

Revolution in Military Affairs and Jointness

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OVERVIEW

Militaries of major states in the international system have been responding to the Revolution in Military Affairs (RMA) debate, mainly to the technological and operational concepts propounded by the US, even though most of them particularly in Asia continue to grapple with its full import. First off the blocks in Asia has been China. Given the salience of the American threat perspective in any Taiwan-centric conflict scenario, it has identified rapid development in high technology with Information Technology(IT) at its core as the means to bring about revolutionary changes in the military field as a strategic and operational necessity to meet the challenge.

There is growing understanding among the military planners that human warfare is entering the stage of Information Warfare(IW) following the stage of mechanised warfare. The essence of this shift is provided by the revolution in information technology in the field of warfare. RMA has five distinctive features. First, weapons and equipment have become more intelligent oriented, where in precision guided long distance attacks are increasingly playing a critical role in operations, and are increasingly becoming the main form of attack. The second perspective is that the RMA has allowed force structures and systems to become more streamlined. This has been possible through rightsizing and readjusting force structures leading to force optimization, but with stronger combat capabilities. Third, a consequent result of above has been automation of command and control(C2) systems, which have incrementally moved from Command,Control, Communication and Intelligence(C3I), to Command, Control, Communications, Computers and Intelligence (c4I), Command, Control, Communication and Computers, Intelligence, Surveillance and Reconnaissance(C4 ISR) and now Command, Control, Communication and Computers, Intelligence, Information, Surveillance and Reconnaissance (C4I2SR) in order to meet the demand for real time, robust, reliable and efficient command and control systems. Fourth this has led to spatial expansion of warfare, from traditional three dimensions, i.e., land, sea, and air, to five dimensional that includes in addition, the spatial and electromagnetic

dimensions. Implication of above is that anybody who controls the information will gain the initiative in high tech battlefield. Finally, and most importantly, operations are becoming more system-oriented requiring not only a high degree of system integration but the integrated application of power in all five dimensions leading to warfare being transformed into completed operations of system versus systems. This is increasingly impacting on the need for integration and jointness.

It is in this fast changing and emerging technological environment that India has to come up with reasonable response to the latest RMA. The underlying perception in India is that response of necessity to the RMA debate will be structured taking into account not only the changing global military trends but also its regional security environment. However the debate is mired at two levels. At one level given the continuing boundary dispute and the ongoing proxy war the dominating perception is to look at national defence in a purely territorial construct, largely from the attrition mindset. Consequently force modernisation and force development models too are looked from single service capability development requirement with joint perspective always being at best a minimum essential. This has created in force development strategies a mindset of force multiplication effect that is essentially weapon system centric. No wonder the entire modernisation philosophy of the services is centred on weapons system procurement (hardware) rather than system integration, in system of system approach.

Second, and more important, is the overall perspective of force development. Our model continues to be based on force modernisation essentially to deal with obsolescence factor more as an attempt to maintain notional conventional edge against Pakistan, rather than part of well thought out force transformation strategy that takes into account changing nature of war. In fact, we continue to persist with old doctrines and thinking which look at force application models based on limited to full spectrum wars while talking about full spectrum capability. Lack of jointness and system integration is creating another serious problem that is of capability enhancement and synergising our capabilities. This is leading to duplication in capabilities; independent force development models that have no common threat perspective. The result, despite sending huge sums on force modernisation and induction of weapon systems, there is limited or marginal accretion to overall capabilities.

In relation to India, the fact is that China has not only grasped the import of RMA, but is well on the way to becoming an informationalised force having decided to narrow the time gap between developed countries and developing countries. The Chinese believe that the tidal

wave of worldwide RMA poses severe challenges to China. Its leadership believes that having missed the industrial revolution which resulted in tragedy for China; it cannot afford to lose another chance of development. Hence they look at RMA in strategic terms and look to boost RMA with Chinese characteristics as the central plank of China's national defence modernisation.¹ The import of the above lies in the fact that increasingly in our security calculations we have to factor in the technologically and doctrinally advanced Chinese armed forces, adept at fighting informationalised high tech warfare.

Second, and even more important, is the fact that given close collusive relationship with China we will have to incrementally deal with technologically advanced military Pakistani military with improved information, surveillance, reconnaissance (ISR) capabilities, networked command and control elements with long range precision fires and greater degree of system integration. In such a milieu, jointmanship and integration among the Indian Armed Forces and other defence support agencies would be the two major leitmotifs of RMA under Indian conditions to meet the challenges to our security.

SCOPE

This paper will examine the incentives or motives for India to adopt new practices associated with the latest RMA. The factors that might enable and constrain the Indian armed forces in adapting to the new military technological and operational requirements will be identified. It has also been said that unlike the 'single system RMA' which nuclear weapons produced the ongoing information revolution is an 'integrated systems RMA' driven by new information technologies. Thus the organisational and doctrinal concepts of jointness and integration along with elements of RMA that predicate the use and practice of these concepts would also be examined.

