the top command structure is the establishment of a General Equipment Department (GED) immediately under the CMC in 1998, with the same ranking with the GSD. This department has taken over the functions of weapons R & D, testing, acquisition, allocation and related matters formerly assumed by the various top agencies in the PLA headquarters. For instance, it incorporated the Department of Equipment in the GSD, administrative and operational missions of the State Commission on Science, Technology and Industry for National Defence (COSTIND) under the State Council, including all military R & D projects and procurement agencies in the General Logistical Department.

The significance of the creation of this GED can be seen from the following two angles. First, it constitutes an effective measure to substantiate the hi-tech defence strategy. Without a sufficient amount of sophisticated hi-tech weaponry, the strategy will remain an empty shell. The new GED reflects the determination of the CMC to concentrate all resources it can to advance the weapons R & D and to quicken the process of equipping combat units with the best hardware. Secondly, the department is also a concrete step to translate the theory of RMA into practical application. For instance, the GED will facilitate the weapons R & D and acquisition in
accordance with the requirements of united warfare. One precondition for this is to rectify the current state of affairs in weapons development by different Services, which can be summarised as uncoordinated with an effect of weakening united campaign capabilities of the PLA. The GED will have power to oversee weapons programs of all Services in order to make them serve the purpose of united warfare.

Another indicator has been the renewed discussion of abolishing the seven military regions in the recent months. The PLA high command invited debate among top brass in the early 1980s about whether to replace all military regions with strategic front armies. For instance, the Shenyang Military Region would be restructured into the Northeast Front Army. The difference between the two was that the former was at once a level of administrative agency and operational command. This made the leadership structure unwieldy. Instructions from the CMC had to go through several layers to reach the units they should go to. In comparison the Northeast Front Army were merely a level of operational command. It was directly placed under the CMC administratively. Another advantage of the reform was to uproot the too intimate connection between PLA regional command and local government. However, the debate did not bring any concrete results due to the resistance of military regions. Later on the CMC abolished the attempted reform simply saying that the conditions were not ripe.45

Since 1997 a new round of discussion of the same theme has been carried out among PLA leading agencies. This time the “conditions” may seem to have been ripe to many PLA analysts. One senior PLA researcher has this to say: “The revolution in information technology changes with each passing day the battleground structure, operation modes and concepts of time and space, which dictates overhaul of the traditional “centralised” and “tier-by-tier” administrative/command structure. It has also been proposed that the current seven military regions be substituted by five strategic war zones. There are several merits in this reform. We have already mentioned the simplified command structure between the central military authority and the basic campaign units (group armies or divisions). Political need is even more pressing. However, the motivation is also rooted in the need to initiate a thorough overhaul of PLA command structure in order to suit it better in IW. For instance, the war zone concept will guide the integration of all Services in joint operations under a united command. It is very interesting to watch the outcome of this reform.”46

Implementing New Campaign Tactics

Closely linked to the PLA’s adaptation of a RMA related national defence strategy is a new effort to implement new campaign tactics deprived from the study of the likely forms of future wars. Lieutenant General Hu Changfa, deputy president of the PLA National Defence University made the following summary at an all-armed-forces conference on campaign theory in late 1996:

The changes in the international strategic environment and the wide application of hi-tech in the military realm have posed an enormous challenge to the PLA. Now we are facing new forms of warfare, new opponents in future wars, new campaign tactics and new patterns of engagement in campaigns. How to win the next war under hi-tech conditions is our primary task of study.”47

To tackle this task the PLA has first identified the new forms of its most likely forms of engagement in a hi-tech campaign. According to General Hu, there are two basic forms. The first is mobile operations and the second is united operations.48 Mobile operation dictates a fundamental revision of the PLA’s operational doctrine centred on the positional warfare and promotes a kind of non-line defence warfare. The PLA has realised that line
defence belongs to the era of rifles, guns and tanks, the short-range engagement. Non-line defence represents future, requiring long-range mobility and stifling attacks at the enemy’s rear with precision missiles and electronic bombardment. Inevitably the campaign operations have to be supported by satellite guidance and multi-dimensional strike capabilities.49

Therefore the essence of mobile operation is offensive oriented operation (gongshi zuozhan) which will be the main form of the PLA campaign engagement with its opponents.50 To PLA theoreticians, mobile operation is seen as key component of a campaign in information age. Hi-tech limited wars are characterised by non-fixed campaign battlefields, fast change in operation formats, and little distinction between the front line and the defence depth. Only through mobile operations will the PLA take the initiative of the war. Mobile operations are also required by China’s strategic landscape. In the future campaigns the PLA may be confronted with the mission of operating in multiple strategic directions and over a vast space of war zones. It has to move very rapidly in order to establish regional superiority in terms of human resources and hardware.

Another dimension of the PLA’s new campaign tactics is joint operation. Joint operation is now seen as reflecting the nature of IW. This is a major departure from the PLA’s long time emphasis on combined operation, which was regarded as its basic campaign typology designed to be centred around the ground force combat. “Combined” refers to employment of different arms of Services (junzhong) within the Army: units of tank, artillery, anti-chemical warfare, engineering, telecommunications, and others are brought together executing a ground campaign. Specialised Services such as the Navy, the Air Force and the missile force were, however, given only a minor role. This campaign form is in agreement with the level of China’s overall military technology: the specialised Services are left far behind in hardware development. After all the Chinese armed forces grew from the ground force and are dominated by it. Now the PLA high command believes that time has come for the rectification of the flaws both in campaign theory and typology. The special Services have made progress in both theoretical guidance and hardware upgrading, making them more capable of supporting joint operations. In IW the status of specialised Services has at least risen to parallel the ground force. More importantly, fighting with potential opponents requires a more crucial participation of the specialised Services. According to Lieutenant General Hu, in China’s future strategic war direction landing operation of some scales will be the PLA’s primary task. Landing operations have to be united operations which makes the basic form of theatre campaign under hi-tech conditions.51

Conclusion

There is no doubt that RMA has inspired the PLA to formulate its long-term modernisation guideline according to a new set of rules of the game. To the PLA RMA is the world standard and development trend for a powerful military that it cannot afford to ignore. Indeed, it is the very fact that China has little capability to cope with the RMA type of war that stimulates the PLA to study RMA and to apply, where it can, its principles in practice. To the Chinese leadership the danger of RMA as applied against China does not lie in its effect of mass destruction in military terms but its political consequence in destabilising the country’s social stability and government. This is where the CCP is very much worried and has taken measures of self-protection. In the next few decades PLA watchers will see continuing reforms within the Chinese armed forces along the line of RMA. The PLA’s C3I systems will gradually be streamlined and digitalised. Its force size will be significantly trimmed and force components restructured to allow more
space for new specialised arms of Services to emerge. Military R & D programs will give great emphasis to the development of new concept weapons. National defence strategy, campaign tactics and combat principles of different Services will be under constant review to guide the PLA to follow the latest innovations of the major military powers. In short the PLA will gradually become more open, flexible and forward leaning. As a result, it will become more professional and hi-tech oriented.

To the PLA rectifying doctrinal defects is more important than immediate possession of modern combat hardware in its long-term modernisation. Embracing RMA and trying to put it into practice may have set the PLA in the right direction. However, adopting a correct strategic guideline does not guarantee the PLA will succeed in transforming itself eventually into a world class fighting force. People may question: yes, the Chinese can copy American thoughts but whether they can also materialise RMA is not at all obvious. If the Soviet failure in its technological race with the US tells us anything, it is that the closed socio-political system may stifle the imagination of the scientists and doom the long-term potential of the nation. Therefore, the biggest challenge to China’s search of a major power status may not be the current backwardness of its technology but the rigidity of its governing process.

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3. Liu Jishan and Qian Zunde, Dangdaig waiguo junshi sixiang (Contemporary military ideas in foreign countries), Beijing: the PLA Academy of Military Science Press, p. 32.
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10. Typical of these younger officers is Major General Zhu Borong, currently deputy commander of the PLA Hong Kong garrison. He received a tertiary education, served as an active duty officer and worked in Western countries as a military attache. When he led the Institute of Strategic Studies at the PLA National Defence University, he developed good working relations with the university’s president, General Zhang Zhen, as the Institute frequently put forward innovative ideas concerning the PLA’s modernisation. All this has been of great help for him to be picked up by Zhang Zhen as a key leader in the Hong Kong garrison, along with Zhu’s experience in England and his fluent English.
15. ibid.
19. Li Jijun, p. 22.
22. See the numerous media coverage after NATO's bombing of Chinese embassy.
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37. ibid, p. 47.
41. Interview with China’s defence analysts in Beijing in January 2000.
42. See, for instance, the Decision on Advancing Technological and Scientific Research by the Central Committee of the CCP, May 1995.
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A new pattern of military revolution, which is more effective for other countries, is attempting to be established through the study of the United States warfare pattern in the aforementioned events. This type of warfare has been presented concisely by some authors:

Desert Storm began with operations designed to neutralize the most dangerous Iraqi offensive and defensive capabilities, to diminish Iraq’s ability to sustain its forces occupying Kuwait and to directly attack the combat capabilities of Iraq’s land forces. Once these objectives were achieved, the final phase began. The last phase had two basic objectives: to drive Iraqi forces from Kuwait and to deny to Saddam Hussein the ability to reinforce the theater or to pose a threat to Kuwait in the future.\footnote{1}

The Gulf War exhibited an impressive stage in the evolution of blitzkrieg, especially in aspects of the continued integration of dominating manoeuvre and precision strike.\footnote{2}

A “blank cheque” was effectively made available for the prosecution of the war. The massive effort cost over $US 60 billion and this burden was shared between a dozen or so nations.\footnote{3}

In the case of Kosovo, US and NATO had achieved agreement for peace, after air bombs during 24 March – 9 June 1999. Yugoslavia had to withdraw all the troops from Kosovo and let the multinational peacekeeping forces into Kosovo. NATO spent several billion dollars. The US Congress signed for budget 12.9 billion dollars for this operation.\footnote{4}

It is clear that the successful operations in the Gulf and Kosovo were because of the technological sophistication and the massive budget of the Coalition forces. These operations possessed some useful technical tools; however, ASEAN countries should consider their conditions relative to the US, if they want to make a difference in future warfare.

Although military leaders in ASEAN have paid attention to the progress of military technology, their internal security problems have to be solved before developing their military power. In the Cold War, the armed forces of each ASEAN country consisted of a large number of military personnel, out of date weapons, and their emphasis was on guerilla warfare. Even though they procured some modern weapons, it was not a systematic development of their military power.

The economic problems in this region and the dated technology are the main obstructions that make military development of ASEAN countries different from the military revolution Dr. Andrew F. Krepinevich mentioned.
Military revolutions comprise four elements: technological change, systems development, operational innovation, and organizational adoption.

ASEAN countries do not have new technology and cannot afford to develop new systems. The dependability of Western countries on technology and new weapons systems requires a very high budget they cannot necessarily afford. Recently, ASEAN’s economic crisis and changing situation has forced them to rapidly change their military. They cannot keep a quantity of old weapons and personnel because of their diminishing military budgets. They cannot let their military power become weak whilst other powers are strong. Thus, new organisation is required to accommodate decreasing defence budgets, while keeping capability at suitable levels. Nevertheless, ASEAN countries cannot avoid the military revolution. But this revolution may be different in concept from that of the Western countries.

Security Concerns in South-East Asia

The countries in South-East Asia, consisting of Brunei, Cambodia, the Philippines, Indonesia, Laos, Malaysia, Myanmar, Singapore, Thailand, and Vietnam, previously divided into groups and conducted conflicts based on political belief. These conflicts almost disappeared when the Cold War ended. The cause and possibility of conflict using military force in this region was also reduced. Lessons learnt from past events encouraged each country to join together to abolish conflict, and increase regional stability. The similar connections of these countries, with regards to geo-political, economic, and social issues should make this region peaceful, but peace depends on the stability of each individual country. When one country experiences a problem that may encourage intervention through outside powers, it is likely that other countries in this region will face similar problems. For example, if Myanmar faces security problems within the country, it will affect the peace near the Thailand–Myanmar border. There will be refugees that Thailand is expected to support, with the probable intervention from an outside power. The best way to build up the security in this region is to look at the whole picture, and not solely concentrate on individual security which has been the focus of the past.

In most of the South-East Asian countries, there are major differences in the social, cultural, economic and political patterns of their societies. These governments are confronted with issues of ethnic minorities, income disparities, unemployment, rebellion and even insurgencies. This has resulted in a state of turmoil and instability in many of the countries in South-East Asia. However, turmoil and instability in the political system are not peculiar to South-East Asian states. These issues exist in every society comprised of people from diverse racial, religious and cultural backgrounds. Even in developed Western societies, ethnic clashes, protests by alienated groups, separatist movements, industrial strikes and even rebellions are common features. Hence, domestic instability is a characteristic of nearly all societies.

Thus, with regards to the domestic stability within the South-East Asian states, the problems of internal stability and security are manageable and pose no threat to the pattern of the existing political system. Internally, the political differences can be resolved in a way amenable to the political leaders of each state. Only where power struggles have involved superpower intervention, as was the case in Indochina, has there been widespread conflict and bloodshed. Further, where external influences and external intervention are present, the implications for regional stability, as well as global security, have been significant.

At the intra-regional or interstate level, conflict between South-East Asian states, arising from disputes over such matters as
ethnic-cultural, economic and territorial disputes, illegal crossing/refugee problems, border delineation and other political differences, have been present since pre-colonial days. These conflicts still persist.

