POINTER

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Foreword

Mark Twain once said that "Most writers regard truth as their most valuable possession, and therefore are most economical in its use." Thankfully, this has not been the case in the candid feedback that the Editorial Board has received since POINTER underwent a metamorphosis two issues back. This is a healthy development. After all, good feedback like good writing should stir passions and inspire the intellect.

In one of the letters received by the Board and posted on the online POINTER discussion forum (http://www.mindef.gov.sg/safti/pointer/forum.htm), MAJ Alfred Fox's What's an Opinion? turns the sharp tip of his pen on POINTER itself. The points raised concerning the new POINTER's sustainability, readability, and senior command emphasis are valid ones. They remain real challenges that the Board would have to confront, and would continue to grapple with. What is clear is that we cannot work in the same ways as before and yet hope to publish issue after issue bearing the same sterling quality. The Board recognises that it has to go about creating a buzz that seeks to widen our readership appeal and professional reach. In so doing we hope to also ignite the interest and desire in our readers to contribute to the intellectual ferment that is so necessary for our transformation towards a third generation SAF.

It is in this context that I am pleased to welcome on board COL Ng Kok Wan, LTC Joseph Leong and MAJ Irvin Lim as members to the Editorial Board. They were quick to respond to the challenge of forging an active readership, and developing POINTER as a "Community of Practice" and instrument of learning in the SAF. On that note, I would also like to urge all our readers to partake in our collaborative efforts by playing constructive, critical and creative roles in whatever capacity you think you can best contribute. Just drop us a note. We would love to hear from you.

As we look towards new horizons, I would like to take this opportunity, on behalf of the Board, to express our warmest appreciation and bid a fond farewell to COL Lim Kok Pheng who has ably helmed POINTER and taken us up to the latest leg of our transformational voyage.

For those still reticent about joining us in our journey, I leave you with this saying by William Faulkner: "I never know what I think about something until I read what I've written on it."

COL Lim Teck Yin

Chairman, POINTER Editorial Board

Editorial

Firstly, we would like to extend a warm welcome to the new Chairman of our Editorial Board, COL Lim Teck Yin, formerly from 2nd People's Defence Force Command. He has very clear ideas on improving this journal and we look forward to working together to build on POINTER's transformation.

In this issue, we are very privileged to have a lead article by COL James Soon, Republic of Singapore Navy (RSN) Fleet Commander. He shares his insights into how the RSN's mode of operations, materiel and doctrine need to change in order to prepare for unconventional warfare while still retaining its capability for conventional missions.

Renowned maritime expert Prof Geoffrey Till and Revolution in Military Affairs (RMA) researcher-practitioner LTC Joshua Ho give their respective big picture takes on how seapower and maritime security are radically changing in the context of the new world order and the rise of East Asia.

Writing from an outsider's perspective, Dr Tim Huxley, of Defending the Lion City fame, assesses the relevance of the RMA to Singapore and, more controversially, whether the Singapore Armed Forces (SAF) can actually walk the RMA talk.

MAJ Irvin Lim sounds a cautionary note on not drawing the wrong lessons from Operation Iraqi Freedom. He warns against becoming seduced, by the promise of lean speedy kills, into downsizing force structures to the bone and being unable to muster the critical mass when it comes to the crunch. In a similar vein, Mr Wong Chee Wai analyses the World War Two battle for Imphal and argues that although the Japanese were hampered by faulty strategic planning and weak generalship, the fundamental factor was their inferiority in resources and material viz a viz the Allied forces.

Having thoroughly perused the Integrated Knowledge-based Command and Control (IKC2) monograph, LTA Ng Pak Shun shares his reflections and reservations on treating technological innovation as an unambiguous good for the military and highlights four possible danger areas.

On that note, we would like to have more SAF personnel contributing to POINTER and to see more critical reflections and views in our pages.

Talking the transformation talk, with a wide symphony of our own voices, is also an important part of walking the transformation walk. Do make your presence felt and your voices heard!

Editors, POINTER

eNforce: Transforming The Fleet For Unconventional Warfare

by COL James Soon

Claiming that the Republic of Singapore Navy (RSN) force structure is oriented towards fighting a conventional naval war should hardly surprise anyone. This stems from the SAF's mission of deterrence and diplomacy and the RSN has certainly reaped significant dividends in its conventional development over the years, in that it is today regarded by keen naval observers to be the most advanced and well organised navy in this region.1 However, the key security challenge confronting the Fleet2 these days belongs in the unconventional realm. Of the many facets of unconventional naval operations, maritime terrorism is the most probable and dangerous threat that the navy has to counter today. The repercussion is not so much in deliberate actions that are needed, but the omnipresent force protection posture that must now be adopted. The latter was triggered by the USS Cole attack although the reverberating effects really hit home after the attacks on September 11, and the discovery of the Jemaah Islamiyah (JI) cell in Singapore.3 The duality of Fleet ships as defender of our seas and prime terrorist target at the same time is clearly a new reality not of our own making or choosing. Deterrence and diplomacy seem to be alien concepts to the new threat.

Like the efforts invested in the past three decades in conventional naval warfare, the Fleet must address terrorism and other aspects of unconventional warfare holistically, taking it in our transformation stride. Emphasising both conventional and unconventional warfare proficiency at the same time can be challenging as past experience has shown. But a balance has to be struck between traditional and transformed naval roles. Equipping, doctrine and training to deal with unconventional warfare should be further bolstered to strengthen the Fleet for what appears to be a long battle ahead against an amorphous and adaptive threat of uncertain trajectory.

Unconventional Naval Warfare - Different Probes for Different Folks

"Naval battles are fought without ever seeing the enemy with the naked eye." So reads an old Navy advertisement in the 1990s. Indeed, face-offs at close proximity between ships and hand-to-hand combat between sailors are images that we still see but only in movies like Master and Commander: The Far Side of the World. Since the birth of modern naval missile warfare in the 1967 Israeli-Arab War4, it would not be far fetched to characterise battles between warships as cyber-space warfare. Conventional naval warfare as many in the navy know today is focused on electronic suites with warfighters seated in front of system consoles inside the Combat Information Centre (CIC). Decisions are made primarily on the basis of an electronic information display. Improvements in technology continue to enhance the range and precision of missiles and the efficacy of radar and other electronic sensors, thus lending further credence to the advertisement tagline.

A well-established doctrine and training regime exists today in the Fleet to train officers how to fight this kind of battle. Sophisticated and very capable training systems like CIC Simulators or the Fleet Instrumented Sea Training System (FISTS)5 are available in the RSN to hone the skills of the warfighter. Indeed, the entire Fleet Training System is structured around conventional naval warfare.