RELEVANCE OF RMA

RMA is not only an important military, but also a political and strategic tool for global and regional security policies of the future. It is a metaphor for the politico-military establishments of the countries to prepare in advance for likely wars and conflicts of the future. Political, economic, technological and strategic factors influence to a very large extent the quality and speed of occurrence of RMA.

Dramatic advances in technology and their impact on warfare has resulted in what is being generally referred to as RMA. But for real RMA

to occur, it is not only the technological edge which is needed but also the doctrinal innovation, refining of concepts and precepts and accompanying organizational changes which are essential components. Three principles of war, namely, inter-Service cooperation, economy of effort and unity in command and control(C2) would continue to be key imperatives of knowledge age warfare. A study of recent campaigns of Gulf War I and II has indicated that greater degree of jointness and integration achieved by the American and coalition forces was a key battle winning factor.

Further, improved ISR capabilities, networked command and control elements with long-range precision strikes are best exploited by a joint and integrated effort of the three Services. Whether it is network-centric warfare (NCW), effect-based operations (EBO) or information warfare (IW), the synergies at operational level are best obtained by a unified effort. Admiral Bill Owens of the US Navy had visualized a system of systems connecting myriad war fighting entities that would respond in real time to the threats and challenges posed to it by the adversaries. Needless to emphasise that RMA cannot occur substantively unless it is accompanied by a joint and integrated approach.

In this regard the Chinese concept of RMA is an apt example. The twin goals of Chinese RMA are to develop informationalised force capable of winning what the Chinese term "information based local wars". Within the above construct the focus is on overall transformation from a mechanized to informationalised force. With the information being the driving force, the Chinese impetus is on developing information technologies, weapons and equipments, combat theories and associated concepts and doctrines, with the aim of fighting future wars as integrated air-land-sea-space warfare in an integrated operations of system versus system.²

Not only has China included the chiefs of the Peoples Liberation Army (PLA) Navy and Air Force in its Central Military Commission in 2004, the PRC has also introduced joint military logistics units in at the Military Region level. This signifies a coordinated development of all the components of a military force. Further, the PLA has been practicing the concept of 'War Zone' which revolves around somewhat like our precept of an integrated theatre command. The efficacy of War Zone concept is further sought to be enhanced by RMA enabling technologies.

FACTORS INFLUENCING INDIA'S RMA

Political, economic, technological and strategic factors influence to a very large extent the quality and speed of occurrence of RMA. The

Indian approach to RMA is, therefore, shaped by geo-political and geo-strategic contexts and security concerns arising from these:

- Fiscal pressures
- Technology imperatives
- Social and cultural context

Political purpose or policy in Clausewitzian parlance dictates the objectives to be achieved at the national level. Military strategy would only be a sub set of the overall national strategy to achieve national goals. The security challenge facing India is diverse, complex and evolving. Instability in our neighbourhood and extended neighbourhood sharpens the threat to our security. Our strategic thinking is influenced by what happens in the Indian Ocean, West Asia, Central Asia and South-East Asia.

Prime Minister Manmohan Singh, during his address to Combined Commanders' Conference in October 2005, observed: "To meet national security challenge, our strategy has to be based on three broad pillars. First, is to strengthen ourselves economically and technologically; second, to acquire adequate defence capability to counter and rebut threats to our security, and third, to seek partnerships both on the strategic front and on the economic and technological front to widen our policy and developmental options."

Thus introduction of cutting edge technologies both in the field of defence and civil becomes equally important. Even though preference to economic development over military development is given, it is possible to proceed simultaneously in both the areas once a certain level in economic development and capabilities has been reached. RMA, which is a priority for the armed forces, need not be a priority at the national level because of competing needs of other more important civil sectors which need funds for development. But what is inescapable is joint and integrated development of military capabilities.

India's core defence policy goals are protecting and safeguarding India's territorial integrity and sovereignty. Ensuring the security of sea lanes and other means of securing energy supplies becomes vital for our national security energy. Our defence and security policy is, therefore, dovetailed with the larger national mission of rapid economic and social development and to ensure a peaceful internal and external environment, in which such development can be pursued. As for social and cultural context, India has generally emphasized on soft power and non-military means to pursue conflict resolution because non-military measures are invariably needed to evolve durable solutions.

Further, development of human resources in terms of education and improved health also contributes to improved quality of manpower available for both civil and military purposes.

Yet, at the military level, India's situation is unique in that it faces threats along the entire spectrum of conflict ranging from sub conventional warfare at the lower end, to a high end threat of a nuclear conflagration. Therefore, the Indian Armed Forces have to be prepared to meet challenges along the entire range of conflict in a unified and integrated manner. This adds to the complexity of moving towards building a RMA enabled military.

The drivers or motivators for RMA in China and India can generally be perceived to have some common denominators like, keeping up with the peer competitors, reducing the technological gaps with modern militaries besides national security and strategic concerns. A National Intelligence Council (NIC) Report of the US (in 1999) had observed that among the countries considered, India, China, Russia and Australia have the greatest potential to achieve RMA. This is a conference report titled "Blue Rogers or Rock Towers".