Examples are as follows: Malaysia and the Philippines were at odds with each other over the Moro or Muslim rebellion in the Southern Philippines; Malaysia and Thailand, over the Thai Muslims in southern Thailand; and Thailand and Laos, over the Laotian minority in northeast Thailand. A number of states were involved in territorial disputes: the Philippines and Malaysia over Sabah; Malaysia and Brunei over Limbang; Indonesia, Malaysia and Vietnam over certain islands in the South China Sea; and Thailand, Indonesia and Singapore have yet to resolve the traffic in smuggling across their common borders and territorial waters. Then, on the question of illegal immigration or refugee crossings, Myanmar and Thailand have quarrelled over the movements of Burmese refugees into Thai territory.

The above examples of conflicts, experienced in the South-East Asian region, have caused tension and strained relations among states. Sometimes, conflict has led to the boycott of trade and even the breaking of diplomatic relations. But at no time have such intra-regional conflicts resulted in serious military conflict or forceful occupation of territories except in cases where external powers were involved. Malaysia and the Philippines broke off diplomatic relations in 1962 as a result of their conflicting relationship. Thailand and Cambodia had problems over territories and sacred places along their common border, until the resolution of this matter by the International Court of Justice. Malaysia and Singapore had heated arguments over economic and political matters after separation, but these differences were eventually resolved through bilateral negotiation.

Another example is in the Indochina states where, since 1975, the communists achieved power in Vietnam, Laos and Kampuchea through military means. But the events cannot be categorised as a domestic or even intra-regional development simply because of the involvement of foreign powers. When the Cold War ended, these states reached peace and order.

The threat to regional stability and security in South-East Asia has been due to intervention on behalf of imperial and external powers. Western imperialism was imposed in South-East Asia through military means. It persisted even after World War II when the French in Indochina and the Dutch in Indonesia refused to withdraw from their colonial possessions. After the war, the Soviet Union instigated the upsurge of communist insurrections in the late 1940s and early 1950s in Myanmar, Malaya, Indonesia and the Philippines. The Soviet Union provided substantial aid to the Parti Komunis Indonesia (PKI) – influenced Sukarno regime, which embarked on military confrontation against Malaysia in the early 1960s. From the mid 1960s to mid 1970s, there was the American and Soviet intervention in the Indochina states. In all these cases, the imperial and foreign powers exploited the conflicting issues at domestic and intra-regional levels, in order to pursue their own objectives in South-East Asia.

In summary, at present, South-East Asia has been threatened at three analytically separable levels of security concern: domestic, intra-region, and South-East Asia as a theatre of superpower competition. However, only superpower intervention causes serious security problems to the region.

**Threats Opportunities and Future War**

Changes in the international security environment present new threats to all South-East Asian states. The Western strategy of containment of communism was replaced by the strategies of promoting democracy, dealing
with environment issues, expanding free trade, and respecting human rights. This new strategy is the most effective weapon to date, to be used by the West, towards intervening in the political, economic and military aspects of the Third World countries included in the South-East Asian states. The economic sanctions in Myanmar and the peace operation in East Timor are the latest intervention, and are unlikely to be the last case for this region due to the rising internal problems in this area. These problems are seemingly exacerbated by Western intervention, which may cause conflict between South-East Asian states, as has happened in the past.

None of these states can ignore the process of change occurring around the world, but they should not let these changes master them. There are differences amongst states of South-East Asia; communism, non-communism or socialist states, however, it must be recognised that all of the above states are members of ASEAN. ASEAN was formed, in the 1960s, for economic cooperation, based on the desire to reduce conflict and tension among South-East Asian countries and the possibility of “a great power” intervention. It should be recognised that although they have never cooperated in a military operation, except for bilateral exercises, there is an effective channel to make military cooperation available in the future.

The future of war for ASEAN should not include fighting amongst ASEAN countries. Conflicts about disputed boarder, nationalism, religious, or ideology should be solved by the political means of ASEAN. However, there will be some problems, such as the case in East Timor, that will lead the way for outside powers to intervene. The members of ASEAN should take a bigger part in participating in this kind of operation, for they can better serve their members than outside countries and they will limit the outside intervention. For this reason, the military operation should emphasise peace operations, and therefore, will not raise the feeling of threat amongst ASEAN countries.

RMA in ASEAN

To prepare for the new type of military operation, the “peace operation”, the ASEAN countries should take on board the new concepts derived from the Revolution in Military Affairs (RMA), in developing their military forces. The RMA in ASEAN should consist of changing the way military leaders think, the military role, organisation, and suitable weapons and doctrine.

The military leaders of the future should not only specialise in military operation, they should also be specialists in political and economical aspect, and should be the leaders of the RMA.

The military role should not place emphasis on protecting their own national interest, but it should expand to the stability of ASEAN as a whole. So, they should develop military cooperation with other members of ASEAN.

Military organisations should not be as extensive as the military forces of the Cold War, because such organisations need substantial financial support which has the potential to cause an economic problem in certain states. Military organisations should emphasise the effectiveness of new types of operation; the peace operation.

According to Western philosophy, this new type of operation needs new weapons and new doctrine. But most of the ASEAN countries cannot afford the procurement of the necessary new technological weapons. However, if they have to perform this kind of operation with their current capabilities, they could adapt the new doctrine to their particular situation. The difficulties of maintaining these weapons can accentuate weaknesses in military effectiveness, however, the key determinant of the most capable military forces is the quality of its personnel. To gain superiority in this circumstance, the states concerned need to
improve their military training and also develop new doctrine for these new operations. It is not easy for ASEAN to conduct such an RMA, but the new threats, challenges, and opportunities amplify the need for more thought and discussion on these issues to ensure that they will be able to contribute to South-East Asian peace, order and stability.

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3. ibid, pp.116.

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Rear Admiral Waranon was commissioned from the Royal Thai Academy into the Thai Navy in 1972. He has a Bachelor of Science from the Naval Academy and is a graduate of the Thai Naval Staff College and Naval War College. Rear Admiral Waranon took many courses in the USA, including Anti-Submarine Warfare, Amphibious Planning, Defense Resource Management, and Naval Command College. He has won four prize essay competitions, including the first prize in the US Naval Command College, international prize essay competitions in 1991. From 1972 to 1990 he served in the Royal Thai Fleets. He was the Commanding Officer of HTMS Kirirath during 1986-1987 and Deputy Chief of Staff, Patrol Squadron in 1988. He assumed his current appointment as the Chief of Staff of the Institute of Advanced Naval Studies on October 1998. Rear Admiral Waranon will assume the position of Commander in Chief of Patrol Squadron at Sattakip in October 2000.
Australia is a modern middle-power – a "David" rather than a "Goliath". There are financial, personnel, and other limitations, which are challenges for the Australian Defence Force (ADF). The ADF has to have the ability when called upon to fight larger and more numerous opponents and win. In order to achieve this the ADF must seek to generate an advantage that does not simply rely upon size and brute force. Therefore the ADF must be smart in the way it thinks, the way it trains, and the way it fights.

**Introduction**

Today’s ADF is committed to developing an integrated Navy, Army and Air Force that is capable of being that 21st century “David”. Each of the Services must develop with an integrated view of the future – not just with the current view of single Service units operating independently. In furthering that view each Service must acknowledge that it comes to the stage with its own paradigms and particular languages. This is not in itself an obstacle to development, as each Service has particular strengths, such as expertise in an environment – Land, Sea or Air, which can be integrated into a superior force. Indeed, each Service must maintain specialist core skills to be used as the conflict dictates. What each Service must have is the knowledge of each other’s capability and where each unit, regardless of Service, fits into the Integrated Battle. The ADF can no longer afford to take for granted the joint nature of warfare. Historically, for Australia, operations have, and will continue to be, of a joint nature. The Australian Navy, Army and Air Force face a common future and will gain greater synergy and integration by addressing these challenges cooperatively.

This article will outline how the three Services see the Revolution in Military Affairs (RMA) being applied operationally. In doing so it will cover what the RMA means to the ADF; the relevant RMA concepts affecting the ADF, and each Service; and how each Service is implementing the opportunities the RMA provides. It is also important to look at the personnel and equipment aspects of the RMA in the ADF context. But what is the RMA?

**Revolution in Military Affairs**

The Revolution in Military Affairs provides the potential to develop David's Sling concept. To answer this question, a long and questionable debate could be stimulated resulting in a general conclusion that the RMA is based on the benefits of embracing revolutionary technology in warfare. The semantics of the RMA is largely irrelevant.
What is truly important is to understand that rapid changes in modern warfare are occurring. These changes will obviously provide challenges and many opportunities. Similarly, the opportunities will not be restricted to the Australian military but may provide the catalyst for a currently inferior adversary to gather momentum and emerge as a credible threat. The challenge of the ADF is to exploit the opportunities provided by “the RMA” to develop and maintain a capability edge over any adversary. A single Service approach to this challenge risks duplication of effort and misuse of valuable human resources and assets. The ADF has the potential to become a disjointed force through an inability to integrate, and to tempt failure by not developing the requisite capabilities for effective joint operations. Equally, it is the Services with their deep expertise and desire for practical application of ideas, which is more often than not the originator of new concepts. The RMA is not simply about technology. The ADF must also address the way it is organised, the doctrine it develops, and the training methods it employs in order to be an effective warfighter in the future. Even when all these aspects are addressed, the RMA does not provide a “silver bullet”. Warfare will continue to be a human endeavour that remains uncertain, chaotic, dangerous, and at times bloody. Nevertheless, to ignore the RMA would also be a mistake, and technology is an important aspect of the RMA.

Technological developments have the potential to realise a battlespace in which sea, land, air and space assets will achieve a common awareness and engagement capability. For a small force such as the ADF this will generate the capacity to temporarily dominate decisive points in time and space, allowing the optimum deployment of assets and weapons, and the effective disruption or dislocation of an adversary’s capabilities. The technological developments influencing the RMA have had important flow-on effects of increasing the speed and agility of operations and threats. Increased speed and agility are significant concepts to address. Regardless of the impact of the RMA, there will be a tendency toward higher intensity, short time-frame operations. It may become necessary to exploit this trend by generating the ability to vary the tempo of operations, both speeding them up and slowing them down to suit the ADF’s needs. Controlling tempo will be crucial given the ADF’s size. Generating tempo in the US sense, through the constant acceleration of operations, is simply unsustainable for the ADF. Additionally, potential adversaries may be non-conventional in structure, technique or intent. Actions against non-conventional nation-state or non-state adversaries employing asymmetric capabilities will require smaller widely dispersed footprints both ashore and at sea. These issues present real challenges as to how warfare is undertaken in any future environment. Current expeditionary operations consist of Army Elements embarked in a Naval Task Group, with Air Force assets assigned to protect and sustain the offshore force. It is important to consider the complete task force as a single integrated force with the ability to influence the land, sea, aerospace, and cyberspace environments. Although the Services will bring niche, or expert, capabilities to this theatre, the force requires the flexibility to employ selected capabilities across all Services to achieve specific effects. To achieve the mission decisively and efficiently the force will require the full integration of C4ISR, offensive fire support, air defence, and sustainment (or logistic capabilities). This approach raises two important questions: Who will command this integrated force? And where does the commander best sit, especially given the nature of non-linear battlespace and distributed operations?

Future Technologies

The development of network-enabled operations will allow the commander to sit
almost anywhere from the strategic level, completely divorced from the battle environment, to the tactical level where he or she can just as easily view the operation in person. The Service of the Force Commander does not matter either as network-enabled warfare gives all arms of the force the same exposure. The ADF cannot, and probably will not, be able to unilaterally afford operations in several theatres at once nor will it have the capacity to be engaged in protracted or attritional warfare. However, through the use of integrated local information, sensor and engagement systems, the most efficient course of action can be taken to ensure any operation is surgical and decisive. The technologies attached to the RMA have the potential to provide increased situational awareness, speed, reach, precision, lethality, agility, miniaturisation, stealth, tailored effects, sustainability, and reliability. Each of these warfare categories has the further potential to increase operational effectiveness. Unfortunately, as with most new Defence equipment, the development and implementation of new technologies come with an increased cost. Arguably, the most important factor of any operation is the ability to know all that the enemy is doing. The key words are Intelligence, Surveillance, and Reconnaissance. They will not win any war but they will allow the correct decisions to be made, such as where to focus the attention of limited resources. Once critical targets, which when eliminated will cause the greatest detrimental effect on the adversary, have been selected, the next challenge is to effectively coordinate and synchronise attacks in real time. Parallel operations can be conducted simultaneously to completely disorient and dislocate the enemy, not allowing its decision cycle to operate at all. For a defence force like the ADF, with limited forces and limited resources, this provides the greatest opportunity to influence the attacker. Previously, the ADF has been platform-centric which has meant it was forced to take old warfare techniques into the modern battle. It is now necessary to shift the ADF’s focus on to the ability to deliver tailored effects, from a number of different platforms or mediums, targeting particular battlespace characteristics. These effects might not require the delivery of lethal force but may involve cyber attack or diversion, and deception techniques, in which case other non-military departments may have a leading role. An example of this is the ADF’s need to deliver a cost-effective force projection capability. One concept is for a multi-role ship that could be tasked to either projection, or sustainment missions. In addition to embarking land elements and a deployable joint force headquarters, the vessel could also operate the full range of ADF helicopter types and UAVs, perhaps this future UAV squadron may be manned by personnel from every Service. Personnel are vital to the application of RMA. As reliability of equipment improves, and the percentage of commercially available equipment used for military purposes increases the required skill sets for Service personnel will change markedly.