In contrast, unconventional naval warfare shares none of the rich heritage of its conventional cousin. To be sure, terrorism, and many other aspects of unconventional conflict, is not exactly new. However, its pervasive nature and character as we know today is certainly recent knowledge. Indeed, literature dealing with the specifics of terrorism at sea is wanting probably due to the amorphous nature of the threat. Therefore, more open-sharing among the maritime agencies will be needed.

From a warfare perspective, unconventional warfare is directly the reverse of that advertised for conventional warfare. Here the images of eyeball-to-eyeball contact become real. The roles played by electronic warfare sensor suites in a conventional setting are thus likely to be relegated to the background when dealing with the terrorist threat. The target of interest here, a small fishing boat or an innocent-looking pleasure craft, is not likely to produce any useful signature that would lead to clear conclusions about its status and intent. Indeed, the radar detection ranges of such craft are likely to be so short that in many instances, visual sensors will provide the first indication of the existence of such vessels. However, the conclusions derived from visual observations, are also likely to be fraught with uncertainty. Hence, communications with suspicious craft are a necessary risk in the classification process. Unfortunately, the difficulty is further exacerbated by the fact that many small craft, at least among fishing vessels, do not carry any communications equipment and if they do, may not have it turned on. To fulfil its mission,

the naval ship then closes in on the target to within loudhailer or searchlight range for closer observation and shadowing probes. Even then, ambiguity is never overcome even at the closest range.

Ships therefore have to be wary against explosives they cannot see, as well as small arms and short-range projectiles that could be unveiled and used only at the last moment and with a higher possibility of achieving deadly surprise. The USS Cole incident has demonstrated the lethality of an explosive-laden craft at close range.6 Whatever the case, the response suite of the navy ship will certainly exclude the use of missiles or even the main guns. Any direct action is likely to be achieved by the ship's own small arms or machine guns.

The contrast between conventional and unconventional naval operations is further illustrated by the nature of the rules of engagement (ROEs) and the span of control. In missile warfare, where the decision cycle is normally very short, the ROEs normally provide sufficient latitude to the Commanding Officer (CO) to decide when to fire and what to fire at. Higher HQ will hardly be in any position to intervene nor will they necessarily want to in every instance even if they could. Some latitude for tactical initiative and operational flexibility for dealing with dynamic exigencies will always rest heavy on the shoulders of commanders at sea. On the other hand, unconventional operations are likely to unfold much more slowly. Furthermore, peacetime operations are generally more tightly controlled with complex ROEs, given the potential political consequences of actions at sea. Whether in defence or offence, ships involved in unconventional warfare operations have to walk the tightrope between executing their missions effectively or risking the ship and its crew in the process.

Striking A Balance

The need for the Fleet to learn how to juggle between conventional and unconventional warfare roles at the same time is a given. However, there are concerns that expanding the portfolio of capabilities will have negative impact on the Fleet's growth in conventional warfighting. During Ops Thunderstorm7 in 1975, key strike craft like the Missile Gun Boats (MGBs) were so pre-occupied with illegal immigrant operations that for the better part of this period, MGBs were little more than patrol boats. This had a significant impact on the development of our strike capability. It was not until the acquisition of the Coastal Patrol Craft (CPC) from 1979 onwards that enabled the Fleet to refocus the efforts of its missile-armed craft towards developing an effective strike capability. This lesson has not been forgotten. Our preference for clearly delineated roles was further manifested with the setting up of the Flotillas in 1992 to enable better focus on strike and support warfare within the Fleet structure. Even today, patrols are undertaken by Patrol Vessels (PVs) and not missile-armed craft.

The delineation of roles based on vessel type certainly helps readiness and resource allocation in maintaining capabilities. In deliberate operations to counter unconventional threats, the appropriate platform can be selected and even equipped, if time permits, to ensure maximum operational efficiencies. Theoretically, smaller, high speed naval vessels would be more suitable within the Singapore Strait . However, against an enemy that wages asymmetric warfare, the time, place and character are all not of our choosing. The threat's force size and whereabouts are normally doubtful. No one can pretend to be capable of rationalising all potential courses of actions that the terrorist threat will adopt. We cannot count on intelligence being available in sufficient time nor with adequate precision for our forces to prepare themselves. In short, each vessel deployed at sea could be required to deal with terrorist threats at any time.

Preparing ourselves to cope with unconventional operations as a matter of daily plans is thus a necessary modus operandi. But this cannot simply be reduced to a lesson on mounting a strong defence using existing means and doctrine or left to the imagination and creativity of forces on the ground. This clearly is not the nature of the military. Ignoring investments in this area just because we may be fighting against a threat that we cannot fully recognise, cannot be justified. Indeed, it is when the threat is real but yet not well defined, that we are called upon to prepare even harder.

Materiel Transformation

The mindset change that conventional and unconventional capabilities must co-exist in the Fleet will help transform thinking on how we approach the equipping of our ships. Our existing missile ships are designed primarily for conventional naval warfare duties. The focus has traditionally been on ensuring that sensors and weapons are present to enable one to fire a missile further and at longer range than an enemy ship. Fortunately, while we await the realisation of network-centric warfare at sea to solve all our woes, today's sensors are already capable of meeting the requirements of unconventional operations to some extent. The ship's radar and electro-optic system (EOS) are effective in detecting small targets. A modern radar with Automatic Radar Plotting Aid (ARPA) is already

capable of setting guard zones to automatically detect small fast vessels that come within a prescribed range of the ship. The EOS technology available today is also quite capable of better laying-bare activities onboard unknown vessels at much longer distances for further situational appraisal and decision-making.

However, open literature has suggested that terrorists can become very sophisticated in their methods8 and the use of stealthy vessels to reduce the warning time of naval vessels poses significant concerns. In such a situation, new technology like the Infra Red Search and Track (IRST)9 that involves a rapid and continuous 360 degrees visual scan around the ship may well be the solution to visually detect these small contacts even in the absence of radar signatures. This same system will also be needed against stealthy passive missiles when ships engage in conventional wars.

The equipping transformation of the Fleet began a few years ago with the introduction of the EOS. This has now become a favourite among sailors for its obvious efficacy in day and night operations. Previously, Fleet ships depended on hand-held night vision devices and binoculars to identify targets at night because it was believed such short range operations were not critical to the main missions of these ships. Although this school of thought has finally been laid to rest, it is no exaggeration to say that the EOS is so important in today's unconventional naval actions that ships ought to be equipped with two units to provide redundancy and also to ensure better all round coverage.