ESSENTIAL COMPONENTS OF RMA

According to the Indian Army Doctrine of October 2004, RMA is termed as a major change in the nature of warfare brought about by innovative application of new technologies which combined with dramatic changes in military doctrine, operational concepts and operations, fundamentally alters the character and conduct of military operations. Therefore, major constituents of RMA are doctrine, technology, training and evolving suitable organizations to meet the challenges of new nature of warfare. Thus, components of RMA which have been focus of attention in the Indian Armed forces are:-

- Innovative doctrine and operational concepts;
- Achieving information superiority and improving information warfare capabilities across the services;
- Achieving capabilities in long-range precision strikes, sensors and Unmanned Aerial Vehicles (UAVs);
- Adopting concepts of Network Centric Warfare, strengthening C4I2SR systems and EBO approach;
- Sharpening the strike capabilities of Special Forces;
- Strengthening space support for force multiplication of air and surface forces and enhancing the strategic reach of air and surface forces through improved power projection capabilities;

- Evolving joint and integrated structures and organizations and enhancing jointness;
- Attracting knowledgeable personnel and training them for knowledge age wars;
- Spurring R&D and strengthening self-reliance in defence industry;

All the above elements of RMA which is moving at a leisurely pace in India tend to be best exploited in a joint and integrated manner both at the higher direction of war level and at the operational and tactical levels.

DOCTRINAL INNOVATION, JOINTNESS AND RMA

In May 2006 a joint doctrine was promulgated to synergize the efforts of the three services. Essence of the joint doctrine was to harmonize the existing single service doctrines in the environs of knowledge age warfare and in the context of the ongoing RMA. It is too early to say as to what is its efficacy of joint doctrine in advancing significantly the goals of RMA since it remains a classified document. Yet, the evolution of the joint doctrine could not have been but influenced by the fundamental elements of RMA. All the three single service doctrines devote a considerable portion of their length on nature of warfare, RMA and emphasize the need for jointness even though in practice the required levels of jointness are lacking. Further, comparatively speaking, RMA seems to have advanced in technology intensive services like Indian Air Force (IAF) and Indian Navy (IN) as compared to the Indian Army (IA).

Before the joint doctrine was unveiled the Indian Army had come out with what is referred to as the new 'cold start' war doctrine. It envisages a number of task oriented integrated battle groups (IBG) penetrating into enemy territory from a cold start and executing their assigned tasks within a limited period of a week or so. These groups would have varying composition of different arms including combat air support so as to form well integrated combined arms groups. In certain contingencies these groups are likely to be based on tri-service components. In order to be successful these battle groups would need a favourable air situation in the envisaged areas of operations and at the same time they would also need close air support along with a preponderance of tools of RMA. The new doctrine also mandates that we move towards induction of RMA elements into all the components of combat power at a faster rate. These groups would need to be strengthened with capabilities of long-range precision attacks, a robust C4ISR network, enhanced abilities in the fields of information warfare and network centric warfare. All surveillance and operational resources

would need to be better integrated to reduce mobilization and force generation time.

Doctrinally, air forces all over the world tend to emphasize their strategic role: the importance of Counter Air Operations over Offensive Air Support and greater desirability of Battlefield Air Interdiction as compared to Close Air Support (CAS). On the other hand, land warfare doctrine usually assumes the ultimate need to exert some degree of control on the ground and consider air power as a useful and necessary mean to achieve their ultimate mission. It has also been generally recognized that providing CAS is always a challenge due to safety of own troops, difficulties of target identification and acquisition and exposing increasingly expensive aircrafts to highly dense ant air environment. Advantages of new RMA technologies like blue force tracking devices, use of PGM and stand-off weapon systems and improved means of suppression of enemy air defences would reduce the effects such threats.

The US forces achieved remarkable success in Operation Iraqi Freedom (OIF) using new technologies and weapon systems. They also used a wide variety of airframes like Apache helicopters, A-10 Warthog, F-16, F-18, and even bombers like B-1, B-2, B-52 for CAS even though the A-10 is the one which is dedicated for CAS.³ These aircraft were enabled to undertake CAS because of PGMs, new technologies fielded and a very high degree of interoperability. However, what we need to study is the joint procedures and mechanisms instituted by the US armed forces for CAS. The US forces had Joint Terminal Attack Controllers who are trained personnel from various Services with suitable equipment and communication to guide the air strikes. This was besides the traditional presence of airborne and ground based Forward Air Controllers. General T. M. Moseley Combined Air Forces Air Component Commander, considered this to be "another wonderful testimony of joint training, joint doctrine and joint Close Air Support and being able to work together to get the aeroplanes up there."⁴

Our armed forces need to move forward to streamline procedures and mechanisms for CAS and need to focus on improvement in the areas of training, equipment and interoperability across the Services. The gradual dawn of RMA (which includes advances in technology, doctrinal innovation and organizational improvements) in armed forces seems to be bypassing the components of CAS which is an essential element of Air Land battle.