**Future Concepts**

It shall be necessary to recruit people who are Information Operations (IO) specialists. IO is a key element of the RMA and even more so for a medium power, like Australia, to maximise its combat power. For example, how many computer hacker billets are there in today’s ADF? Not many, if any at all. In 20 years time it could be a core skill of IO warriors and a frontline position. Computers and their associated networks do not replace people. Intellectual thought, the will to resist, and the will to win is fundamental and a uniquely human response upon which states act. The state that has more personnel engaged in the “thinking war” will prevail. Having looked at these conceptual aspects, the question to be asked is how are the three Services implementing them, as individual Services and together, as an integrated force. A good
example of the Services working together is a current initiative by the three Service Headquarters to develop a joint Warfighting Concept. This work will build on the Project SPHINX Future Warfighting Concepts. Since their inception the single Services have always had some sort of long-term plan. But it is only in recent years that they have had dedicated Futures Directorates.

**Service Futures – The Navy**

The RAN only recently created its Strategy and Futures directorate. The challenge for the Navy is that it must look at a range of future concepts and technologies to see which are appropriate for the future RAN. As a medium power navy this is a considerable challenge. The RAN has blue water responsibilities as well as a requirement to operate in an integrated fashion in the littoral. With finite funds and personnel resources it is essential to the Service’s development to make informed decisions. Integral to this development is charting a course from Navy 2000, through the Enhanced Fleet and on to the Future Fleet. Recently the Navy completed work on its two future plans – Plan Blue and Plan Green. Plan Blue examines the way ahead for the RAN out to 2030 while Plan Green looks at the immediate future of the RAN over the next five years. These two documents form the map on which the RAN will chart its future course to an integrated Service. A key finding of the RAN’s futures work is the promotion of various trials involving futuristic technology. For example, the Navy has HMAS Jervis Bay, a fast sealift catamaran, undergoing trials in alternate missions including a role as a surface combatant. These trials are an attempt to practically explore the tactical impact of high speed in the war at sea. In conjunction with the other Services the RAN is also looking at such things as Network Centric Warfare, Cooperative Engagement Concept or CEC, Warfighting Concepts and UAVs.

**Service Futures – The Army**

The Army commenced its futures work in 1995 with the Army in the 21st Century Study. This work has formed the basis for the largest trial ever undertaken by the ADF in the “Restructuring the Army” trials. These trials involving the 1st Brigade in Darwin, now drawing to a close, after three intensive years of hard work sought to provide a rigorous analytical basis for defining an appropriate force structure for the Army. Many of the insights gained have provided the foundation for further experimentation and design of the next Army, termed the Enhanced Combat Force that will exist in the 2015 timeframe. The synergy generated by Army’s Futures work has created a foundation upon which it can develop and utilise the advantages generated by the RMA. The articulation of a concept-led and capability-based approach to Army’s modernisation relies on future concepts to guide Army’s ongoing development.

**Service Futures – The Air Force**

In the RAAF, Project ORACLE 2030 seeks to identify the possible futures out to about 2030 and develop the new concepts and strategies required to “pre-adapt” the force to what will most likely be a future very different from today. The Air Force is undertaking trials of new technologies including UAVs with limited payloads and in addition to this is investigating future aerospace options through the AIR 6000 Project. Work is also ongoing to meld the insights from ORACLE 2030 with the change initiatives already extant in the force, to achieve a strong continuum from a known today to futures perceived only through a glass, darkly. This work is the subject of the “Air Force Strategy 2015”.

**Conclusion**

National security planning for the 21st century is addressing a broad spectrum of potential operations, many of which are outside traditional defence frameworks. This spectrum of operations exists within a strategic
environment characterised by ambiguity and uncertainty. International, and Australian, society is evolving to adapt to new global norms. Also, real-world resource constraints mean that the military must be cost effective and relevant to a changing context – it must produce the most “bang for the buck”. It is an ongoing challenge to military forces everywhere, to ensure that they can adapt to meet national, coalition, and UN security needs in a dynamic strategic environment. The international system has been experiencing a strategic surprise about every 18 months and such surprises are likely to increase in frequency. The question is how will the ADF adapt to meet these surprises head on? This is the evolving context from which the ADF must derive the operational initiatives that will “pull” the force forward, to effectively address the burgeoning threat spectrum.

There has been a trend of blocking technological advances due to cultural and organisational inertia, our current capability development process does this with its short-term outlook. Work such as Project SPHINX underway in the Department of Defence’s Strategic Policy and Planning Division and associated work in the Navy, Army and Air Force Headquarters are trying to grapple with these very issues. An area where efficiencies can be made is in sensors and their application. If platforms are becoming network enabled, there is no reason to duplicate sensors across all of the platforms in the battlespace. Only sufficient sensors are required to alert the system, be it Automated or Human in the Loop, so that additional sensors and ultimately effects could be focused on the area of interest.

The basis of the ADF must be three strong effective Services with environmental expertise. In order for that capability to be nurtured, and to grow, it is essential that each Service stay informed by their futures programs. Often some of this work is at the operational or tactical level that is outside the preserve of ADHQ and unashamedly focuses on developing single Service capabilities. This does not however, mean that the Services’ futures areas are working in isolation. It should be clearly understood that there is a great deal of cross-pollination, and where appropriate, collaborative effort undertaken by each of the three Services. The RMA, properly applied, will provide Australia the sling it requires in meeting the security challenges of the future. However, as noted, this sling requires a well-trained arm, an accurate eye and a sharp mind if it is to ever slay a Goliath.

Air Commodore Blackburn, Director General Policy & Planning – Air Force, joined the RAAF in 1975. After conversion to the Mirage aircraft he had postings to 77 SQN and 3 SQN in Butterworth, Malaysia. In 1980 Air Commodore Blackburn attended the Empire Test Pilots School in the UK before returning to Australia as a test pilot at ARDU. He spent four years in the US on tactical fighter projects followed by several years back at 77 SQN. His senior appointments have included Deputy Director Airspace Control in HQADF, Officer Commanding 41 WG and Director General Policy and Planning – Air Force. Air Commodore Blackburn holds a Master’s Degree of Defence Studies and a Master of Arts in Strategic Studies.

Commodore Lee Cordner, Director General Navy Strategic Policy & Futures, joined the Navy in 1968. He has commanded two small ships (Betano and Bass) and two frigates (Sydney and Adelaide). He served in the Vietnam and Gulf Wars. He is a graduate of the US Naval War College and Australian Joint Services Staff College. He has masters’ degrees in management and international relations.

Brigadier Swan graduated from the Royal Military College in 1972 to the Royal Australian Signals. His primary speciality has been in the field of strategic communications culminating in the command of the Defence Communications Group (1992-95). He has served with the United States Air Force at Nurrangar and has had a variety of regimental and staff appointments. He was awarded a Masters’ Degree from ADFA in 1988 and attended ACDSS in 1996. Brigadier Swan has served as the Director General Information Management – Army, the Director General Information Policy and Plans in Defence Information Systems Branch, and assumed his appointment as the Director General Future Land Warfare in Army Headquarters in May 1999.
The increased complexity and dynamics involved in the planning and conduct of modern military operations drives the need to search for improved means of synchronisation to realise political and military endstates.

Australia has focused on combining manoeuvrability, the use of highly capable force elements, and the support of wide-area surveillance to achieve an edge in military operations. This edge is facilitated by influencing the actions of the adversary through a superior decision cycle, which centres on the exploitation of information for command. The ability to synergise operations by coordinating wide-area manoeuvre, concentrating combat power, and focusing logistics, may be achieved through the exchange of information. Information becomes the binding force for all elements, with the deep implication of this synergy that the force may achieve a level of effectiveness equivalent to that of a much larger force. The power of this network is derived from the quality and timeliness of shared information and from the new kinds of system and command relationships that it enables. A network-enabled force has the potential to operate at higher levels of capability by changing the elements in the information-decision-action cycle. For example, the network enables a shift from radar-pilot-missile, to say, SAR/EO-joint air operations centre-cruise missile (land / air launched).

Self-synchronisation has been illustrated [Alberts et al. 1999] as a potential emergent property of such a networked force and constitutes an alternative model for planning and operations. Self-synchronisation of a collective is facilitated when the actors achieve “network awareness”, that is, they share a common perspective of the goals and the environment, underpinned by the communications necessary to allow dynamic alliances to gather and converge.

However, the potential benefits and application of the concept of self-synchronisation to military operations remains largely unarticulated. In operations where internetworking between coalition partners has historically been poor, synchronisation has been planned through clear and deliberate separation of activities over the dimensions of time, space, and tasking, largely to avoid fratricide. These seams in the coalition offer

Modern warfare is characterised by unprecedented levels of complexity and high rates of change. These characteristics manifest in military planning and operations which are required to form a broad spectrum of conflict from humanitarian assistance in a multi-national coalition, through to precision weapon strikes.

To manage dynamics and complexity, synchronisation is employed in the lead-up to an offensive operation, and whenever a change in the situation is observed or expected. Synchronisation coordinated across a large and distributed enterprise requires a network that will automate complex information processing, facilitate shared situation awareness, and transform large volumes of information into assimilated knowledge by commanders.

We consider the contexts for military synchronisation, and study the concept of self-synchronisation in a networked enterprise. Several enabling technologies are described to potentially support self-synchronisation. Experiments with alternate organisation and technologies as required to enable self-synchronisation are described.

Network-Enabled Force Synchronisation

By Dr. Jason B. Scholz, Defence Science and Technology Organisation
vulnerabilities that an adversary may seek to exploit [Carpenter, 1994]. Future joint and coalition operations may be significantly enhanced through a rich coalition information environment, allowing the potential for integration, and new synergies in coalition planning and execution to emerge, sealing up the gaps in these dimensions.

Planned synchronisation of forces is vital in the lead-up to an offensive operation where precise timing of effects over a wide area needs to be realised. The potential for self-synchronisation on the other hand, occurs whenever a change in the situation is observed or expected. We next examine, categorise and discuss contexts for synchronisation.

**Contexts for Synchronisation**

The success of joint and coalition warfare in future will rely heavily on the ability of otherwise disparate forces to synergise and synchronise to focus military effects. A 1999 report to the US congress [US Secretary of Defense 1999] on the state of PLA joint and integrated operations describes a familiar story on the maturity of force synchronisation:

*The PLA conducts interservice exercises at the tactical level, but the services are not fully integrated into a cohesive combat force. Disparate elements train simultaneously and in proximity, but do not appear to be controlled at the operational level by a joint commander and staff. Ground and air components exercise together with regularity and are improving their interoperability. Integration of ground and naval forces, however, is rarely exercised, particularly at the operational level, where synchronization and command and control are of greatest importance in the conduct of complex operations. The navy is beginning to conduct more combined operations between ships and naval aircraft. The PLA also is looking into the possibility of instituting a “joint command” structure at the operational or theater level, similar to that of the U.S. military.*

Any force is indeed likely to be more effective with operational level synchronisation, however, if such a force was enabled by a network facilitating information flows across command levels and between coalition logistic systems, reconsideration of the nature of synchronisation may be necessary.

Conventional synchronisation is planned by an operational commander in an attempt to employ assigned land, air, sea and electronic capabilities to strike the enemy simultaneously throughout the theatre of operations. These strikes are aimed to exploit an enemy’s critical vulnerabilities and to allow penetration to the enemy centre of gravity. This planning and scheduling activity is achieved with the cooperation of other national and international efforts devoted to the same objective including for example, diplomatic and economic activities.

Synchronisation of forces is required in the lead-up to an offensive operation and whenever a change in the situation is observed or expected. These would include, for example:

a. Change of objectives and tasks,
b. Regrouping,
c. Reallocating support,
d. Change to areas of responsibility of components,
e. Change to the time schedule,
f. Change of subordinate commanders,
g. Arrangement of support from higher or adjacent authorities
h. Commitment of reserves,

**Self-Synchronisation**

Change in tasks requires reallocating resources and is a division of labour problem for which evidence in natural systems [Delgado and Sole, 1998] suggests that self-synchronisation, enabled through minimal communication with neighbours is more efficient than random reassignment of agents
to tasks. Of course, reassignment would not be random in a military network, however, reassignment from a top-down perspective takes valuable time, so that a tactical asset may lose the opportunity to respond to unexpected and perhaps fleeting opportunities to exploit an enemy’s weakness. Although this vulnerability may become apparent through shared situation awareness, synchronisation is required to coordinate a rapid, considered and effective response.

In considering self-synchronisation we use the term “agent” to represent either human or software entities, which communicate and process information as part of an “information network”.

Self-synchronisation might be best characterised as the ability of a well-informed force to organise and coordinate complex warfare activities from the bottom up. The most formal definition [Alberts et al. 1999] is:

*a mode of interaction between two or more entities ... with shared awareness, a rule set, and a value-adding interaction. The combination of a rule set and shared awareness enables the entities to operate in the absence of traditional hierarchical mechanisms for command and control. The rule set describes the desired outcome in various operational situations. Shared awareness provides a mechanism for communicating the ongoing dynamics of the operational situation and triggering the desired value-adding interaction.*

Figure 1 accompanies this description:

This description and diagram does not explain the required behaviour of intelligent self-synchronising agents. To describe what we would consider to be a minimum set of essential layers of agent behaviour needed to produce self-synchronisation, we will draw on a model for successful human partnerships [Covey, 1994], illustrated in Figure 2.