Similarly, the firepower equipping of our existing ships is slowly under-going an important transformation. Currently, Fleet ships (less the Mine Counter-Measure Vessels) are equipped with a very effective 76mm Oto Melara gun linked to an effective gun fire control system that also makes use of the EOS as a sensor to aim the gun. However, against small targets and in potentially cluttered sea areas, the use of a 76mm gun for prosecution at short ranges is less efficient and could put other ships in the vicinity at risk. At the same time, relying on small arms like the 0.5-inch guns also has many limitations, not least of which are accuracy and the inability of simple night vision devices to see the target effectively for engagement. Navies today make use of the guns in the 25 - 30mm calibre for effective short range prosecution. These guns like the Typhoon from Rafael or the MSI gun, are stabilised and linked to an EOS to provide targeting information. In fact, the RSN has installed and tested the Typhoon gun on one of its PVs and found it to be extremely effective at short ranges. It has even been deployed for operational force protection duty during the recent RSN Landing Ship Tank (LST) deployment to the Gulf.

This automation is not a luxury. Unconventional naval operations in peacetime demand appropriate levels of force be applied and accuracy of the gun is an important parameter. Warning shots should remain just that. Stray rounds that accidentally kill someone in the process may develop into incidents that drag military operations into unintended political fallouts of an international dimension. Conversely, accuracy in the first few rounds could mean the difference between mission success or the damage of one's own warship from a weapon fired suddenly at close range.

The progress taken in recent times to transform Fleet equipping to deal with the unconventional threat is commendable. To strengthen this transformation demands a holistic and proactive approach. Unlike the travel industry that has depended on the September 11 incident as the trigger to revamp security to prevent future occurrences, the Fleet has a duty to constantly be ahead of the OODA10 loop in maritime counter-terrorism. The cycle times for materiel trans-formation against unconventional threats like terrorism are many times faster than what is normally seen in conventional naval wars. We are not talking about years of change here but months or even days. The rate of change is now determined not by technology but by the destructive creations of the human mind. Similarly, as much as new equipment may be needed, our forces must also learn to constantly adapt what is already currently available and initially acquired for other purposes. In this regard, thinking literally out of the box or beyond traditional Service lines is a necessity. Innovative use of all available equipment, whether designed for naval use or otherwise, must be explored and anticipated.

Although the use of the word, "Transformation" in today's context normally connotes something futuristic and high tech, it would be unwise to simply throw the problem at transformation teams. As explained earlier, existing technology like radars and EOS serves their purposes well. Rather than more expensive new equipment, what may be more critical to effective unconventional warfare is simple equipment such as the public address system to enable communications to be broadcast further. It is pointless that after all the high tech sensors have detected and identified a craft at a safe distance that the ship still has to go very close to the target simply to make verbal contact or risk being completely ineffective. This example highlights the kind of rigour that must accompany thinking on materiel transformation. It demands dedicated and continuous effort that cannot afford to be reactionary. We must avoid the proverbial closing of the barn door after the horse has bolted.

Of course, there is a high technology element to transformation. An example is the future unmanned vessel technologies such as Project Spartan.11 This US-led Advanced Concept Technology Demonstrator involving the RSN will provide an unmanned platform capable of detecting, investigating and even attacking suspicious contacts. Spartan could read the paperwork demanded of suspicious craft or recover it with a grabber to pass it to the mothership for greater scrutiny. It can also perform a 360 degrees close-in visual probe that would yield far more than an EOS system at long range. Multiple Spartans networked to a mothership, swarm-like, exponentially enhances the ability of a single major navy platform to cover a wide battlespace will be significantly enhanced. Suffice to say here, there are many other technology innovations which the RSN is leveraging on its fight against terrorism and in other un-conventional operations.

The setting up of the Fleet Experimentation Battlelab a few years ago is the first of many steps needed to expand the capacity of the Fleet to deal with materiel transformation in a holistic way. But this group is small and can only be a catalyst. Ultimately, ideas big and small to deal with the unconventional threat must be borne out of direct experience in the field. To ensure that there is sufficient thinking in this area requires a transformation of doctrine.

Transformation of Doctrine

Materiel transformation takes time and money. In the meantime, the Fleet must learn to make better use of what is currently available. A key enabler to our ability to successfully counter the terrorism threat regardless of the state of our equipping is doctrine.12

The doctrinal transformation in the Fleet over the last few years can be witnessed by changes in the Fleet's state of readiness and approach to assigned tasks. At sea, cruising stations have taken on fresh meaning. Previously, it signified ships transiting from point A to point B in a relaxed administrative state. Today, ships are ready for limited action at a moment's notice even in cruising stations. Ships now choose their routes carefully and maintain a close watch all around not just for the sole purpose of navigation safety but to safeguard themselves against sudden threats. Even within our own naval bases, the Fleet maintains a high defence posture with an integrated defence between base defence units and organic ship-borne defensive measures while in harbour.

To further illustrate the doctrinal changes that must accompany this transformation, ships no longer take what they see at face-value. In the past, our ships would respond immediately to any signs of distress at sea. Experiences in other navies suggest that nothing can be taken for granted and terrorists will disguise their measures to lower the guard of their targets to gain the advantage before making the fatal stab. Every occurrence at sea now has to be evaluated on the basis that there could be a potential threat.

Similarly, in situations where merchant / trade ships have to be ordered to be stopped for boarding and search operations, the presumption that these ships could be hostile until proven otherwise must be adopted. RSS Endurance's recent participation in the Proliferation Security Initiative13 in the Gulf has been operationally instructive and organisationally significant, as it marked the first time the RSN has participated in such a far-reaching international initiative to help safeguard the global maritime domain. A new way of identifying strengths and limitations in the conduct of maritime interdiction missions needs to be taught to our officers and men, taking into con-sideration the type of weapons that may be utilised ranging from machine guns to rocket-propelled grenades. Close ship manoeuvres and interdiction approaches in congested waters which invariably manifest the dilemma of being too far away and therefore useless versus being too near and vulnerable, need to be contemplated in the school-house and not be learnt through painful experience. Like the methodical training provided to warfighters in conventional warfare, it would be unreasonable to assume that the decisions and actions to be taken in unconventional naval operations can be reduced to common sense.