JOINT EFFORT NEEDED

Gaining of information and converting it into intelligence is fundamental to good planning and success in operations. The long- range precision firepower of modern weapon platforms would be of no use without information and intelligence. In fact instruments of military power derive their power from their ISR assets; without these eyes and ears they would be powerless.

Attaining information superiority has become one of the most important objectives to be achieved in the era of knowledge age warfare. The concept of information superiority is somewhat analogous to similar concepts of air superiority, superiority at sea or in space. This is because proper use of information is as lethal as other kinds of power. Further, concept of information superiority leads us to attainment of decision superiority. Information operations are increasingly be considered as important as sea, land and air operations. The Information Operations (IO) could vary from physical destruction to psychological operations to computer net work defence. Well conducted joint information operations with new RMA technologies, improved organizations and doctrine would greatly contribute to a successful and decisive outcome.

The importance placed by the US forces during OIF on information operations has highlighted the need for synergistic response in this sphere. The Americans tom-tommed the awesome power of their arsenal and the overwhelming superiority of their forces, and thus inevitability of the Iraqi defeat. As part of continuing psychological operations the US Air Force dropped over 31 million leaflets and also broadcast messages for surrender of Iraqi troops.⁵ Based on good intelligence and targeting and in concert with surface forces they also struck the fiber optic cable network with repeater stations of Iraqi command and control structure to degrade its functioning.⁶ The American IW appeared to have achieved a considerable degree of success since, eventually, Iraqi troops including the elite Republican Guard did not put up a worthwhile fight as expected. The PLA has carried out a number of cyber warfare exercises, which according to media reports, included India as one of the target countries.⁷

During the month of August 2005, in a joint and combined exercise titled 'Peace Mission' comprising sea, land and air operations the Chinese military practiced psychological operations including dropping of leaflets, carried out C2W and EW as part of giving practical expression to its concepts of IW for the benefit of visiting dignitaries. The overall aim was to emphasize the progress the PLA has made in jointness and in the field of IW as a subset of its overarching objectives to achieve RMA with Chinese characteristics.⁸ In the case of Pakistan their expertise in hackers'

field is well known. In our case it is at operational levels where weakness in our IW efforts exists. There is a need for joint linkages and joint planning to synchronize our response to all elements of IW.

APPLICATION OF DISCRIMINATE FORCE THROUGH PRECISION ATTACKS

If force has to be used selectively, keeping in mind the sensitivities of the global community and the inevitable pressures on the warring states, then force will have to be wielded in a manner so as to achieve political aims through short, swift and precise military operations. This would imply greater proclivity for pre-emptive operations, enhancement in ISR capability and creating the legitimacy for military action based upon just and well-articulated causes, combined with distinctive and refined means available for conducting the operation to avoid collateral damage to civilians and non-combatants. This does not mean that punishment will be less severe. It only implies that the method and means will vary. Long distance precision attack through the use of precision guided munitions (PGM) would provide a capability to RMA enabled forces to apply force discriminately.

PGMS: ESSENTIAL FOR JOINT CAPABILITIES IN RMA ERA

The use of precision munitions has been following an upward trajectory since Operation Desert Storm. The percentage of PGMs used in Gulf War I was 7.5, thereafter its percentage increased in Kosovo and Afghanistan. In OIF it climbed to 68 per cent versus 32 per cent of dumb bombs.⁹ The precision weapons substitute mass for effects. They enable concentration of effects from geographically widely dispersed forces and also contribute to reduced logistics tail. The conventional munitions of industrial age type are required to be fired in large numbers to achieve desired effects at the target and which could be either destruction of the target or its neutralization. Similar effects could be achieved by firing a few rounds of precision munitions. Therefore, as a corollary a small number of precision weapon platforms would be required to achieve the desired effects. Thus in air land operations or tri-service operations these benefits of PGMs can be jointly exploited to reinforce and complement the unique characteristics of each Service. The increasing inventory of precision weapons in IAF and surface forces (i.e., both Navy and the Army) would enhance the force multiplier effect of the existing weapon platforms. This would be very relevant in the short duration conflicts when speed, shock action and accurate long-range fires become essential to achieve worthwhile objectives in a reasonable timeframe.

A larger inventory of PGMs with IAF, for instance, would enhance its strategic agility, reduce the size of aircraft packages and decrease logistics requirements. This in turn would release additional air effort which would become available to be exploited for other strategic, operational and tactical tasks.¹⁰ For instance, in OIF, F-16, F-18, B-1, B-2 and B-52 aircrafts were armed with multiple Joint Direct Attack Munitions (JDAM) which enabled these aircrafts to strike multiple targets during a single sortie. This economy of effort provides the joint forces an opportunity to engage a wider spectrum of target systems and an increased capability to fight close, rear and battle in depth simultaneously. It would also be possible to engage multiple targets with new PGM from stand off distances. Precision attacks from stand off distances would enable the air support to be provided in close vicinity of land forces. With suitable percentage of PGM in IAF inventory, it may be possible to commence counter air and counter surface campaigns almost simultaneously.