We assert that the “self” in “self-synchronisation” implies the ability of an agent to arrange timing aspects of its own activities without the influence of other agents. This means that an agent is capable of independence. In order to be truly independent, the agent must first be pro-active, using situation awareness to best position itself for action with respect to the enemy and as a part of the broader coalition force, rather than react in the face of a change in situation. Secondly, the agent must begin its course of action with the command intent and endstate in mind. This involves visualising the effect of ones potential
action before taking it. Thirdly, the agent must be able to prioritise its activities. All of these aspects relate to the behaviour of an individual agent, and are necessary attributes upon which to build its behaviour in a collective environment.

The term “self-synchronisation” is naturally applied not only to an individual agent, but to an arbitrary number of networked agents, and in this sense implies a collective “synchronising” behaviour. This collective behaviour is agent interdependence. Interdependence is built upon a pre-requisite basis of independence. Returning to Figure 2, “thinking win-win” a coalition agent enters into a relationship with another seeking a mutual value-add outcome so both benefit from the exchange – i.e. rather than win-lose, lose-win or lose-lose. This involves the sharing of material resources, recognition and power, and acknowledges that the notion of “limited resources” applied to human agents is flawed. In considering courses of action against an adversary in the process of military planning, this concept may be seen as the precise and considered application of effects to result in a desired adversary reaction. It is recognition that to force an overwhelming win-lose outcome on an adversary results in their loss of face, damages your public image, and serves to further harden resolve against you. For an agent to seek to first understand others’ perspective’s before expressing its own, penetrates to the essence of most communication problems. When one listens actively and understands another, the relationship is transformed and a deeper level of trust may be established. This is a balance of courage and consideration. Synergising agents are in a position to self-synchronise to the collective. Synergy produces solutions that are far better than what either agent may have produced originally. Rather than being based on negotiation, which at best achieves a compromise, synergistic communication uses understanding of basic underlying needs and interests to find solutions to satisfy both. The final behaviour not shown in Figure 2, is for self-renewal, a process of continuous improvement to refine these behaviours.

A collective of agents behaving in this way organises a flexible and unique set of internal and external linkages for each new operation. Unlike a bureaucracy, with fixed relationships

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**Figure 2.** Covey’s model for achieving successful partnerships as a model underpinning self-synchronisation.

<table>
<thead>
<tr>
<th>Achieve more than the sum of the parts (creativity self-synchronisation)</th>
</tr>
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<tbody>
<tr>
<td>Understand your partners (courage balanced with consideration)</td>
</tr>
<tr>
<td>Aim for mutual value-add (mentality of abundance)</td>
</tr>
<tr>
<td>Prioritise (draws on will power)</td>
</tr>
<tr>
<td>Command intent &amp; endstate (decide within the time, talent, &amp; tools available)</td>
</tr>
<tr>
<td>Situation Awareness (especially own-force teleology)</td>
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<table>
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<tr>
<th>Synergise</th>
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<tbody>
<tr>
<td>Seek to understand before being understood</td>
</tr>
<tr>
<td>Think win-win</td>
</tr>
<tr>
<td>Put first things first</td>
</tr>
<tr>
<td>Begin with the end in mind</td>
</tr>
<tr>
<td>Be Pro-active</td>
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**The Network Perspective**

**Independence**

**Self Perspective**

**Dependence**
for processing all problems, this networked organisation moulds itself to the operation at hand. It adapts itself not by top-management command, but by leadership vision, interactions with problems, people and resources; and within the broad constraints of the strategy, members autonomously work out relationships [Nohira and Eccles, 1992].

Levy [Levy, 1997] describes a synergistic, regulated human group as a “collective intelligence” which is distributed and constantly enhanced, coordinated in real-time, and results in the effective mobilisation of skills. With respect to the temporal dimension of self-synchronisation, Levy comments that time in the networked community spreads itself out, blends with itself and calmly gathers itself together. The paradox is that to achieve a symphony requires time to make sure that the right agents are involved, to forge bonds, and to agree on actions. However, independent agents have their own periodicities. The information network with intelligent agents is a knowledge space, which although it uses real time technologies, is focused on its interior rhythms – not to achieve simultaneity within an external time, but to allow adjustment to the environment and to asynchronous situations.

Distributed Network Technologies to Enable Self-Synchronisation

To facilitate a network-enabled operation, coalition-wide synchronisation of sensors, command, effects and flow of resources is required. It is not unreasonable to ask why this synchronisation could not be achieved by a relatively simple, centralised, operational command. An illustrative example is the Air Tasking Order (ATO) used with success in the Gulf War to permit coalition-wide synchronisation of air space to reduce fratricide [Carpenter, 1994]. This centralised process worked for the air environment, but there are a number of reasons why the ATO approach is unlikely to facilitate self-synchronisation:

1. the ATO schedule period which cannot be serviced without significant whole-of-force reprioritisation and rescheduling;
2. although aimed to shrink considerably through ongoing US DARPA research programs, the ATO schedule planning-to-dissemination period is finite, and criticality is shifted to communication of the schedule which must be accepted by all participating force elements before execution;
3. a schedule of air space usage does not reveal the full teleology behind it to the tactical-level participants, so that local constraints are not accounted for, and unforeseen efficiencies cannot be exploited;
4. in theory, fratricide is a tactical issue not for the operational level of war and therefore should be controlled at the tactical level.1

To allow coalition-wide synchronisation of assets, knowledge of the teleology of all shared resources is required. That is, what asset is proposed to be used, who is requesting access to it, who has authority for its use / release, how it is to be used, when it is to be employed, where it is to be employed / moved to, where it is now, and why that asset was chosen, etc. This information must be generated and shared by the coalition. The volume and complexity of such shared information, spanning coalition intelligence, command support, finance, personnel, and logistics systems need to be managed. The information typically resides in a wide variety of National and non-Government databases, which are globally distributed, disparate and at different security classification levels. To gain answers to complex queries requires new forms of software infrastructure [Hawthorne et al. 2000], which embody knowledge of the relationships between business entities or assets.

Humans alone could not possibly process the sheer volume and complexity of shared information. Decision-makers will in future
require the support of secure pervasive computing resources employing software agents to roam the network to gather, process, share, integrate and present the information as required [Jagiello et al. 2000].

Ecology is a word that describes the synergism in nature – everything is related to everything else. To make best use of assets and resources, a communication system that facilitates an “information ecology” is required. In such a system, at any time, an agent may be a producer or consumer of information, leaving the significant challenge of routing information to other agents who require it. If an agent has information to share (e.g. a combat system registers after an engagement that five less missiles are available in the weapon rack), it may be difficult to decide who (other than the enemy!) would benefit from knowledge of the event, and therefore where to send the information. In this example, the information would be vital to other combat system agents to assist in computing optimum future firing solutions, however, it may also be used immediately by shore-based logistics to plan resupply (which may be provided through a coalition partner). In future we would envisage the establishment of such an information relationship to be initiated and maintained by machines, to enable best informed decisions.

The publish/subscribe model is a common and simple protocol used in distributed systems (particularly middleware) as illustrated in Figure 3. However, due to the free-form nature of information, the use of subscription channels or categories (as is common in existing Defence command support systems e.g. Lotus Notes) does not scale – the number of information classes soon becoming too large to manage. To deal with this, the Elvin system [Arnold et al. 2000] searches the content of published information to match it to a set of rules in the subscription specification, thereby allowing only specific information relevant to the consumer to pass, who is notified of the availability of that information. This form of technology has the potential to form the basis for new forms of interoperability for very large scale pervasive computing.

The simplicity of this model belies the sophistication of network relationships that may emerge as a direct result of its employment.

**Conclusions**

We have considered the nature of synchronisation and particularly self-synchronisation in the context of a network-enabled coalition force. We believe that an improved model of agent behaviour (both human and intelligent computer-based entities) in a networked environment is necessary to progress development of these concepts beyond situation awareness. The principles of this model may be incorporated into doctrinal procedures as well as embodied in the design
of software agents. Emerging technologies such as those described will be crucial to find, process and communicate complex, distributed and voluminous information facilitating the dynamic alliance between agents at the heart of self-synchronisation.

NOTES
1. Elicited from discussion with Vice Admiral Arthur Cebrowski. Note however, that without a self-synchronisation framework, there is no clear means to control fratricide at the tactical level.

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[Covey, 1990] Stephen Covey The Seven Habits of Highly Effective People: Powerful Lessons in Personal Change.

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I could, of course, be describing the United States and its armed forces in 2000 but I am not; I am describing Great Britain and its armed forces in 1927. While no comparison between the Britain of the 1920s and the United States of the 2000s can be exact – for one thing the Britain of the 1920s was not a sole superpower – there are sufficient similarities between the two situations to justify an analogy.

During the 1930s, British interest in military modernisation lost impetus in important areas such as mechanised and combined arms warfare. At the same time, Nazi Germany rapidly emerged as a dangerous totalitarian rival with a military establishment that was encouraged to embrace modern “machine warfare”. Britain’s military modernisation faltered partly because it neglected one of the most critical aspects of innovation: that of organisation. It is a receptive organisation that provides the crucible for successful military innovation and this is particularly true when change is attempted under stringent fiscal conditions. Ultimately, it is in the interaction of organisation, doctrine and technology that a military revolution begins its march to maturity.

This article argues that exploiting the emergent Revolution in Military Affairs (RMA) or information age revolution in warfare will require a substantial change in the Service cultures of advanced armed forces and that this is likely to provide a greater challenge than new technology. Four areas are explored: first, the role of organisational factors in the process of military innovation is briefly surveyed. Second, an attempt is made to demonstrate the complexity of achieving military organisational change by analysing several historical case studies of institutional reaction to the challenge of modern technology. Third, perspectives from the history of military organisational change are employed in order to examine the management of problems within structures of the current US armed forces. Fourth, some of the future implications for the organisation and structure of armed forces confronted by the environment of RMA-style technology are discussed.
The Importance of Military Organisation

Advances in military technology cannot be applied successfully without corresponding organisational innovation and flexibility within armed forces establishments. It is through organisational responsiveness that technology is translated into superior strategic performance. Once technology moves from the pristine setting of laboratory testing into the practical world of military acquisition, it is shaped by the institutional values and skills of its users. Effectiveness in exploiting technology is thus heavily dependent on the compatible behaviour of organisations.

Some developing nations have purchased the latest military technology only to lack the essential corporate skills to maintain equipment or manage it successfully. For instance, since the 1970s Libya may have spent in the region of US $28 billion acquiring an arsenal of advanced tanks and missiles. However, because of lack of maintenance skills, most of this materiel has been destined to lie rusting in giant junk yards. In the Libyan situation, the nexus between exploiting advanced technology and good organisational management would appear to be almost non-existent.

In contrast, American forces in the 1991 Gulf War used the technological-organisation nexus to great effect. While most of the platforms used in Desert Storm dated from the 1960s and 1970s, what was new in the conflict was the US military’s ability to combine them effectively with new weapons systems in an integrated operational plan. Organisational adaptation and new operational concepts allowed American and Coalition commanders to optimise new technology to achieve decisive battlefield results.

Technological superiority, then, means little without organisational effectiveness. In some situations, organisational strength can act like a form of operational art and reduce technology to only tactical significance. Ulysses S. Grant in the American Civil War and Mao Zedong in the Chinese Civil War were, in many ways, practitioners of organisational warfare. In the 1860s, Grant was the first commander to master the institutional complexities of industrialised warfare based on massed armies, the railways, telegraph and rifled weapons. In the 1930s, Mao Zedong developed the strategy of people’s war by fusing age-old guerrilla tactics with revolutionary political organisation to impose protracted war on superior-armed opponents.

One of the most important lessons in the history of military revolution is that organisational dynamics will determine the setting in which technological innovation will either succeed or fail. However, the role of organisational dynamics is sometimes obscured by a powerful mythology of radicalism that surrounds military revolution. In this mythology, mavericks such as Major General J. F. C. Fuller and Captain Basil Liddell Hart are often portrayed as lone advocates of future war locked in a struggle with reactionary military establishments dominated by assorted Colonel Blimps.

Both Fuller and Liddell Hart, the apostles of armoured mobility, used their formidable pens to portray their struggle to modernise the British Army between the two world wars as a clash between radical visionaries and blind reactionaries. Yet as the leading American historian of technology, Elting E. Morison has written, it is simply not enough to attribute resistance to technological change within armed forces establishments to the alleged workings of what he terms a “causeless Bourbon distemper that invades the military mind”.

Historically, the success of military innovation has never been so clear cut, nor has it ever been the special preserve of radical reformers at the expense of military conservatives. In military thought, radicals are not always right and conservatives are not always wrong. Radicals, by their very nature, act as evangelists of new ideas. They fire the
silver bullets that puncture the glass houses of outmoded thinking and they often hope that the power of the pen will give them advantages over their adversaries. However, as policy-makers, radicals and mavericks have often had limited institutional impact as can be seen from a glimpse of the careers of Fuller and Liddell Hart.

Fuller was an irascible mystic to whom criticising senior military officers was grist to the mill. His outspoken views about the mental strangulation of "stockyard generalship" in the British Army were bound to limit severely his influence. Liddell Hart has been called the Toscanini of military thinkers – a prima donna whose desire for public recognition diminished his capacity to act as an effective policy adviser in the late 1930s. The fate of most military radicals is a reminder of Pierre Vergniaud's famous saying that revolutions tend to devour their own children.