Therefore unconventional war-fighting, particularly against terrorism, demands a training regime of its own. Trainers have to be knowledgeable about the subject and getting the requisite know-how will be a challenge. A systematic way of collating both our own experiences and those obtained from sharing with other navies must exist. Training hours to deal with this complex subject will have to be set aside, competing within the traditional syllabi and skill sets in our courses. Beyond training, there is a need to ensure that we continuously translate the Organisational Learning initiatives we have underway into adaptive operational learning that transforms our operational logic into tactical advantage at every turn when tackling asymmetric threats. As has been well-said: "Tactics vary constantly with the situation…when confronted by a situation, leaders must choose from a variety of possible solutions and adapt their solution to circumstances at the point of engagement."14

Making full use of technology, simulators can be employed to expose shipborne personnel to the wide range of

scenarios that may be expected. For starters, the existing shiphandling simulator, in the absence of something more specific, can be transformed in its utilisation to become a scenario generator for command team training. Instructors making use of the visual graphics generated by the ship handling trainer can create challenging situations that will force ship operators to apply their knowledge and think on their feet. In the future, the RSN will need to acquire a more specific trainer that falls into the category called the Bridge Mission Trainer, much like the one from Transas.15 This is the only way to enable unconventional training to be conducted with regularity and yet be challenging enough for the command teams.

At a more basic level, doctrinal transformation means revisiting the old, especially those things that have been left behind in the modern age of warfare. Two areas quickly come to mind: Laws of the Sea and Seamanship.

Undoubtedly, naval vessels performing a policing role need to be well versed in maritime laws and the laws of armed conflict. We must know what our rights are without needing to go back to HQ for directions. More often than not, there is no time for real time consultations and the CO of a ship on scene must be clear what he can and cannot do. A new training regime that puts an officer through different challenging scenarios at sea to test his appreciation for the application of the laws will be needed.

Seamanship is a capability that is almost taken for granted but one that is undoubtedly more vital in unconventional operations. Several aspects of unconventional operations testify to this point. Firstly, in bringing a ship close enough to another to carry out interrogation of the vessel of interest, COs must possess the necessary shiphandling skills to ensure self-preservation. More often than not, this means bringing ships near to one another making way and often as close as 100 metres or even less. At night, this challenge is multiplied several fold. Secondly, in rough seas and where boarding teams have to be deployed for the purpose of investigation, good seamanship skills will be in high demand to minimise exposure and reduce vulnerabilities.

If the conclusion on doctrinal transformation seems biased towards single ship preparations, this is acceptable from a defensive point of view. In many other unconventional operations, ships are not likely to operate alone but with other forces, whether joint, inter-agency or combined. New flexi-doctrines married with the relevant technologies to better integrate disparate forces put together for ad hoc or cross-functional operations is needed. Increasingly, many naval strategists like Geoffrey Till have advocated for a "systems or network-centric approach" where the real emphasis should not be on platforms per se, but on systems, weapons and sensors.16 That said, the role of system-drivers like doctrine and technology will be the critical "re-orged" operational turn-keys.

Conclusion

More than ever, the Fleet now has to shoulder additional duties of the unconventional kind in daily operations. Proficiency and capabilities acquired in conventional naval operations do not necessarily guarantee mission success against unconventional threats. Equipping aside, the Fleet has to recalibrate its doctrine and training, laying a strong foundation in core naval subjects like the laws of the seas and seamanship as well as providing a framework to share lessons and manage knowledge effectively. The threat will not go away anytime soon and we must be prepared to enhance our capabilities and "en-force" the fleet to face down the emergent unconventional challenge while fulfilling extant conventional mission requirements.

Endnotes

1 See, for example, Tim Huxley, Defending the Lion City: The Armed Forces of Singapore (St Leonard's, NSW: Allen & Unwin, 2000), pp159-171.

2 The word "Fleet" here is used generically to denote assets from both the Fleet and Coastal Command (COSCOM) formations of the RSN.

3 It was established that the JI targeted US Navy ships calling at Changi Naval Base and Sembawang. See White Paper 2/2003: The Jemaah Islamiyah Arrests and the Threat of Terrorism (7 Jan 2003), pp11, 13, 28-30.

4 In the 1967 Arab-Israeli conflict, missiles fired by an Egyptian Komar class missile boat sank the Israeli warship, INS Eilat. See Edgar O 'balance, The Third Arab-Israeli War (London: Faber & Faber, 1972). In 1973, the Israelis showed the world the beginnings of the anti-ship missile by firing Gabriel missiles that effectively sank the Egyptian fleet. See Chiam Herzog, The War of Atonement:The Inside Story of the Yom Kippur War, 1973 (London: Greenhill

Books, 1975), pp262-269.

5 FISTS is an embedded instrumentation acquired by the RSN that brings training at sea involving weapon systems to a very realistic level. See http://www. mindef.gov.sg/navy/ navynews/12_dec/021210.html

6 The USS Cole was put out of action and nearly sank if not for quick fire fighting and damage control measures. Repairs were extensive and took nearly a year. See US State Department, International Information Programs, http://usinfo.state.gov/topical/ pol/terror/colearch.htm

7 Ops Thunderstorm took place during the height of the Vietnamese refugee influx to many countries in South East Asia and the Navy was tasked to prevent refugee-carrying boats from landing in Singapore. For a brief account, albeit from a medical perspective, see http://www.mindef.gov.sg/joint/hqmc/ art_man.html

8 Graham Gerald Ong, "Next Wave of Terror Targets: Will They Be At Sea?", The Straits Times, 15 Sep 2003 and Asif Ansar, "Just How Prepared Are We?", Weekend Today, 27 Sep 2003.

9 Several companies have already deployed IRSTs. See http://www.sagem.com/en/products-en/ defense-en/eptronique-en.htm

10 OODA is an acronym for Observe, Orient, Decide and Act. This is commonly used to explain the sequence of steps taken in military actions. See, for example, Realising Integrated Knowledge-based Command and Control: Transforming the SAF, POINTER Monograph No.2, Mar 2003, p13.

11 Project Spartan was initiated by the US as an experimental unmanned surface vessel programme. RSN signed an agreement with the US Navy to co-develop the concept and prove its use in several sea scenarios. The first experimental Spartan prototype will be ready for testing this year. David Boey, "ST Engg to boost military robotics projects", The Straits Times, 18 Aug 2003. Also see David Vergun, "Spartan Unmanned Surface Vehicle Envisioned for Array of High-Risk Missions", Navy League of the United States (May 2003),
http://www.navyleague.org/sea_power/
may_03_23.php

12 The term "doctrine" here is used not to describe tactical procedures but a general way of thinking.

13 Inaugurated in 2003, the ProliferationSecurity Initiative(PSI) is a US-led response to the growing challenge posed by the proliferation of weapons of mass destruction (WMD), their delivery systems, and related materials world-wide. PSI participants are committed to the following interdiction principles to establish a more co-ordinated and effective basis through which to impede and stop shipments of WMD, delivery systems, and related materials flowing to and from states and non-state actors of proliferation concern, consistent with national legal authorities and relevant international law and frameworks, including the UN Security Council.