Similarly increased inventory with integrated battle groups would add additional punch to its arsenal and may reduce its requirement of air support. Armed helicopters with fourth generation missiles, cannon launched guided projectiles and missiles of various types including air defence missiles, all cutting edge instruments of current RMA, would enhance the joint and integrated effort required for attaining goals in short and intense conflict.

In August 1998 a US aircraft carrier fired Tomahawk cruise missiles against terrorist camps of the al-Qaeda at Khost in Afghanistan. This signified firing of a PGM purchased from the budget of the Navy which travelled through the medium of air and after having been provided space support it struck land targets. There cannot be a better example of jointness and integration in the era of RMA.

In the second Gulf War, by adding inexpensive cheap strap on kits for GPS guidance, the US armed forces' weapons and weapon platforms achieved precision capabilities. The US Air Force used a wide variety of PGM: over 6,000 of JDAM, 1,000 Wind Corrected Munitions Dispenser (including Sensor Fused Munitions) and a variety of laser guided bombs. The Army used Sense and Destroy Armour (SADARM) along with long range acquisition system and Hellfire missiles besides many other kinds of PGM.¹¹ In our own case, some of the smart munitions like the laser guided bombs were used by the IAF in the Kargil conflict with a telling effect.

The use of PGM by their very nature would involve joint planning and joint targeting in most of the cases and especially so in tactical battle area. There would also be a need for formulation of joint

procedures for enabling cross-Services sensors and target designators to effectively utilize the precision platforms and weapon systems of the other Services.

NETWORK CENTRIC WARFARE: THE DEFINING FEATURE OF INTEGRATED SYSTEMS RMA

A networked joint force is able to maintain a more accurate presentation of the battle space built on the ability to integrate intelligence, surveillance, reconnaissance, and information and total asset visibility. This integrated picture allows the joint force commander to employ right capabilities at the right place and at the right time. Fully networked forces are better able to conduct distributed operations.¹² Network Centric Warfare (NCW) has many connotations but essentially its main purpose is to exploit the information technologies for efficient and effective conduct of warfare in the information age.

A joint, integrated and responsive network would enable the air and surface forces to work together through more effective sharing of information. It links widely spread sensors, decision makers and a wide variety of weapon systems into one composite whole. This common grid increases the speed of command and response and provides a shared common operational picture. It is possible to synchronize and coordinate complex activities of a joint force in the battlefield leading to attainment of unity of effects and efforts across the various components of the force. The decision makers through timely and relevant support can achieve decision superiority because of the network.

A jointly networked force generates increased combat power and enhances the ability of the force to transform into a seamless and well oiled military machine. It is increasingly being recognized that smaller joint force packages suitably networked can possess more flexibility and agility and are able to yield greater combat power at the points of decision. NCW generates higher levels of operational efficiency and both new and traditional capabilities can be used with speed and precision.

The three Services recognize the benefits of a networked force and NCW and have introduced a number of systems and architectures to improve connectivity with sensors, decision makers and shooters. The IAF is setting up a high speed wide area network with adequate bandwidth and redundancies for effective command and control.¹³ It is also ensuring that latest UAV imagery and satellite pictures are available for real time response. The aim is to connect all the IAF

entities involved in a manner that air power¹⁴ assets are employed with optimal efficiency and effect. Similarly, the IA has been implementing a wide variety of programmes like Command and Information Decision Support System (CIDSS) named Project Samvahak, Battlefield Surveillance System named Project Sanjay and Project Sathi, i.e., Situational Awareness and Tactical Handheld Information besides certain other projects.¹⁵

The IN has also been working on such systems. It has identified two key thrust areas in field of IT - networking and e-enabled solutions. But there is a glacial movement towards setting up of a joint network that will bring relevant entities of the three Services on a one common high speed network. A joint Services network appears to have been planned with adequate bandwidth to cover real time voice/data/imagery along with adequate protection to handle classified data.¹⁶

However, what is needed in addition is a vastly improved joint network architecture of sensors, decision makers and weapons platform at the operational and tactical levels of war. It is axiomatic that a suitably networked joint force with adequate ISR capabilities but with fewer weapons platform can achieve much better battlefield effects compared to a poorly networked force with superior quality and quantity of weapons platform.

RMA ENABLED SPECIAL FORCES OPERATIONS AND JOINTNESS

Special Forces (SF) operations invariably would be joint operations with involvement of more than one Service along with intelligence agencies other than those of the armed forces. SFs offer a suitable military response to situations that require a tailored, precisely focused use of force. They can operate independently or in connection with other forces. They are suitable for employment during conventional war, in low intensity conflict operations and also during peace for anti-terrorist operations, hostage rescue and for assistance to friendly foreign governments, like it was done during the successful joint Operation Cactus in Maldives in 1988.