Just as radicals are not always successful in promoting military innovation so it is that military officers are not always incapable of fostering military change. Nowhere is this truer than in the German Army between the two world wars. In the 1920s, it was under General Hans von Seeckt, a conservative Junker aristocrat, that the German Reichswehr laid the intellectual roots for the blitzkrieg. By employing the talents of a highly educated officer corps, an efficient military bureaucracy and a system of extensive field trials, Von Seeckt provided the framework in which innovation would later flourish in the Wehrmacht. Significantly, in 1940 when the blitzkrieg was used in France, German tanks were superior neither in numbers nor in quality to those of the French and British. The key factors in German victory were superior organisation and better doctrine.

The point to grasp is that successful military innovation must, at critical points, be organised internally and from the apex of great institutions. Change is only successful if the military accepts it in a corporate manner. This is not to deny that there may be important, even crucial contributions from commanders and policy-makers. In this respect, one thinks of the role of Lord Haldane in British military reform in the early 1900s; of the influence of Generals John A. Lejeune and John Russell in reorganising the US Marine Corps’ for amphibious warfare in the 1920s and 1930s; of Admiral Hyman Rickover’s tireless advocacy of the US Navy’s transformation into a nuclear force in the 1960s; and of General Donn A. Starry’s promotion of the US Army’s AirLand Battle doctrine in the late 1970s. However, these individuals had one feature in common: they all sought to reform or innovate by harnessing organisational power.

Successful change and innovation in military organisations usually requires the steady harnessing of human resources in an institutional framework. This reality dictates that peacetime military change is usually evolutionary in nature. The technical aspects of innovation have to be matched by an understanding of corresponding doctrinal and force structure demands. In 1927, Field Marshal Lord Milne the British Chief of the Imperial General Staff (CIGS) attempted to set the technological parameters for “the army of the future” by creating a British Experimental Military Force. However, he neglected conceptual and doctrinal issues – the vital processes by which an officer corps learns about future warfare. Only in 1932 was a committee established to study the basic military lessons of World War I. Milne’s initiative proved to be largely personal in nature and, when he left office in 1933, there was no institutional constituency in the British Army to carry forward the cause of armoured warfare.

In contrast, Hans von Seeckt’s influence was of much more lasting value because he succeeded in leaving behind him an officer corps dedicated to the study of future warfare. In the 1920s, Von Seeckt established no less
than 57 committees to try to deduce the lessons of World War I. Consequently, the German Army’s approach to future warfare was far more institutionalised than that of its British counterpart and resulted in development of panzer forces in the 1930s.

The point to grasp is that military innovation does not occur because of the work of a few military radicals or maverick officers; it occurs when coalitions of actors in an organisation are mobilised behind the cause of change. Knowledge of organisational dynamics and culture is essential to the ability to innovate. New thinking is likely to be institutionalised in policy only if innovators can back up their ideas with organisational power.

Individual reformers only succeed if they can garner support and develop an institutional ethos of change while simultaneously mastering the process of security policy and bureaucratic politics. General Donn Starry has argued that there are seven essential conditions for changing a military organisation. First, there must be a mechanism to identify the need for change. Second, innovators and reformers must share an educational background that promotes “cultural commonality of intellectual endeavour”. Third, there must be an effective spokesperson for change. Fourth, that spokesperson must forge a philosophical consensus that will give new ideas a wide audience. Fifth, there must be continuity of service among the architects of change; Sixth, a champion of change, a patron and a protector, must be found at the apex of the organisation. Seventh, all proposed changes must be subjected to rigorous trials and their relevance must be convincingly demonstrated to the military establishment by experiment and experience. It goes without saying that fulfilling such conditions takes time, patience and intimate knowledge of organisational politics and interests.

Military Organisations and the Challenge of Technological Revolution

Because rapid technological development disrupts long-standing norms and structures, it is not surprising that organisational factors are critical to the process of military change. How then have military institutions reacted to ideas about military innovation and technical revolution?

The measured inter-war German response that fused organisation, doctrine and technology together in the form of the blitzkrieg is a relatively rare achievement. Historically, there are other paradigms of response to military technological revolution. Some military organisations indulge in a reactionary impulse clinging to what they know and in the process risking defeat in war. At the other extreme there are instances of military establishments that engage in a radical embrace of change. While this approach represents a bold response, it is by no means a guarantee of success. Much depends on whether a military institution has interpreted the trend of revolutionary technology correctly. If it has not, then a dramatic “leap ahead” may fail simply because the organisation moves in the wrong direction and may take years to recover from its mistake.

These models are by no means mutually exclusive or definitive; their ingredients overlap and infuse various aspects of adapting to new technological and political conditions. As a general rule, it is those military forces that succeed in integrating a reformed organisation with new doctrine, operational concepts and technology in a coherent strategic framework that seem to succeed. However, specific cases emphasise different combinations of variables. For instance the 16th century European gunpowder revolution was both technological and organisational; muskets created volley fire; volley fire created new infantry formations. In contrast, the Napoleonic military revolution of 1792-1815 was essentially organisational and doctrinal. The nuclear weapons revolution of
the 1940s and 1950s was, on the other hand mainly technical in nature – at least in its beginnings.

The Reactionary Impulse: The Case of Steam Propulsion and Radio in the United States Navy

An interesting example of the reactionary impulse at work in a military organisation is the case of the United States Navy. The American naval establishment rejected the concept of steam propulsion in the 1860s and in the early 1900s became ambivalent towards radio communications. In both instances, overcoming institutional resistance to new technology took over 20 years.

In 1868, the US Navy produced the USS Wampanoag, a steam warship that was the fastest fighting ship in the world. Yet in September 1869, the Wampanoag’s design was condemned by a special Naval Board on Steam Machinery as “scarcely more than naval trash”. The vessel was abruptly decommissioned and a series of executive orders directed that all naval ships were to proceed under sail only. These measures represented a sweeping rejection of over half a century of steam engineering and the US Navy entered a period of stagnation that was to last for a generation.

Why did the US Navy reject the advantages of steam propulsion? There appear to be three main reasons. First, American line officers believed that the requirements of steam in terms of the costs in machinery and coal fuel compromised naval armament requirements; steam made ships faster but less efficient as fighting vessels. In reality the US Navy was in a transitional period between the age of sail and the age of steam, and few line officers could bring themselves to accept that the state of steam propulsion justified the need to develop a radically new US Navy.

Second, many line officers feared the social threat posed to their traditional status from the rise of a new class of naval engineers. A “line-staff” struggle developed in which the line officers became determined not to cede their professional authority over seamanship to engineering officers. A third factor that exacerbated the “line-staff” dispute over steam propulsion was the drastic reduction of the US Navy’s size and strength after the end of the Civil War in 1865. This “downsizing” was felt keenly by many veteran line officers concerned about their future in a smaller, peacetime navy. In effect, steam technology became the catalyst for two naval sub-groups to engage in a struggle for social supremacy and hierarchical power within the US Navy. As a result the full benefits of an important new technology were not realised for years to come. Not until the 1890s was the US Navy to break free from the outmoded sailing concepts embraced in the 1860s.

Similarly, the introduction of radio in the US Navy was delayed for 20 years between 1899 and 1919 largely for reasons of institutional conservatism. Although the US Navy had by 1900 shifted to steam and steel, changes in organisation, administration and communications lagged far behind technology. The Service was decentralised and divided between autonomous naval commanders that ran the ship-based Navy and independent-minded bureaucrats that ran the shore-based Navy. The emergence of radio communication threatened to end this comfortable world of separate cultures.

As a result, the new communications system was merely grafted on to the existing naval system with operators usually being inexperienced and junior enlisted men. It took years before senior officers realised the value of creating a professional fleet radio organisation – only in 1913 did the US Atlantic Fleet use radio communication during fleet manoeuvres. Ultimately, it was only after the United States entered World War I in 1917, that a structural revolution allowing radio operators to be integrated into a central naval command system finally occurred.
Like conservatives, radicals are just as likely to mistake the meaning of military technology. The US Army’s adoption of the Pentomic division in the 1950s is a good example of technology, organisation and doctrine combining in theory yet failing in practice. Between 1953 and 1961, at the height of the nuclear revolution, the US Army was reduced from 20 to 14 combat divisions. Under the strategy of massive retaliation, many political commentators believed that the era of large-scale conventional land warfare was over.

The Army responded to the nuclear challenge by restructuring its warfighting role around the use of low-yield atomic missiles and rockets. Tactical nuclear weapons were regarded by some Army theoreticians not so much as revolutionary devices, but as artillery projectiles of unprecedented destructive power. By the late 1950s, US Army doctrine declared the atomic battlefield to be of paramount importance in ground operations with the conventional battlefield portrayed as subsidiary. By 1957, the US Army was spending 43 per cent of its budget on short-range divisional and battalion atomic missiles.

In order to match atomic technology with organisational structure and doctrine the Pentomic Division was introduced in 1956. This new structure was designed to allow troops to operate on a non-linear atomic battlefield, and to do this, the US Army dispensed with an intermediate brigade or regimental echelon. Few Army planners foresaw that the structure of the new division would present commanders with acute command and control problems in the field. Doctrinally, manoeuvre was declared to be obsolete in favour of attrition through atomic firepower. In the words of West Point scholar Robert A. Doughty, “the [US] Army probably has never experienced a more radical change during peacetime in its thought, doctrine and organisation.”

The US Army fundamentally misinterpreted the balance between nuclear technology, doctrine and organisation. Doctrine leapt too far ahead of a technical understanding of the realities of an atomic battlefield. When the Pentomic Army exercises were held in Louisiana in 1958 using tactical atomic devices, umpires declared that all life in the state had “ceased to exist”. To its discomfort, the Army discovered that it could not survive on the very nuclear battlefield its weapons, doctrine and organisation had consigned it to fight on. The Pentomic experiment served only to distract the Army from developing a coherent rationale for the use of conventional land forces in the nuclear age. By 1961 the new divisional system had been abandoned and the US Army was facing the prospect of major operations in South-East Asia.

The historical cases described suggest that, while force structure and organisational changes must be expected in advanced armed forces faced by technological innovation, the actual process will be uneven, lengthy and above all, unpredictable. In examining the challenge of a transition towards an information-age/RMA environment, it is very important to remember that change must take account of context, institutional politics and the reality of the overlay of older practices and capabilities. So-called “legacy systems” of aircraft, tanks and other armoured vehicles dating from the Cold War era will not disappear quickly in Western armed forces. In the information age, as in previous eras of rapid technological change, discontinuities are likely to be common.

Thus, while it seems that over time some technological systems have the potential to stimulate important RMA-style shifts in advanced Western military establishments, there is little evidence to date to suggest that this process will be smooth or easy in
organisational terms. Indeed, evidence from the United States suggests that institutional restructuring in response to technological change is likely to be protracted no matter how skilfully it is introduced. Suggestions that tanks and aircraft carriers are now “sunset systems” doomed to perish in favour of “sunrise systems” such as deep precision-strike weapons and uninhabited aerial vehicles (UAVs) are exaggerated and appear to have created a backlash within the Services.

Resistance to Digitisation in the US Army

In the current US Army there appears to be considerable resistance to modernisation through digitisation. The problem has become one of convincing the victorious Army of Desert Storm – a force preoccupied with high levels of operational commitment – of the need to “overthrow success”. In a recent study, the military theorist Robert Leonhard has warned that the digitisation of the US Army has become as much a cultural revolution as a technological one. He argues that there is “a sustained insurgency within the [US] Army against digitisation”. This insurgency has been fomented ironically by the power of e-mail – which has allowed officers from all over the US Army to build information networks to discuss the implications of digitisation in the creation of a 21st century land force.

The main reasons for the groundswell of opposition to digitisation appear to be cultural and organisational. The conjunction of post-Cold War downsizing and the simultaneous move towards digitisation has created a situation in which US Army modernisation is often perceived as being synonymous with force cuts and job losses. The view that digitisation and new technology threaten the traditional status of heavy divisions as the centrepiece of ground combat has gained momentum in US Army ranks.

Within the US Army there are considerable fears that the priority given to information technology overlooks its vulnerability to enemy disruption. Some US Army sceptics point out that the theory of dominant battlespace knowledge (DBK) is like viewing the play on a chess board – it may be transparent but situational awareness does not necessarily mean situational understanding. Like chess players, the Roman Consuls at the battle of Cannae in 216 BC could see Hannibal and the Russian and Austrian generals at the battle of Austerlitz in 1805 could see Napoleon – yet in both encounters, surprise was achieved. Critics have also pointed out that the digitisation of the Army may have the unwelcome effect of creating a land force characterised by an “information warfare Maginot Line” mentality that emphasises attrition over manoeuvre.

The US Navy and Modernisation for Littoral Warfare

In the post-Cold War era, the US Navy’s transformation from blue-water operations to the littoral has also been troubled. For example, the US Navy’s semi-submersible arsenal ship which combined a small crew with high-firepower, has been resisted inside the Service by a coalition of surface warfare officers, naval aviators and submariners often. The basis of naval opposition has been that the vessel is little more than a seagoing ordnance truck. As Thomas G. Mahnken of the US Naval War College has recently suggested, very few US naval officers want to become truck drivers. In November 1997, concerted opposition to the arsenal ship led to the US Navy abandoning the project altogether.