14 Colonel Clinton J. Anker III, "Doctrine for Asymmetric Warfare", Military Review, (Jul-Aug 2003), p20.

15 Transas is a UK company that specialises in visual simulators. The company showcased a simulator during International Maritime Defence Exhibition (IMDEX) 2001 which dealt with actions needed to counter various threats as seen by an officer on the bridge of a ship: http://www.transas.com/simulators/ bridge_simulators/full_mission/ main_components.asp

16 Geoffery Till, "Can Small Navies Stay Afloat", Jane's Navy International, (May 2003), p33.

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The Transformation of Seapower and the New World Order

by Prof Geoffrey Till

As Shakespeare's Merchant of Venice once remarked: "Thou knowest that all my fortunes are at sea." This might have made sense then – but does it now, with the world so transformed? The answer must surely be yes, because seapower has been transformed too – and is likely to be at least as crucial to the world's future as it has been to its past.1

The Sea Matters More

This is partly a simple matter of resources. The relative importance of the resources of the sea will surely increase in the 21st century, especially with the world's population of five billion or so going up, according to some estimates, by 90 million a year. The demand for oil, to cite only the most obvious case, is likely to increase by approximately nine million barrels per day by 2010, equivalent to the daily output of Saudi Arabia . The same increases in demand on other mineral and living resources of the ocean will increase in like measure as the world's population, level of industrialisation, living standards and expectations go up. Maybe the sea will have new and substantial resources to offer as well, tide and wind energy, potable water, chemicals in suspension, energy from under-sea volcanoes. For this reason, maritime jurisdiction is also likely to be under dispute.

One of the resources of the sea is its sea-lanes, the capacity it offers to move people and goods around the world. Even with the electronic networks of cyberspace, international trade is still underpinned by the capacity to move people and goods across the face of the ocean. 90% of world trade by weight and volume still moves about on water. Even to maintain current standards of living, the increase in the world population means this has to grow.

Once the waterfront was where you gained the latest news from abroad or from remote parts of your own country. With the use of the undersea cable, the radio and now the World Wide Web, the sea's historic role as a medium for the spread of information has diminished (although faint echoes of it survive in the concerns felt by many countries about subversive materials, abortion ships, pirate radio ships for the danger they might do to the fabric and values of their own society).

But this partial decline has been more than offset by the rise of the perceived importance of the sea as an environment, both for the future enjoyment of its resources, and for the physical health, even the future, of the planet and all lives on it. 1998 was declared the Year of the Ocean, in order to draw attention to the fact that much of the world ocean is in a state of near crisis, environmentally. And marine environmentalists point out that the neglect of this will imperil mankind's ability to use the sea in all the other ways just mentioned. If this goes, everything goes.

The Result: A System Exists...

Because all these interests intersect, the result is a globalised sea-based trading system, well described recently by the maritime, island, trading state of Singapore :

The Asian economic crisis has demonstrated how closely intertwined the interests of nations have become in a borderless world. A small and open country like Singapore is especially susceptible to unpredictable shifts in the international environment. This vulnerability will increase as we become more integrated with the global economy. What happens in another part of the world can have immediate and great spillover effects on our economy and security. But we cannot turn back from globalisation. We depend on the world economy for a living. We will have to work more actively with others to safeguard peace and stability in the region and beyond, to promote a peaceful environment conducive to socio-economic development.2

And of course this global system is still based on the merchant ship and more particularly on the container; the fact that according to some estimates, the average container travels the equivalent of eight times round the world every year shows how globalised and multinational the "system" is. Typically, a merchant ship is owned by a shifting international conglomeration, insured by another set of international bodies, the cargo owned by a third, the crew coming from all over. When it is attacked, it is hard to tell who is being hurt beyond the crew. It may seem curiously anachronistic to expect state-based entities like individual navies to be tasked to protect other people's property, especially when it is not easy to tell who those "other" people are.

This way of looking at the sea-based trading system is not entirely new, however. Mahan himself was aware of it:

This, with the vast increase in rapidity of communication, has multiplied and strengthened the bonds knitting the interests of nations to one another, till the whole now forms an articulated system not only of prodigious size and activity, but of excessive sensitiveness, unequalled in former ages.3

It's a system, which has hugely increased the levels of economic inter-dependence and drastically decreased the importance of geographic distance – so that what happens "over there" matters far more to us "here" than it once did. And as Mahan also spotted, it's a system under permanent threat, never more than now.

Some, indeed most, of the threats to the system arise from those who wish deliberately to attack it. These attacks will usually take place on land, but their consequence may spill over into the sea, and may well need to be dealt with, in part at least from the sea. The system is also vulnerable to a whole set of risks and threats to the good order at sea upon which the safe and timely arrival of merchant shipping depends. For both these reasons, just as the sea is central to the system, so is maritime power to its defence.

Dealing with Threat to Good Order at Sea

These threats include maritime crime (piracy, drugs and people smuggling), the resource degradation that comes about through over-exploitation or pollution, maritime terrorism, simple accident, the quarrels of competing sea-users (e.g. oilmen vs. fishermen vs. submariners) or inadvertent involvement in the quarrels of others (the 1980s tanker war in the Persian Gulf, or jurisdictional disputes such as those in the South China Sea).

In many cases these maritime disorders can be attributed to wider disorders ashore - the crisis in governance in Indonesia increasing piracy rates in local waters, or Al-Qaeda extending its activities to the sea as a means of attacking the system being examples. The result is a vortex of inter-connected threats, such as Al- Qaeda funding its operations through the drugs trade, that needs to be considered as a whole.

This calls for defensive and preventative action against drugs smugglers, pirates, snake-heads, polluters and poachers. Since many of these problems are transnational, local, regional, even global responses rather than just national ones will all be necessary. Since many of them are in the grey area between the civilian and the military aspects of sea use, the response also calls for truly cooperative action by coastguards and navies. And, above all it calls for an all-round "Oceans Policy" decided and implemented by properly "joined-up government" .

These diversifying maritime threats to the system may well require something of a shift in emphasis from the military to the civil aspects of seapower. It may well lead to navies re-defining their relationship with coast-guard forces, or even producing forces which essentially act as a coastguard, and which need to be regarded as a crucial component of homeland security as it is now understood.