SF can perform a wide variety of missions at strategic, operational and tactical levels to achieve political and military objectives. SF are trained for insertion and extraction by air, land or sea. Importance of air power in supporting SF operations and at times even naval support cannot be over emphasized. Whether SF are heli-dropped or are para-dropped the insertion of forces into hostile territory requires a very high degree of coordination and joint training. They would also be networked with ISR sensors, target designators and long range

precision systems of various Services and especially so for calling in of air strikes when required.

The success of US Special Operations in OIF has had an important impact on the Indian Army which has embarked on raising SF on the lines US SF. In December 2002, the Cabinet Committee on Security had approved the raising of four battalions of SF but only for counter insurgency tasks. After observing the US assault on Iraq in OIF; it was decided to raise four more battalions for out of area capability.¹⁷ Further, even IAF and Navy have their own Special Forces for tasks as visualised by them and there is an obvious need to practice the concepts of jointmanship and integration in this sphere also.

Coming back to OIF, it was a campaign supported by the largest Special Operations Forces since the Vietnam War. They were employed in North Iraq along with Kurdish fighters and helped to bring in the 173 Airborne Brigade by para-drop. They called for air strikes against Iraqi regime targets and were also responsible for attacking a number of specific targets like airfields, weapons of mass destruction sights, command and control HQ and securing of oilfields. In addition, they were inserted in Western Iraq for search and destroy missions against Iraqi missile launchers. They also did some specialized work to help Shia elements.¹⁸

It must also be remembered that US Special Forces had failed during Operation Eagle Claw of 1980, i.e., Iran hostage rescue attempt because of lack of synchronization between the various components of the force. In fact, this failure has been cited by many US analysts as one of the major drivers to move towards unification of armed forces through Goldwater-Nichols Act of 1986. This was also instrumental in establishing a US Special Operations Command (USSOCOM). In OIF, there was a Theatre Special Operation Command and included, from the Army, special operations aviation, Special Forces, Rangers, civil affairs and psychological operation forces; from the Air Force, special operations aviators and special tactics squadron; and from the Navy, sea, air, land (SEAL) teams, SEAL delivery vehicle teams and special boat teams.

The nature of special operations was such that SF efforts had to be joint and integrated. The US Air Force provided 12.5 per cent of the total air effort for SF operations in OIF. Earlier in Afghanistan, SF elements had destroyed al-Qaeda terrorists traveling in a vehicle by calling for support from a Predator UAV, which fired a Hellfire missile on the vehicle.¹⁹ This effort symbolized the joint efforts of the US armed forces and the effectiveness of a unified military machine. In the Indian context, whether joint organizations or structures for command

are evolved or not, joint planning and training for envisaged SF operations, interoperability, unity of effort, good command and control arrangements and suitable fire support from diverse sources would continue to be important to ensure success.

SPACE SUPPORT, KNOWLEDGE AGE WARFARE AND
NEED FOR JOINT EFFORT

Space has been often referred to as ultimate high ground, a position from where one can have commanding view of all other media. Advances in technology have enabled space platforms to view every object and activity taking place in air, on land or at sea. The use of space for military applications has seen an exponential growth since last decade or so and it has become an essential component of the ongoing transformation among the modern militaries of the world. Space is increasingly been seen as a medium which can impart tremendous force multiplication effects to military assets in the air or with the surface forces. The characteristics of the present RMA point towards an increased use of space assets for varied missions like ISR, C2 Warfare, Information Warfare (IW), battlefield management and for imparting improved lethality and precision to weapon systems. The nascent space capabilities and the evolving space capabilities would have an essential role to play in strategic, operational and tactical tasks of Army, Navy and Air Force. Space assets would also provide capabilities for improving joint networking among the forces and help in establishment of robust C4ISR links for joint and integrated operations.

The proposed Indian Aerospace Command is a step towards harnessing the national space capabilities for military uses. The space infrastructure would not only cater for demand of all the Services but it would also have tri-Service clients like Strategic Forces Command (SFC) and Defence Imagery and Photo Analyses Centre (DIPAC) functioning under COSC/CDS. Therefore, necessarily, the organization for exploiting the space assets would have to have elements from other Services to exploit the space capabilities optimally.

For instance, in OIF, a component of the US Air Force Component Command was placed at Prince Sultan air base in Saudi Arabia as part of Air Operation Centre under Unified Central Command. The Aerospace Command also had officers from the surface forces so that requirement of all Services could be jointly organized and coordinated. The US forces had the benefit of over 50 satellites providing communication, intelligence, battlefield surveillance, missile warning, weapon guidance and meteorological data support to them.²⁰ The US forces also fielded a new robust and more accurate Global Positioning System (GPS). The

GPS was also used to programme Cruise missiles, for certain PGM like JDAM, for Army Tactical Missile Systems and for positioning, movement and timings. In the words of one American officer, "GPS is like water, our combat forces do not go anywhere without it." The US Army considers itself to be the largest user of space assets. Its Tactical Exploitation of National Capabilities (TENCAPS) is a project to leverage the national space and technological capabilities. The army had fielded a Tactical Environment System which provides commanders with a near real time correlated imagery and SIGINT from national and theatre resources. TES was earlier used in Afghanistan and it was effective in merging many different pieces of the picture together.²¹