Another interesting case of institutional disagreement has been the reaction to Vice Admiral Arthur K. Cebrowski’s “streetfighter” concept of assured access in the littoral – a concept based on small platforms to overcome area-denial. The streetfighter concept has, in some quarters, been seen as a threat to the supremacy of traditional naval platforms. For instance, Admiral Daniel Murphy, Commander of the 6th Fleet called Cebrowski’s concept a “wild idea... a bumper sticker” devoid of
intellectual analysis. It was not for nothing that Admiral Cebrowski ruefully told an Australian audience that, “[naval] culture trumps technology every time”.

The United States Air Force (USAF) and the Challenge of Uninhabited Aerial Vehicles

The US Air Force has not been immune to the challenge posed by new technology. The pilot culture, the so-called "fighter Mafia" that is central to Air Force identity, appears to be a major reason why the US Air Force currently has only two UAV squadrons while Uninhabited Combat Air Vehicles (UCAVs) are yet to be fully developed. Although Air Force operators of UAVs must be pilots, tours of duty with UAV squadrons are designated as non-flying assignments. As an incentive to try to attract pilots, the USAF offers UAV operators a two-year tour of duty with a Predator squadron.

To date only US$ 2 billion has been spent on UAVs – roughly the cost of one B-2 bomber – and one tenth of the money that will be spent on manned air combat planes in 2000. It is also useful to remember that it was the US Congress rather than the US Air Force that stimulated the formation of the Defence Airborne Reconnaissance Office in 1993 to manage the UAV/UCAV programs. With the exception of the US Marine Corps, which is committed to “institutionalising innovation”, the American armed forces’ approach to RMA-style developments has remained hostage to many organisational and cultural norms developed during the Cold War.

What the above examples suggest is that in the United States, the birthplace of the RMA, the organisational-doctrinal changes that may be needed to realise new technological potential are impeded by a combination of scepticism, anxiety and conservatism from many inside the military. At the heart of this resistance seems to be a general dislike of the idea that modernisation must be promoted at the expense of continuities in readiness and force structure. This position is likely to be bolstered by the recent work of the American scholars Stephen Biddle and Michael O’Hanlon. Both writers are sceptical of radical ideas that advocate sweeping changes in US military organisation and force structure to meet the needs of an RMA.

According to Biddle, the key issue to be addressed in the RMA debate is not so much radical change but deductive rigour to ensure that military institutions come to the right conclusions about new trends in warfare based on a careful assessment of available evidence. Michael O’Hanlon argues that in the current RMA debate the adjective, “revolutionary”, can only be applied to specific realms of defence technology such as electronics, computers, communications and precision munitions. Sensor technology has yet to match the rapid advances in computers while developments in propulsion systems, aerodynamics and hydrodynamics remain incremental. Consequently, platform technologies from the Cold War era will continue to be found in large quantities on the battlefield of 2020. Despite the pro-RMA rhetoric of the Pentagon’s modernisation program, Joint Vision 2010, O’Hanlon suggests there is little hard evidence to suggest that the American defence establishment has embraced an RMA-style transformation strategy.

Information Technology and Military Organisation: Influences from the World of Business

How should modern militaries react to the organisational challenges presented by technological innovation and the RMA debate? If information technologies represent the heart of a potential RMA, should advanced militaries concentrate on embracing the networked systems that have helped transform the world of corporate business? And can the transformation of business organisational structure and practice over the last decade provide a model for developing new forms of
military structure that might be better suited to conducting military operations in the information age?

It is clear that some contemporary RMA ideas about information age warfare are partly inspired by cutting-edge business practice. Information technology has had an effect on a large number of civilian business organisations in three ways. First, the phenomenon of the flattening of hierarchies has created a broader, decentralised participatory base for corporate business practice. Second, the digitisation of business practice has increased self-management and, third, an emphasis on developing core competencies has led to higher efficiency. The question arises: to what extent do these processes translate realistically from corporate to military culture?

The Military Relevance of Flattened Hierarchies:

“Flattening” an organisation usually involves decentralising responsibility by reducing the number of layers in a hierarchy. The advantage of decentralisation in an age of computer-driven business practice is that it helps maximise the use of relevant information. However, the corporate world’s use of flatness can only be applied to the military environment with a clear recognition of the unique nature of combat operations. The unpredictability of battle has often made the military “flatter” and far more flexible than most civilian organisations. It is arguable that many recent corporate changes imitate modern military experience in the use of teamwork, group cohesion and the notion of “empowerment”.

Military operations create an environment of chaos that is outside the realm of corporate business theory. The business management notion of a “span of control” in which a number of subordinates report to a given supervisor is not a military leadership model. As Field Marshal Sir William Slim once pointed out organisational management is a science that consists of accurate calculation, statistics, methods and timetables. Military leadership, on the other hand, emanates from the human spirit; it is compounded of personality and vision, and its practice is an art. Commanding a military formation in the field is not the same as managing the local Microsoft branch. For this reason, eliminating entire echelons in military organisations in the name of “flattening hierarchies” may only destroy an entire training ground for officers.

A radical approach to military command and control is probably incompatible with the range and complexity of potential missions that contemporary military forces may have to confront. In the future, while there is likely to be a strong emphasis on mission command and a blurring of functions in the field, flatter hierarchies are not necessarily well suited to fighting structures and operational command. In military terms, flatter organisation is probably most relevant in the areas of procurement, logistics and combat service – areas where the move from mass to precision favours such structures.

This is not to suggest that major changes in force structure and organisation are unlikely. In the future, advanced armies are likely to field modular and task-force oriented formations with smaller high-tempo, lethal and agile units able to attack from many directions. Under modular organisation, formations may become more self-contained with a “golf bag of capabilities” to draw upon. However, these types of formations will still require structured command from grouped headquarters to coordinate operations. Smaller force headquarters may assume many of the responsibilities of corps and divisions; but the yardstick will not be information management theory, but good operational practice.

The Military Relevance of Digitisation

In many business corporations, digitisation (or networking) has served to improve information flow and to maximise efficient
practice. However, the translation of digitisation from corporate culture to military organisation is not automatic. The process of digitisation may come to mean decentralisation at the operational base or it may come to mean more centralisation from the operational apex. Easy availability of information may tempt senior military commanders to intervene in operations and to delay decisions by “searching for certainty” – a notion that is alien to the nature of war.

A proliferation of information combined with a dislike of taking casualties may also contribute to a sense of caution that reduces military tempo and mission command in favour of highly structured and methodical operations that recall the geometric spirit of Jomini. In an information-rich, but still uncertain operational environment, micromanagement of missions in the style of Field Marshal Haig and the World War 1 chateau generals is not inconceivable. Developed incorrectly, digitisation will probably create information overload through the generation of routine transmission from collecting systems. Developed properly, the process of digitisation will probably serve to reinforce a commander’s judgment and contribute to military decisiveness in the field. In advanced militaries, digitisation will have to be carefully designed to enable filtering by skilled intelligence staff so delivering aggregated information to the commander. In short, successful digitisation is likely to produce greater combat power only if a commander is able to use situational awareness to manoeuvre successfully and mass forces and effects throughout the battlespace. However, because military digitisation is still evolving, there is no optimal structure available at present. The need is therefore for rigorous trials and experimentation using simulation.

The Military Relevance of Corporate Core Competencies

In modern corporate culture, change requires risk-taking and rigorous training to develop core competencies. The notion of “a virtual corporation” stripped down to concentrate on cutting-edge functions seems to present an attractive model for modern militaries. However, the corporate business idea of “freedom to fail” and risk-taking cannot be replicated indiscriminately in military organisations. In the corporate world people may get fired when managers fail; in the military field people may lose their lives when officers fail.

The point is that, unlike civilian corporations that engage in their core business daily in real-world conditions, peacetime military organisations can only engage in their core competency – warfighting – occasionally. The workings of the marketplace are constant; the dynamics of the battlefield may only appear in rare circumstances. Preparing for warfighting takes place against conditions that are unique to the military profession. A military establishment must prepare for future operations in unpredictable political factors; against an unknown opponent; and in an arena of combat whose chaos and uncertainty have no counterpart in civilian life. To prepare for the core competency of warfighting, military organisations must therefore place much emphasis on training. This preparation requires that armed forces establishments must foster an environment of constant learning that embodies rigorous intellectual analysis of politics, society, strategy and operations.

The intellectual approach of the armed forces needs to be far broader than that employed by business corporations concerned with narrow profit and loss. Since the military is vitally concerned with national security its members must embrace lessons learned from military history and social science as well as from technology and modern management techniques. In addition, all innovation must be
tested in a realistic framework of trials that contain concrete scenarios at all levels of war.

*Fabrizio’s Choice: Military Leaders and the Dilemma of Change in the Information Age*

Advanced armed forces can learn about the intellectual and philosophical challenges of change from the literary past as well from the corporate future. In *The Leopard*, his magnificent novel about the nature of radical change, the Italian writer Giuseppe Tomasi di Lampedusa portrays a traditional way of life at the point of decline.9 The central character Don Fabrizio, Prince of Selina, is a figure steeped in the ancient ways of the Sicilian aristocracy. He personifies a basic dynamic of the human condition: that intellectually, change must be recognised as irresistible yet emotionally there is always a powerful yearning for the familiar past.

As the revolutionary forces of Garibaldi and the Italian *Risorgimento* menace all that he holds dear, Don Fabrizio seems doomed to have to choose between resisting the winds of change or capitulating to them. Instead, he skilfully fashions a response that satisfies the intellectual demands of change without sacrificing his identity. To secure the future of his ancient line, the Prince compromises with the forces of nationalist revolution by consenting to marry his beloved nephew to the daughter of an *arriviste* enriched by the new order. He justifies this sacrifice with the cool observation, “we live in a changing reality to which we try to adapt ourselves like seaweed bending under the pressure of water”.10 Yet true to his aristocratic code, Don Fabrizio refuses to endorse a new revolution by despairing – an action that puts an end to his political influence but preserves his sense of honour.

Fabrizio’s choice is a metaphor for leaders of advanced armed organisations confronted by the perplexities of change. Military leaders may not always care for the uncertain world of the information age, but they must be wise enough to develop an intellectual response to its demands. As this article has endeavoured to demonstrate, the choice in times of rapid military change is seldom between the red of revolution and the white of reaction. Rather it is Fabrizio’s choice: that of steering a balance between the siren call of conservative tradition with all its certainties and the temptation to rush headlong into the uncertain world of radical change with its attendant dangers of faddism and loss of identity.

**Conclusion**

Forging an organisational response to the process of technological innovation is never easy because the raw material of change is a fallible humanity. The paradox that has faced military reformers since the time of Philip of Macedon is likely to continue, namely that the promotion of essential organisational changes may well threaten traditions and methods dear to the very military personnel whose hearts and minds must be won over. Advocates of rapid change in the military all too often ignore the vital social setting in which a technology must be introduced. Too little attention is paid to the hopes and fears, ambitions and frustrations of the individuals that have an important role in the acceptance of change.

In the quest to balance the network against the hierarchy and the platform against the system, 21st century military institutions must respond with a considered transformation strategy that blends continuity with change. Such a strategy is epitomised by what might be styled the “Reichswehr model”. The Reichswehr of the 1920s and early 1930s possessed a conservative leadership, but one that was not averse to change provided progress was based on evidence. The German Army moved into the future by testing ideas about technological innovation against careful experimentation and field trials in order to demonstrate what did and did not work in practice. The Reichswehr operated on the premise that new technology had to be within practical reach of current abilities as well as being achievable with reasonable expenditures.

The Reichswehr model provides a useful example of how abstract ideas can be
translated into concrete practices by evidentiary methods. The lesson is clear: the needs and benefits of innovation and change need to be clearly demonstrated to a military organisation. Only by this approach can military organisations avoid false prophecy and fool’s gold, as well as myopia and conservative reaction. A commitment to sweeping military technological change that is not matched by a corresponding strategy for organisational transformation will ultimately prove counterproductive. Evidence from the post-Cold War American military suggests that radicalism results only in the rhetoric, as opposed to the reality, of change.

Finally, it is important to note that analysis of future warfare should never be viewed merely as a form of prediction like weather forecasting or reduced to a military checklist of Nostradamus-like utterances. The true measure of acumen in the study of future warfare lies in establishing certain core concepts that are of intrinsic value in studying the phenomenon of human conflict and defining its likely directions under new and changing conditions. Like the labour of Sisyphus in Greek mythology, this is an unending and often thankless task. Grappling with the RMA debate and the future of warfare offers much toil without prospect of reward, recognition or even understanding. However, without individuals and institutions committed to such intellectual endeavour no nation can move towards the future in either confidence or safety. We can perhaps find comfort in the wisdom of the Renaissance Commonwealth of Venice – tiny, rich and independent for almost one thousand years – which engraved upon its armoury the famous words: “Happy is the city which in time of peace thinks of war”.

NOTES

1. This article is based on a paper delivered by the author to the Experimentation Division, United States Joint Forces Command (USJFCOM), Norfolk, Virginia on 26 July 2000.
10. ibid., p. 49.
I do not know why the RMA discussion paper has been shelved, although I could hazard a guess. Australia’s policy-makers have already decided how we need to respond to our changing defence and security environment: in the way laid out in ASP97 and the forthcoming Defence White Paper (which, if recent ministerial speeches are any guide, will rehearse the basic approach contained in the former document). The role of the RMA discussion paper, then, is not so much to discuss the RMA itself but to inform the Australian public about how the RMA can be used to support the Government’s new policy of “forward response”, and to explain why it is necessary to spend more money acquiring RMA weapons and support systems.