If the meaning of maritime security is widened like this and if it is accepted as increasingly important, then all this is also likely to have implications for the traditional concept of freedom of navigation. Perhaps sea space may need to be treated more and more like air space - with merchant ships getting more like airliners, handed on from one land-based sea traffic controller to another. From this point of view, the 21st century is likely to prove a very challenging time for navies.

Dealing with Land-Based Threats to the System

The system can also be seriously threatened by actual and deliberate attack (such as September 11), by potential attack (the war on terror) or by the general effects of gross instability ashore (the tanker war of the 1980s).

The current international maritime operation against Al-Qaeda's international infrastructure, through the interception of terrorists and terrorist materials at sea, shows that effective response requires international cooperation and that this in turns demands a kind of maritime multi-lateralism in which navies seek to cooperate with one another in order to influence the strategic environment in beneficial ways.

Naval diplomacy in all its various forms makes all this possible. Through their capacity to make free use of the comparatively unencumbered ocean as a grand manoeuvre space and being armed with weapons and sensors of increasing range, navies have unique advantages as agents of diplomacy.

They can be a means of coercive diplomacy either to compel wrongdoers to do things they would rather not do, such as seeking to persuade Iraq to withdraw from Kuwait in 1990, or to deter them from committing such acts in the first place. In the tanker war, there were many examples of Western navies deterring attack on passing ships both

by the threat of punishment – "You may be able to do it, but we'll ensure its not worth your while." Or by the promise of denial – "You won't be able to do it." All this is critically dependent on "naval presence" and on the capacity to build and maintain a continuing picture of what is happening everywhere. Failures in intelligence can be catastrophic in human, political and operational terms.

Because even for the US, and certainly for everyone else, pressure on budgets, the growing expense of naval weaponry and the political costs of uni-lateralism mean that there is a growing gap between the extent of their maritime assets and their potential commitments, there is increasing incentive for navies to operate together in common cause against common threats. Hence the importance of coalition building, and the need for navies to develop ways of operating together.

There is nothing new about this. Mahan himself talked about maritime multi-lateralism at the beginning of the last century, advocating "a community of commercial interests and righteous ideals" . But as we move further into the 21 st century, the need for collective maritime action of this sort in defence of the common sea-based system on which the whole world depends becomes ever more obvious. This explains the growing emphasis on maritime coalition building of all sorts ranging from naval visits, cross-training, combined procurement and the holding of combined exercises. This activity is by no means confined to large navies; small navies do all this too. By such means can small navies have large consequences – or at least much larger consequences than their assets might otherwise warrant.

Maritime Power Projection

The most demanding way in which navies may be required to act together in common cause is when they need to project military power ashore, particularly in expeditionary operations at a distance from the home base. Freed, in many cases, from the traditional requirements of peer competition and the need to fight to make use of the open ocean, navies can now concentrate whole-heartedly on exploiting that control. Making use of the vast size, and ubiquity of the world ocean and of their own inherent flexibility, navies can contribute critically to the military capacity to manoeuvre at the strategic, operational and tactical levels. But this requires them to some extent to shift their priorities from the sea to the land, from power at sea to power from the sea.

The variety of forms this can take was demonstrated at the end of 2001 by the US Navy's helicopter carrier USS Peleliu. In November, with 2,100 marines on board, Peleliu and two other warships took up station off Qatar to help guard a meeting of the World Trade Organisation taking place in Doha . Later that month, that same ship was one of the ships that projected US marines 400 miles inland into southern Afghanistan as part of an international and initially sea-based operation against the Taliban and the Al-Qaeda network. Both were clear examples of the way in which cooperative maritime endeavour helps defend a globalised trading system.

Maritime forces have qualities and attributes that make them particularly valuable in the conduct of expeditionary operations. They are usually more flexible and more controllable than their land-based equivalents. They are often more readily available, indeed, first on the spot. They provide a means by which diplomats can slide the intensity of the operation from coercive diplomacy to limited conflict and back again. They have increasing reach and they can sustain operations ashore. They seem to be uniquely useful, in other words, as a means of policing the system.

This does not mean, of course, that they can do all that is required on their own for this is manifestly untrue. Their reach tends to be ephemeral when compared to the long-term effect of "boots on the ground" . There are in-numerable types of instability ashore that are better handled ashore, or indeed can only be handled ashore. The recent Iraq war illustrates both the contribu-tion and the limitations of maritime power.

Rightly or wrongly, the chief protagonists engaged in Operation Enduring Freedom because they thought that Saddam's Iraq represented a clear and present danger to the system. It seems pretty clear that the British at least thought the opening maritime moves were to be a grand act of sea-based coercive diplomacy, expanding on the compellance already in place through the sanctions operation. This campaign of coercion only turned into a war when it failed to elicit the desired response from Baghdad .

Thereafter, seapower moved sufficient military power into the area and provided a last-minute means of rebalancing the force strategically when it became clear that the Northern option of entering Iraq through Turkey was not available after all. Thereafter seapower kept the forces ashore supplied, no mean task given the complexity and the demands of modern military operations. When these operations eventually began, naval forces projected air and missile power far inland, engaged in classic shore bombardments and supported an amphibious operation against

the AI-Faw peninsula. Typically for these very political wars, one of the first operational requirements was to get humanitarian supplies into Umm-Qasr as soon as possible. For this reason, minesweeping of that port's approaches became not merely an enabler of maritime op-erations, but in this area at least almost their whole point.

The need for navies to cope with the very different challenges of maintaining sea control in the narrow seas and the littoral against everything from shore-based aviation, missiles and artillery, though mines, coastal submarines and fast attack craft to swarming attacks from terrorists on jet-skis must be one of the most obvious and immediate lessons of this exercise in maritime power projection. A moment's reflection on what might have been the consequence of a serious challenge to the gathering of an international armada in the Bay of Bengal for Operation Enduring Freedom should also make it clear that sea control in the classic Mahanian bluewater sense it is still the essential enabler, because of what it makes possible.

But navies around the world are increasingly recognising that to be really useful, they need to have an impact on the unfolding of events ashore. This is not merely a question of their being able physically to project military power; it also mandates a thoroughly "joint" force, which is much more than merely a sum of its parts. This requires a shift from looking at general inputs to specific outputs. For example, are carrier-based aircraft more or less useful than land-based ones? What is the required effect and how might it be best achieved in this particular case? This shift towards "Effects-Based Operations" is both facilitated by and predicated on network-enabled capabilities that challenge traditional naval ways of doing things and some very ancient naval expectations about their relative operational independence and freedom of manoeuvre.