A former IAF Chief had cautioned that, "Military application in space has lagged behind. We strongly feel that primary reason for this is lack of central organization to coordinate and manage space issues. This void would be filled if an aerospace command is formed — the command is not about ownership of the assets, it is about utilization of the assets, training, etc."²² It is also evident that some dedicated and specialized cells for dealing with specific tactical and operational tasks for respective Services as well as for joint bi-Service or tri-Service operational tasks would be necessary for exploiting scarce space assets synergistically. These assets would require a very high degree of joint networking to provide real time service to all its users -- from the army formations and units and sub-units in the battlefield to aircraft in the air, missiles in flight and to ships and other naval platforms at sea.

Therefore, an organization to coordinate the space efforts would be more of a tri-Service organization rather than a single Service structure in outlook. It also needs to be remembered that our regional competitor China is far advanced in the development of its space capabilities with ambitious plans outlined for the mid-term to long term period. For example it has plans of putting 100 to 200 satellites in the orbit during the next 10 to 15 years time span. Its military and civil efforts are well integrated because of historical legacy while we have assiduously kept development of civil and military space effort apart with little attention being paid to acquiring military capabilities.

POWER PROJECTION OPERATIONS AND INTEROPERABILITY

Amphibious and airborne capabilities are essential lynchpins for achieving power projection competencies. Together with RMA enabled land forces, amphibious and airborne forces serve as powerful threats in being. The mere presence of power projection in the theatre of joint operations

deters the adversary and during active hostilities causes him to divide his effort to protect himself against such a threat.

Amphibious operations are an acid test of tri-Service jointness. It is the most complex operation of war requiring close cooperation and coordination among the participating components of all the Services. The precepts of flexibility, mobility, and concentration of forces at the most opportune moment and the most advantageous point become the essential considerations for successful conclusion of amphibious operations. This can only be achieved through finely honed joint skills and RMA enabling technologies. The Air Force supplements the air support from carrier-based aircraft by extending its power projection capabilities through air to air refuelling for its aircrafts. The ISR assets of all the Services and national capabilities would have to be used in a coordinated fashion to support the objectives of ATF. Amphibious operations would, in fact, involve exploiting all the traditional roles and tasks of the different Services in a conjoint manner, both sequentially as well as simultaneously. Needless to say that organizational structure for amphibious tasks would require unity of effort, joint training, joint staffing, smooth command and control and interoperability of a very high degree.

Interoperability has been defined as the ability of systems, units or forces to provide services from other systems, units or forces and to use the services so exchanged to operate effectively together.²³ Do our interoperability standards enable us to acquire imagery and other information from UAV's and intelligence, reconnaissance and surveillance assets of Air Force or other agencies so that real time strikes could be carried out against time sensitive targets surfacing in Tactical Battle Area or for that matter in any joint tri-service or bi-service war fighting environment? Considerable improvements need to be done in the field of interoperability among the three services. Further, cross-services shooter to sensor links, command, control and communication links, seamless joint structures and effective joint procedures and training become very important to exploit fleeting opportunities in the battlefield of knowledge age.

Further, it is not only hard power projection capabilities but it would also be soft power projection capabilities like managing a disaster due to tsunami which would require across the Service effort with considerable support from air. For instance, Tsunami relief operations, i.e., 'Operation Sea wave' undertaken by joint efforts of the three Services contributed to enhancing of the image of India as a net contributor to security in the region even though the operation was in the realm of non-traditional area of security. The IAF provided seven

IL-76/78, 15 AN-32s, four Avros and 16 helicopters and 3,000 personnel. The IAF carried out 1,834 sorties within India and 1,063 sorties in support of relief operations for other countries like Sri Lanka (Operation Rainbow), Maldives (Operation Castor) and Indonesia (Operation Ghambir). The Indian Navy supported the operations with ships, aircraft, helicopters and personnel. The Indian Army contributed with 8,300 personnel.²⁴ It was a well coordinated tri-Service effort between the three Services and the Coast Guard under the aegis of IDS and ANC. Such situations further reinforce the need for JFHQ in the area of operations to coordinate the activities of all forces and different agencies which need to be suitably networked into a common organisational and communication architecture.

SPURRING R & D AND STRENGTHENING SELF-RELIANCE

For RMA to occur in a substantial manner a world-class defence manufacturing industry that would be self-reliant and sufficient, is a necessary pre-condition. Our defence procurement procedures have been streamlined and policies changed to encourage private and foreign participation in defence industrial sector. The objectives are to achieve synergies of both civil and government sectors by integrating their capabilities. Technological and science skills, management capabilities and ability of civil sectors to raise resources need to be combined with the R&D capabilities of government labs and institutions to produce state-of-the art defence equipment. Further, direct offsets in defence industrial against procurement from foreign sources have been introduced for the first time to encourage transfer of technology and investments from abroad. This would help our armed forces to advance on the RMA scale.