Australia’s position on the RMA, in other words, is being driven more by such things as alliance considerations, the views of particular policy-makers or interests within Russell Hill, and narrow defence-industrial concerns, than by any frank or detailed assessment of the nature of the RMA itself and its potential implications for our current or future defence and security posture. Indeed, just as Australia’s defence policy-makers tend to constitute the country’s changing security circumstances in ways that support existing or planned defence policies and structures, so they may be interpreting the RMA itself in a way that suits or at least does not threaten existing interests or “core competencies”.

What do I mean by this last point? There are a range of different views on what the RMA is and the implications it has for the future role of military force(s).

Some consider that there is no RMA in progress, just a series of continuing technological changes which can be incorporated into existing organisational structures and cultures. According to this view, military organisations and capabilities will simply evolve over time into enhanced, more technologically proficient, versions of earlier types (producing “next militaries” rather than so-called “militaries-after-next”).

Some suggest that the RMA is essentially a technological revolution which is altering or will alter, in quite fundamental respects, the way traditional, inter-state wars can be fought. According to this view, which underpins the official American position on the RMA, the basic patterns of world politics will remain largely unchanged, but the capacity of states to use military force to protect or pursue their interests is or will change radically (like some of the earlier “breakthrough technologies”, the present RMA might, for example, be ushering in a further period of offensive or Clausewitzian ascendancy).

Still others argue that the technological and other “revolutions” that are driving the RMA are also fundamentally altering the political, social, economic and security contexts within which military force(s) operate. We are
witnessing, in short, a broader revolution in strategic or security affairs, or the emergence of “new times” (or a “runaway world”) in which everything is changing or will change.1

This last view of the RMA – which I think is what is actually happening – seems to be being either ignored or downplayed by defence planners in most industrialised countries in favour of the first and especially second models. This is certainly the case in the United States where, in line with the objectives first raised in its 1997 Quadrennial Defense Review and later outlined in the Chairman of the Joint Chiefs of Staff’s Joint Vision 2010, its defence planners are hellbent on making the transition from a modern to an RMA-based force (at whatever the cost or consequences). As described by Hundley (1999: 76-9), the US defence establishment has already undertaken a number of “force transformation activities” including: the “establishment of a number of laboratories dedicated to exploring new ways of warfare”; wargaming and associated field experiments; and trialing of new organisational arrangements such as the US Army’s brigade-sized Experimental Force, and Air Force’s Air Expeditionary Forces. It has also identified certain concepts as potential RMA drivers. These include the notions of: “long-range precision fire”, “information warfare”, Admiral Owens’ “system of systems”, and so-called “network centric warfare”.

Defence planners in most other industrialised states are generally following the lead of the United States although because they do not have the means to “go all the way with the RMA”, they will probably be forced to adopt some kind of “middle course”. Britain’s 1997 Strategic Defence Review argued, for example, that it was important to try to keep abreast of new advances in science and technology because military advantage in the future would rest with those who most effectively identify and exploit battle winning technology. This required an ability to generate and identify technological opportunities; adapt them for military use; and integrate them rapidly into platforms” (MOD, Supporting Essays, p.3-1). Maintaining broad technological parity with the United States and other Western allies was also seen to be important both operationally and professionally:

... there is potential for multinational operations to become more difficult if compatible capabilities are not preserved. This could lead to political as well as military problems. Our priority must therefore be to ensure that we maintain the ability to make a high quality contribution to multinational operations and to operate closely with US forces throughout the spectrum of potential operations (Supporting Essays, p. 3-2).

The review accepted that the high cost and rate of change of technology posed Britain’s defence policy-makers with a number of difficult choices and dilemmas. “How much should we invest in improving “enabling” technologies at the expense of weapons numbers? How can our equipment plans keep up with the pace of change? How do we and our allies retain interoperability with US forces given the radical changes they envisage? And will technological changes also require radical changes in the way our forces are organised and fight?” (SDR, p. 10). It also acknowledged that continuing social and technological change were likely to “open up broader possibilities which will have a profound effect on our future security”, and bring “new vulnerabilities as well as opportunities”. These future possibilities and prospects were seen to include:

... new ways of fighting such as information warfare (which attacks through the computer systems on which both our forces and civil society increasingly depend); greater pressures on operational decisions (instant media reporting from both sides of the front line); the wider spread of technologies which may be used against us
(such as biological weapons); and highly sophisticated civil capabilities that will be readily available both for us and potential adversaries. And where we (and our allies) exploit technology to strengthen our existing superiority in conventional weapons, our potential adversaries may choose to adopt alternative weapons and unconventional (or “asymmetric”) strategies, perhaps attacking us through vulnerabilities in our open civil societies (SDR, p. 10).

Rather than seek to answer the questions that were being raised, or examine how some of the more radical possibilities, and their consequences, might be accommodated, the review simply stated that they would be addressed “in the coming years”. In the meantime, “we have taken a hard look at how we can make the most of emerging [technological] trends, including how to adapt our requirements and procurement processes so that we are not left behind by the speed of change” (SDR, p. 10).

Canada has taken a similar position. Its Defence Strategy 2020 – which was released in June 1999 and provides the strategic framework for future DND defence planning and decision-making – declared that the RMA and related changes in business management were “the harbingers of necessary change in the information age”. The RMA itself – defined as “a major change in the nature of warfare brought about by the innovative application of new technologies” – was seen to be fundamentally altering “the character and conduct of military operations”. The document did note that a parallel “revolution in Strategic Affairs calls attention to the concomitant changes in international behaviour and hence to the spectrum of security challenges, risks or threats for which a nation must be prepared”. As in the British case, however, these contextual changes figured less in its detailed recommendations for preparing for the future than the need to target and utilise those “leading edge doctrine and technologies [that are] relevant to the battlespace of the 21st century”. Thus Canada’s RMA Concept Paper, Canadian Defence Beyond 2010: The Way Ahead (NDHQ, 1999) recommended that DND: 1) establish a working group to ensure that a coherent well-defined approach to the RMA was followed; 2) keep abreast of how the RMA might threaten existing forces and capabilities (including from so-called “asymmetric threats”); 3) seek to cooperate with the United States on RMA related R&D and experimentation; 4) study the use of leading-edge technologies in the development of space-based capabilities; 5) improve ties with industry; and 6) modernise Canada’s existing human resources practices.

It seems fairly clear that Australia will follow the example of its British and Canadian counterparts. While this makes sense at one level – it is an easier and potentially less conflictual strategy to follow – it does raise some important questions and dilemmas not least those raised in Britain’s 1997 Strategic Defence Review. What if the defence establishment is wrong and the RMA is of the third type?

It can be reasonably argued, I think, that there is an RMA of the first or second kind either in progress or in prospect. Continuing advances in military and associated technologies are revolutionising the conduct of traditional warfare and, in combination with the end of the Cold War, are serving to reinforce the Clausewitzian notion that war, or the use of military force, can be readily employed to protect or extend national interests. But this trend may be only a small part of the story. The same basic forces that are serving to increase the capacity for conventional military forces to fight and win traditional military conflicts may also be contributing to:

- a decline in the likelihood of inter-state wars – at least between industrialised states
- and the growing incidence of “uncivil wars” or “complex emergencies” which can
neither be understood nor easily dealt with in traditional Clausewitzian terms;
- the emergence of a range of “new” forms of insecurity against which traditional military force(s) are either irrelevant or inappropriate; and
- an increasing preparedness on the part of the international community to use militarily forces to intervene in the affairs of failed or failing states or to protect communities from human rights and other forms of abuse.¹

As in other countries, these changes are serving to expand the existing and forecast roles, functions and operational doctrines of the ADF to take into account of:
- such things as media exposure and casualty avoidance; and
- the expansion in what Anthony Giddens (1999) describes as “manufactured risks” – those that stem from our own actions and decisions. National armed forces are now increasingly expected to help:
  - deal with a range of new sources of threat or insecurity such as terrorism and drug-smuggling and other international criminal activities; and
  - manage the risks stemming from the increasing competition for resources, uncontrolled population movements, pandemics and continuing environmental degradation (military forces everywhere are becoming security rather than purely defence forces).

The same changes are also affecting in quite significant ways the working practices of military and defence establishments, and the expectations of many of their members:
- the activities and value-structures of national defence and security establishments are having to respond to growing global norms and expectations – on human rights, economic rationalism and the environment for example – as well as the agendas of various social movements concerned with questions of justice, equity and gender (see, for example, Smith 1995);
- military and defence establishments are having to deal with the tendency of Service men and women to place their own interests, or those of their families or local communities, above those of their Service or country. Like all citizens, members of the military are now experiencing multiple and often conflicting identities – warfighters and peacekeepers, members of a regiment, a single Service or a unified, joint Service organisation, national and global citizens, and so on – and are often finding the experience difficult and unsettling; and
- military personnel, like citizens everywhere, are less prepared blindly to follow orders or to accept unquestioningly the admonitions of those in control. Authority is becoming increasingly based on the “performance” rather than the constitutional or legal power of those in charge, requiring new means of motivating, disciplining and rewarding.

These kinds of developments are also serving to raise, in the minds of some commentators at least, a range of more specific questions and concerns over how developed world militaries might best fit in with, or be adapted to, the “new” security structures and approaches we are seeing emerge in Europe and elsewhere, and how they might best be structured, equipped, trained, employed and motivated for their new roles and functions. Are existing warfighting structures and doctrines and the high-technology weapons and forces flowing from the RMA the most relevant or appropriate for dealing with the insecurities of a post-Cold War and post-industrial age? Should much more emphasis be given, in national defence force planning, to such areas as combat support, special forces and special operations, and the projection of civil infrastructure – encompassing transport, communications, humanitarian assistance, civil emergency, policing and security functions –
rather than power? Are military forces that are developed and maintained for the defence of the state against external military attack the most appropriate for carrying out national and international peace and security operations? And are existing personnel policies and approaches the most suitable for our post-industrial or postmodern times (see, for example, Burk 1994, Cheeseman 2000b, Segal et al 1999, Snow 1995, van Creveld 1990).

How well prepared is the ADF and its leaders for meeting the challenges and opportunities of the “new times”?

American scholars such as Gompert and Lachow (2000) and Hundley (1999) have suggested that in order to recognise and adapt to change, especially those changes associated with revolutionary times, organisations must:

1 adopt new styles of leadership. Organisations in revolutionary times are said to need leaders who can cultivate the knowledge that already exists within their organisation, are “purposeful but not controlling, impatient but not intrusive, and confident and trusting but not blasé”. They must, in short, be visionaries, navigators, integrators and motivators who:
- are able to identify the problems to be confronted, set overall organisational objectives, and monitor and adjust the responses being developed;
- institute and encourage new ways of examining and solving these problems or of meeting the organisation’s overall objectives; and
- foster a new, more open, more questioning and more innovative organisational culture or climate.

2 establishment of an overall organisational culture or climate which:
- is open to outside ideas and debates;
- fosters diversity, innovation and new approaches to problem-solving;
- is critically self-reflective especially of its foundational disciplines and assumptions (the role of military force(s) in international affairs, military professionalism, strategic and operational doctrine, military ethics, etc.); and
- encourages intellectual ferment, iconoclasm, and vigorous debate about, among other things, the future of the organisation itself and its roles and functions.

3 new organisational structures and approaches to problem-solving and learning. These might include:
- networks of “experts” rather than committees or traditional staffing processes;
- integrated approaches to problem-solving;
- specific mechanisms for experimentation.

How does the ADF and Australia’s Defence Department measure up to these basic requirements? I would suggest not very well. While there have been some attempts to reform existing organisational and policy-making processes, trial new unit structures and operational concepts, and introduce new management tools, these have been done on a largely ad hoc basis. This is in part because there has, until very recently, been little interest shown in changing the style and basic approach of those who run the Defence establishment (of identifying and promoting or procuring visionaries, navigators and motivators). The prevailing organisational cultures of both the Defence Department and the ADF tend to be the antithesis of the model described above. Both organisations are essentially closed to outside access and ideas (see Cheeseman 1999 and Sullivan 1996). Junior officers are frequently unwilling to speak candidly or critically about their work. The military in particular tends to eschew diversity in favour of conformity. Critical self-examination and iconoclasm are frowned upon. There is a strong anti-intellectual
sentiment within the three Services in particular. To the extent it occurs at all, internal debate operates at a functional rather than a conceptual level. And rather than being questioned, “core competencies” and traditional ways of doing things are vigorously defended and asserted.

Some of these tendencies, moreover, and the barriers to undergoing the kinds of transformations being countenanced in the United States, may have actually increased in recent times as a result of:
- the increasing politicisation of the senior echelons of the Defence establishment (and the public service generally);
- continuing budget pressures and the Defence establishment’s expanding “commitment-capability gap”;
- the continuing pursuit of economic and organisational efficiency (which limits the scope for experimentation and inventiveness);
- the increasing emphasis being given to vocational rather than liberal education and training within the armed forces; and
- the current emphasis being given to traditional, “warrior” cultures, a trend which is being enforced by the Government’s support of the Anzac and associated military myths through such activities as Anzac Day, the 85th anniversary of the landing at Gallipoli, the building of war memorials and commemorative highways, and the expansion of the size and programs of the Australian War Memorial in Canberra.