All in all, there can surely be very little doubt that maritime power is transforming from its historic fixation on "simple" military peer competition and that, because of this, the sea, and the forces that operate upon it are going to be critical for the future development of the new world order. But, at the same time, these changes and challenges suggest that sailors around the world are having to do some very hard thinking about how they cope, and about the extent to which they need to reconsider some very long-standing assumptions. For all these reasons, Shylock may have been exaggerating but there's still a lot in what he said.

Endnotes

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Economic Power, Maritime Power and Maritime Challenges in East Asia

by LTC Joshua Ho

For a long time the link between economic power and maritime power has been obvious and intuitive. The quest for economic power is a motivation for the development of maritime power and the possession of maritime power facilitates the attainment of economic power. An example of this link between maritime power and economic power can be found in the mercantilist era of Pre-World War I colonialism, where goods sought new markets in the areas that were colonised. In fact, from a very early stage, prominent personalities like Sir Walter Raleigh had also recognised the nexus between maritime power and economic power.

Whosoever commands the sea commands the trade; whoever commands the trade of the world commands the riches of the world, and consequently the world itself.

The mercantilist period can be said to be the precursor of modern globalisation, and can best be described as globalisation by force as the people in the new markets did not really have much choice but to accept the goods introduced by their colonial masters, mainly out of ignorance of other alternatives. Of course, these goods still expanded the available choice and enhanced the quality of life of the colonised peoples. However, in this new age of globalisation, where information is ubiquitous and rapidly becoming commoditised, Sir Walter Raleigh's dictum still remains true because of a few factors:2

First, over 70% of the world's surface is covered by ocean;

Second, over 90% of international trade, when measured in weight and volume, travels by water, which includes most of the world's raw materials;

Third, the majority of the world's major cities and urban populations lie within 200 km of a coastline; and

Fourth, international law provides for freedom of the seas in which any nation can use the open ocean for purposes of trade or defence without infringement on another's sovereignty, subject to international agreements on pollution and exploitation of resources.

However, maritime power is not just about naval warfare or the possession of a large and powerful navy. The term is more encompassing and has a much broader concept and a country that is said to be a maritime power should have at least the following five components:

Access to international trade and commerce through the sea,

Access to raw materials and natural resources through the sea,

Access to and be able to use resources in the ocean,

The ability to use naval and maritime economic power as instruments of diplomacy and deterrence in time of peace,

and

The ability to operate navies in war.

The Asia-Pacific Century

Much has been written and said about the 21st century being the Asia-Pacific century as the region is expected to experience phenomenal growth rates that are unprecedented in the history of world development and a renaissance of sorts is in the offing. Projections done by US intelligence agencies and wealth management institutions alike have confirmed that we are actually witnessing the beginnings of an Asia-Pacific century.

Currently, the combined 2002 GDPs of China, India and Japan are already half that of the United States in nominal terms.3 By 2015, the CIA's long term growth model has forecasted that the combined GDPs of China, India and

Japan would surpass that of the US and the EU at US$19.8 trillion, US$14 trillion and US$11.6 trillion respectively in 1998 dollars.4 By 2050, the situation will become even more astounding as Goldman Sachs has projected that the combined GDPs of China, India and Japan would be slightly more than twice that of the US and about four times that of Russia, United Kingdom, Germany, France and Italy combined in 2003 dollars.5 In 2050, the largest economies in the world will be China, United States and India respectively, with Japan at a distant fourth. In the short span of time of only one generation, the economic centre of gravity would have shifted to Asia .

As the economic centre of gravity shifts to the Asia-Pacific, it is natural and inevitable that maritime power also shifts to Asia given the nexus between maritime power and economic power. Again, the shift in maritime power may have already started by observing four current trends:

Increasing trade flows into and within Asia,

Rising energy demand in Asia,

Strength of the merchant fleets in Asia, and

Growth of regional navies.

Trends Indicating a Shift in Maritime Power

Increasing Trade Flows into and within Asia

The first trend is that intra-Asian trade flows have increased and Asian trade with the US and Europe is also increasing. In particular, China's trade expansion has remained outstanding, as its exports and imports have risen by 30% between 2000 and 2002 even as world trade stagnated.6 China has become the fourth largest merchandise trader in 2002, and across the globe, China has become a major supplier and a major export destination for many countries including ASEAN, South Korea, Taiwan, Japan, India, the EU and, of course, the US.7 Japan's intra-regional trade has also increased and, for the first time, its exports to China, Hong Kong, and Taiwan have exceeded its exports to the US in 2003.

Rising Energy Demand in Asia

The second trend is that resource demand, particularly energy demand, in Asia is rising in tandem with its economic development. Asia as a whole currently uses about as much energy as the US . By 2020, Asia will roughly double its energy consumption while US consumption will rise by just slightly more than 25%. By then, Asia will have the same energy consumption as North America and Western Europe combined.8

However, Asia is only close to self-sufficiency in coal. For natural gas, Japan , South Korea and Taiwan already consume most of the region's methane supply. To support the expected in-crease in consumption in natural gas, the region will have to turn to Russia as well as the Middle East . As the absolute demand for oil rises, Asia has also to import oil from outside the region, particularly from the Middle East . This increased energy demand will mean an increasing reliance on the sea since most of the energy is transported by sea.

Strength of Merchant Fleet

The third trend is that the strength of the merchant fleet in Asia has been increasing relative to the proportion of the world's fleets. By July 2003, Asia owns about 40% of the merchant fleets amongst the Top 20 owners in the world, and 41% by tonnage. If we include the US , then the Asia Pacific owns about 46% of the merchant fleets and 48.1% by tonnage and the figure looks set to increase in the future. Already, East Asia is home to the world's largest ship-builders with Chinese, South Korean and Japanese shipbuilders having 12.8%, 36.2%, and 28.8% of the global order book in terms of tonnage currently.9 The construction of the world's largest shipyard with a frontage of 8 km in Shanghai, China will further consolidate East Asia's position.10

Growth of Regional Navies

The fourth trend is that the navies in the region will grow in Asia . Asia-Pacific governments are expected to double

their current expenditure on new naval ships by the end of this decade, partly to protect their natural resources and partly to insure against regional conflict. Military reforms and modernisation programmes have been initiated in the region and East Asia's Regional Defence Expenditure as a percentage of GDP has also risen to 2.08% in 2002 as compared to 1.94% in 2001.11 The growth in emphasis on defence and in particular the Navy is expected to continue into the future as regional governments are expected to spend a total of US$14b annually by 2009.12

Alternative Global Future

The trends of increased trade flows, increased energy demands, increased strength of merchant fleets, and increased spending on navies in the region all point to a shift of maritime power to Asia . As maritime power in the region increases, the ability of the regional countries, as well as extra-regional powers like the US , to manage the power politics that emerge will be a key determinant of stability. But what kind of possible future scenarios are we looking at? In the National Intelligence Council's sponsored study on global trends by 2015, four alternative future global scenarios have been postulated based on outcomes of the globalisation process, which can either be inclusive, pernicious, result in regional competition, or result in the creation of a post-polar world.13

Inclusive Globalisation

The inclusive globalisation scenario depicts a positive outcome of globalisation where a majority of the people benefit from globalisation and global cooperation increases. Conflict is minimal within and among states that benefit from globalisation and internal conflicts will persist in and around the minority of states that are left behind.