Strengths of our civil IT sector need to be further harnessed to augment our command, control and communication networks. This would be somewhat similar to what is being done in China where a structure for funding their military-related IT needs has been evolved. Private industries including joint ventures with foreign partners are provided with partial funding by the government for R&D and products are used for both military and civil applications. Some analysts have termed this as a Digital Triangle model.

CONCLUSION

India's armed forces have been given the mission of responding to full spectrum of threats which is a complex task. There is a symbiotic relationship between RMA and jointness. Jointness and integration are conceptual tools while elements of current knowledge-based RMA are technological tools to attenuate the adverse effects of Clausewitzian elements of 'fog, friction and chance' in the battlefield. The unique capabilities of each Service can be best exploited when they fight as an integrated whole. It is also evident that a meaningful RMA cannot occur without practicing the precepts and concepts of jointmanship and integration.

Economy of effort is fundamental to the art of war and without economy there is no art in warfare. With increasing costs, and consciousness in the society about the wasteful destructive nature of warfare, need to devise ways by which age-old principles of warfare are applied more dynamically. Hence joint (or is it jointed in the current context!) operations must give way to Integrated Operations of the three services. With technology showing the way, India must learn to win wars with the least human cost. We need to integrate technologies with the type of forces, which help us fight with greater precision and flexibility. Information technologies are the DNA of current information based RMA and they add to the versatility, agility and strategic reach of our joint military capabilities.

Further, each and every constituent of India's ongoing RMA is amenable to a joint and integrated approach. Even though future direction and pace of progress of RMA under Indian conditions would be impacted upon by a number of contextual factors yet, evolving a joint and integrated response to the challenges of achieving knowledge age capabilities would be the dominant paradigm of the ongoing RMA.□

Notes

1. Briefing by Lt. Gen. Michael Moseley, Coalition Forces Air Component Commander, on April 5, 2003, available on line www.dod.mil/transcripts/2003/tr20030405
2. Ibid.
3. Ibid.
4. Operation Iraqi Freedom briefing by Lt. Gen. David McKiernan, Commander Third US Army, April 23, 2003. See his remarks on Network Centric Warfare available on www.dod.mil/transcripts/2003.
5. Ravi Visvesvaraya Prasad, "Cyber Menace - Integrated Defensive Policy Needed", *Times of India*, May 20, 2003.

6. Arun Sahgal and Vinod Anand, "Russia and China: The New Shooting Stars", *Asia Times*, September 8, 2005.
7. Briefing by General Moseley, op.cit.
8. For instance see the views of Air Marshal T.M. Asthana (Retd.), former C-in-C, Strategic Forces Command in "Communication is the Key", *Force*, June 2005. He discusses the importance of the air force in limited wars and the need to increase inventory of PGM in the air force and its consequential benefits.
9. See N.1 and Maj. Gen. Buford C. Blount III, "Live briefing from Iraq by 3rd Infantry Division Commander", available at www.dod.mil/transcripts/2003/tr20030515-0184htm
10. Department of Defence publication, Joint Operations Concepts, November 2003, p.16, available at www.dtic.mil/jointvision/secdef_approved_jopsc.doc
11. Air Chief Marshal S.P. Tyagi, in an interview to *Force*, published in June 2005 and titled "Formation of CDS will enhance the Synergy for Joint Operations."
12. Ibid.
13. Ministry of Defence Annual Report for 2004-2005 available at www.mod.nic.in/reports/report/05.htm, pp.36-37, p. 53 and 56. As per the report no steps seem to have been taken in 2004-2005 to develop joint services network while individual Services are going ahead with establishing their own networks.
14. See Air Chief's remarks *Force*, June 2005, op.cit.
15. Aditya Sinha, "Indian Army to Raise US-Type Special Forces", *The Hindustan Times*, April 20, 2003.
16. Jim Grammone, "Iraqi Freedom Largest Special Ops Effort since Vietnam", American Forces Press Service, April 14, 2003, www.defenselink.mil/news/dod/news.html
17. Doug Sample, "Pentagon Plans Heavy Investments in UAV Development", April 28, 2003, www.defenselink.mil/news/dodnews.html
18. Michael Krepon and Christopher Clary, "Space Assets and War in Iraq", available at Stimson Centre website www.stimson.org
19. Air Force briefing on "Space: The War fighter's perspective" March 12, 2003; joint briefing by Air Force Maj. Gen. Franklin Blaisdell and army Col. Steven Fox, Director Army Space Support Program."
20. *Force*, June 2005, op.cit.
21. For definition of Interoperability, see "Joint Vision 2020: America's Military preparing for Tomorrow", Joint Force Quarterly, also available at www.dtic.mil/doctrine/jv2020.
22. Vice Admiral Raman Puri, "Tsunami Relief Operations by Indian Armed Forces," *USI Journal*, July-September 2006.