These developments are likely to see the Defence establishments in Australia in particular continuing to respond practically but not conceptually or intellectually to the challenges of the post-Cold War world. Such missions will be carried out professionally and with good intentions but will run the risk of being increasingly ill-conceived, inappropriately resourced or supported, not properly structured for the tasks at hand, and potentially counterproductive. As evidenced by the Canadian experience, such shortcomings and failures could generate tensions within the armed forces – between, say, peacekeepers on the ground and their leaders at home – contribute to a loss of morale among the Services, and serve to undermine the peoples’ confidence in its military leaders and institutions. It might also reinforce the view that military forces should only be used to fight wars and defend the state against external aggression at a time when they are desperately needed to help deal with the gathering problems and insecurities of our new times.

What might be done to encourage a new style of leadership and a more receptive organisational climate?

In seeking to reposition itself for RMAs of the second and third kinds, Australia’s Defence establishment could do worse than begin with its existing system of education and development. Here strategies for reform should be informed by two related factors. The first is that transformations of any kind, but especially cultural ones, take considerable time to occur or enact so the sooner we start the better. The second is that although Australia’s security environment may be becoming more complex and uncertain, it is not necessarily more dangerous. We therefore have time to think before we start acting, to take a few risks, and to experiment with different ideas and approaches.

Some preliminary suggestions, in no particular order, could include:
- completely revising the military structures and curriculum at ADFA and using the savings generated to: 1) offer scholarships to high quality military and civilian students; 2) attract the “best and the brightest” faculty members and research staff; and 3) foster basic research into RMA-related issues and topics (for more details, see Cheeseman and Hall 1997);
reduce the numbers who attend the colleges at Weston Creek; make it harder for people to gain entry and harder still to graduate; staff the colleges with high quality academics and those officers who are destined to be tomorrow’s leaders; restructure the courses and curriculum offerings to specifically foster debate, intellectual ferment and iconoclasm; and use the colleges to help develop and test new defence strategies, military structures, and operational concepts and doctrines;

– substitute certain graduate courses for existing staff qualifications;

– Review the existing system of selection and appointment of officers and other ranks. Here the ADF could consider: 1) making greater use of lateral appointments; 2) reviewing the present nexus between position and rank; 3) revising the existing rank structure within the ADF; 4) getting rid of all uniforms other than field uniforms; 5) allowing for more flexible career paths and opportunities; and 6) encouraging flexible development.

– Overhaul and extend the ADF’s present training systems by, for example: 1) establishing partnerships with other Government agencies; 2) placing people in private corporations; 3) exchanges with other forces; and 4) making greater use of outside specialists and experts.

– Flatten existing, largely hierarchical organisational and command structures, examine the idea of “virtual” decision-making processes, and introduce means of improving channels of communication.

NOTES
1. Bracken (1993) and Metz (1997) discuss the notion of “militaries-after-next”.
3. The suggestion that there is a broader revolution in strategic or security affairs is made by, among others, Builder (1997), Freedman (1998) and Gray (1997). Useful discussions of some of the key characteristics of the “new times” into which we are heading are contained in Baylis and Smith (1997), Booth (1998), Clark (1997) and Nossal (1998). It should be noted that while there is broad agreement that we are on the brink of a new era in international politics, there is much less consensus on what this era will (or should) eventually look like. Recent overviews of some of the alternative futures being canvassed are given in Buzan (1995), Harkavy (1997) and Kaufman (1999).

4. These and other possible implications of the emergence of “new times” for the future role of military force(s) are discussed in Burk (1994), Buzan and Herring (1998), Cheeseman (2000a), Holsti (1996), Kaldor (1999), Mackinlay and Kent (1997), Snow (1996) and van Creveld among others.

REFERENCES


Dr Cheeseman is a graduate of the Royal Military College, Duntroon (1968) and the University of New South Wales (where he obtained a BSc and PhD in physics) and studied politics at the Australian National University, obtaining a MA (Qual) in 1984. Before entering academe, he served in RASigs in the Australian Regular Army, in the Department of Defence as a communications engineer, and as Defence Adviser to the Joint Committee on Foreign Affairs, Defence and Trade. In 1988 he was appointed senior research fellow at the Peace Research Centre in the Australian National University. He joined the School of Politics in 1992. Dr Cheeseman served as review editor of Australian Journal of International Affairs between 1995 and 1998 and has published widely in the fields of Australian and regional defence and security.
Reviews

Books


Reviewed by Bruce Turner

Many readers will have read Andy McNab’s earlier books about action and life in Britain’s elite Special Air Services (SAS) regiment. In his earlier works, Bravo Two Zero (1993) and Immediate Action (1995) McNab painted a thrilling portrait of the courage and dedication required of SAS soldiers and gave a remarkable account of desert action and exploits in the Gulf War.

Now he has written a gripping account of the life of an ex-SAS soldier after his hero has left the Army and become an intelligence agent. Readers will not be disappointed at the amount of absorbing and gripping action, all presented in a very readable and exciting form. McNab the author writes extremely well and the exploits of his hero (Nick Stone) are quite believable, in fact alarmingly so. The book is based around the actual incident of the shooting of three suspected IRA terrorists in Gibraltar in 1998 and flows in fast-paced action from there.

An interesting aspect of this action novel is the hero’s explanation of events in Northern Ireland and the likelihood of a lasting peace in Ulster.

All in all, a great read. Highly recommended.


Reviewed by Lieutenant Colonel Alistair Pope (Retired)

The words Hero, Epic and Tragic are so overworked these days that anyone who can kick a ball 50 yards is a hero in an epic game. If the team fails to reach the finals of a sporting series it is a tragedy. How then can we find words to describe “A Bright Shining Lie”, Neil Sheehan’s Pulitzer Prize and National Book Award winning story of John Paul Vann and his commitment to Vietnam? The story it tells is so overwhelming that it stuns the senses and confuses the mind with extraordinary contradictions. One can barely resist the urge to “will” the storyline to change course to an alternative and different ending. However, there is no parallel world with a happy ending and the tragedy of Vann’s life (in the true sense of the word) unfolds with the inevitability and finally terminates with his death.

Neil Sheehan knew John Paul Vann well and admired him over the many years of their association. Vann was a brave, almost fearless, combat officer who epitomised the “can-do, can-win” derring-do enthusiasm of the American military in the early years of their commitment to the war in Vietnam. Vann was larger than life. Yet his life parallels the American involvement in Vietnam in that he leapt in with enthusiasm, felt disappointment and disillusionment as he and his cohorts ravaged Vietnam in order to save it. The end did not justify the means, but once committed America did not know how to withdraw without “victory”. Kissinger solved that by a contortionist act which allowed defeat to be described as “peace with honour”. It was a plain diplomatic lie, just as Vann’s whole life was based on a lie and, as he advanced in status, the lies grew with his power until he was living multiple lives. There is no simple rational explanation for his behaviour. It was just the uninhibited Vann as the Mr Hyde he really was. In a more normal existence the laws and social behaviours of society would have restrained him, but Vietnam imposed no such boundaries and the black side of Vann’s character was unleashed with full force. This is where the reader’s confusion arises, in the contradiction
and flawed character of a man who epitomises all that is admirable on the one hand, yet he behaves in such an abhorrent way that all who knew the full story would despise him. It is hard to equate such a brave and admirable combat soldier with the character of the man who emerges from the pages of Sheehan’s book.

As described in Karnow’s comprehensive *Vietnam: A History* the politicians had decided “Vietnam is the place” for the final ideological confrontation between East-West, Capitalism-Communism. American technology and the Harvard educated whiz-kids would show the world how it was done. War became no longer “Politics by other means” as described by Clausewitz, but an exercise in statistical management techniques – using real, but remote people to populate the charts and presentations showing production line progress to victory. In an eerie return to the kill-ratio slaughterhouse battles of WWI, the body count and the destruction of assets (even napalmed bamboo huts!) became the obsessive measure for managing the winning of the war. It worked in industry; it *must* work in war, *mustn’t* it?

To the journalists reporting the war, but not schooled in such management niceties, what they saw was wanton, indiscriminate destruction of a sullen, unsophisticated peasantry, corruption by government officials and those favoured by the Diem clan on a staggering scale and dishonest reporting by their own military to please their political masters in Washington. Honesty, it was clear, was a career inhibiting policy for a military officer.

Vann was popular among the journalists for his forthright statements and his open and informed criticism of the conduct of the war. However, Vann was also a well-trained and forward-thinking commander who thoroughly analysed the problem and devised the means to defeat the enemy. Unfortunately, as Sir Robert Thompson had advised his American counterparts, the defeat of the insurgent Malaysian CT’s had required huge resources, clear and popular policies, the support of most of the population and yet it had still taken 12 years to defeat the rebels. In an American society which could send men to the Moon on schedule and as advertised, and in which most problems can be fixed in a one-hour episode (less commercials) this news was not acceptable and Vann’s (and Thompson’s) ideas were never explored.

Having set the scene in the first two books, Book 3, the Battle of Ap Bac in 1963 is hard to adequately describe. It is truly a Greek tragedy with a conveyor belt of opportunities to defeat, if not totally destroy a trapped Viet Cong battalion served up to the heavily armed South Vietnamese Army and its American advisers. These chances are squandered by a series of incredibly inept decisions by the politically appointed Vietnamese Commander, General Cao, commanding the attacking forces. The reader will find the scenario so unbelievable as to be almost surrealistic. Unfortunately, it all happened and many brave soldiers died futilely. Sheehan’s meticulous research spares no detail and no feeling in his description of the first defeat of the South Vietnamese when advised and supported by the Americans. Vann’s leadership and skill caused the result to be less devastating than it might have been, but a defeat by a smaller ill-equipped force it remains. The tragic pattern was beginning to form, but nobody saw or wanted to read the signs and the military and political juggernaut rolled on to its catastrophic end.

Vann completed his tour as an adviser, miraculously unscathed considering the risks he constantly took. In one case he narrowly escaped a well-planned ambush by a combination of courage and good luck. On another occasion his deputy, Doug Ramsey, was not so lucky and was captured. The result was that Ramsey endured more than nine years as a prisoner in the jungle.

Vann left the Army in 1965 as a Lieutenant Colonel and a hero. He was highly regarded in many circles, particularly by the media, as both honest in his appraisals of the war and in how it could be won. He was apparently throwing away his career and promotion to high rank as
a matter of principle so he could address the problems unfettered by the restrictions of being in the Army. Thus, regard for him, his integrity and his drive to win an increasingly unpopular war rose accordingly in political and military spheres. Vann soon returned to Vietnam as a senior Provincial Adviser.

The book now enters the “dark side” of Vann’s character and it would be unfair to the author or the reader to say more. Having justly built up his subject to a larger than life character, Sheehan now spent the next 16 years after Vann’s death in a helicopter crash in 1972 researching his life. For Sheehan the discovery of the truth resulted in a very different picture from the one he knew. The outcome is disturbing, to say the least. Read, enjoy – and be stunned by this story of one man whose life almost paralleled the whole American experience in Vietnam. Like the war itself, Vann and the legacy he left behind damaged or destroyed everyone who had been associated with him.

This book should be read by anyone interested in the Vietnam War, the nature and complexity of the people, the “dark side” of human nature and those who simply want to read one of the finest pieces of literature I have read. A Bright Shining Lie is a monumental achievement and absolutely riveting.

VANGUARD AGAINST JAPAN: RAAF FIRST TO STRIKE by Herbert C. Plenty, Len Books, Canberra, 183 pages, with maps, photos and appendices. Paperback.
Reviewed by Group Captain Mark Lax

Vanguard Against Japan is the personal story of one who witnessed the RAAF’s engagement of the Japanese forces at the very beginning of the war in the Pacific. Described also, are the subsequent dramas as these and other Australian units were forced to withdraw from Malaya and later, the Netherlands’ East Indies during World War II.

Plenty focuses on the air aspects of the Far East Campaign as it eventually unfolded. He starts by describing the move to Singapore of the Hudson squadrons in 1940, as part of Australia’s contribution to Imperial Defence under a growing threat from Japan. Also putting the events in context are Plenty’s descriptions about the social life, work conditions, poor training regime and an astonishing lethargy on the part of the higher headquarters regarding most aspects of military life.

It is not until halfway through the book that the first attacks by Japan are mentioned and the author is at pains to highlight the fact that No 1 Squadron, RAAF was the first Allied unit to attack the Japanese, this some hours before Pearl Harbor. The sinking of the HMS Prince of Wales and HMS Repulse were witnessed by the author, and the making of this book is in his personal recounts of what is was like in those chaotic days. Plenty was later to be shot down, reunited with his unit and escape to Australia just prior to the collapse of resistance in Java in March 1942.

Plenty offers a campaign critique with the benefit of the passing years. While he draws heavily on two previous works (Glory in Chaos by Bob Hall and Bloody Shambles By Chris Shores et al), Plenty’s commentary on the poor leadership, indecisiveness, lack of preparation despite intelligence warnings and the total outclassing of the Allies by the Japanese makes good reading. His commentary is worthy of serious study. The book comprises 183 pages including some useful appendices, and six pages of black and white photographs. Unfortunately the print quality is not good and the text alignment on some pages suffers from the print process. My review copy had page 103-104 missing and the maps are all at the end of the book when it would have been nicer to place them within the text where relevant places are mentioned. Nevertheless, Vanguard Against Japan is an easy read and although let down somewhat by presentation, is highly recommended.