Pernicious Globalisation

The pernicious globalisation scenario paints a negative outcome of globalisation where the elites thrive and the majority of the population fail to benefit from globalisation. Internal conflicts increase, fuelled by frustrated expectations, inequities and heightened communal tensions.

Regional Competition

The regional competition scenario postulates that regional identities will sharpen in Europe , Asia , and the Americas , driven by political resistance to US global preponderance with each region being preoccupied with its own economic and political priorities. Military conflict among and within the three major regions does not materialise, but internal conflicts increase in and around the other countries left behind.

Post-Polar World

The post-polar world scenario postulates a waning US influence in world affairs due to domestic politics and a stagnating economy which forces it to withdraw its military presence globally. Europe turns inwards and Asia continues to prosper in the absence of the United States . In the absence of the United States , longstanding national rivalries among the Asian powers are ignited and conflict is postulated between traditional rivals, China and Japan   .

Maritime Challenges in East Asia

In three of the four scenarios, the possibility of internal conflicts is postulated, and there is a possibility of these conflicts spilling over to its neighbours with one scenario of a regional conflict. If the aim is to move towards an inclusive globalisation scenario, where the majority of the people benefit from globalisation, then the ability to manage conflicts becomes a key determinant to regional stability and the likelihood of a positive outcome. Inter-state conflict prevention is crucial as it appears that Asia remains the one place in the world where direct great power warfare seems possible over the next generation as previously authoritarian or closed regimes experience increasing political pluralism due to increased demands for more transparency and good governance by investors, who want to be assured that their monies will be safe. Mansfield and Snyder have shown that the period of transition to a more pluralistic political environment is the most dangerous time for interstate wars.14 In the maritime arena, the two main challenges are:

To ensure the security of the sea lanes for continued unimpeded flow of resources and goods, and

To prevent maritime conflicts between states due to resource and trade competition as the region and their navies grow. 15

The challenges to resource and trade security will arise mainly from piracy and maritime terrorism in and around the vital sea lanes and choke points in East Asia , of which the Malacca and Singapore Straits are the key thoroughfare for merchant shipping. Inter-state maritime conflict may also arise due to competition for resources, territorial boundary disputes, and from traditional nationalistic rivalries.

Security of Sea Lanes

Piracy

According to the International Chamber of Commerce's International Maritime Bureau, the number of piracy attack on shipping throughout the world has reached a record number in the first nine months of 2003. The Straits of Malacca accounted for about one-third of the world total, making it one of the most dangerous waters in the world.16 The lethality of the attacks has also increased and crew deaths attributed to pirate attacks have tripled as compared to last year.17 An increase in piracy rates and its lethality can drive up direct costs of shipping of around US$16b a year.18 Indirect costs of shipping also go up due to higher insurance rates. The emphasis on combating piracy is also important, as some scholars have highlighted a possible terrorist involvement in piracy as a means for raising revenues.19

Maritime Terrorism

Another threat to resource and trade security is the spectre of maritime terrorism. In the new era of globalisation, ports are increasingly differentiated by their ability to be providers of complete logistics solutions, and their ability to handle the latest generation of container ships coming on stream. This trend means that high-volume trade will focus on just a few mega ports, making these ports the critical nodes of global seaborne trade.20

For example, it has been estimated that the global economic impact from a closure of the port of Singapore alone could easily exceed US$200b per year from disruptions to inventory and production cycles.21 The shutting down of the ports in the western coast of the US due to industrial action which cost up to a US$1b a day in October 2002 also serves to highlight the importance of hub ports as crucial nodes in world trade.22

Hub ports therefore are potential lucrative targets for terrorists who may link up with pirates to hijack oil-laden super-tankers, carriers of liquefied petroleum gas, liquefied natural gas or chemicals and turn them into floating bombs, to disable ports.23

Resource and Trade Competition: Inter-State Maritime Conflict

The other maritime challenge is the possibility of inter-state maritime conflict. Inter-state conflict can arise in the region as a result of competition for resources, from traditional nationalistic rivalries, as well as from competing territorial claims. The shifting of maritime power to the region coupled with the increased spending in regional navies can provide the resources to fuel a conflict. The three most likely areas that may fuel a maritime conflict will be issues relating to North Korea's nuclear proliferation, Taiwan's continued insistence on independence and to a lesser extent the disputes over maritime boundaries and islands in the South China Sea.

North Korea

Although North Korea has acknowledged that it has a nuclear weapons programme, it still appears to be reluctant to launch wide-ranging economic and political reform. The launching of the first six party talks gives hope to some solution to the Korean situation, but whether North Korea will follow in Libya's footsteps is debatable and dependent partly on how much aid the US is willing to provide and whether the US is willing to formally agree to non-aggression.24 A positive sign that North Korea is ready to begin a new round of diplomacy can be seen by its willingness to accommodate the visit of an unofficial US delegation and show them the Yongbyon nuclear complex, which was at the centre of US allegations of North Korea's nuclear weapons programme.25

Taiwan

In Taiwan , what started out as election rhetoric may also fuel a fire that cannot be stopped. Political opinion in Taiwan seems less and less willing to recommit itself to the island's eventual reunification with China . Instead, President Chen Shui Bian's continued insistence that Taiwan be regarded as a separate state and have a more active role in the international community is a recipe for conflict as China has reiterated that it will not tolerate a split. Although, the Bush Administration has recently indicated opposition to Taiwan's intention to hold a referendum and

also opposed any action by Taiwan that could be interpreted as steps towards independence,26 it remains to be seen whether Chen will tow the line or whether China will resort to military action. However, Chen appears to have toned his rhetoric somewhat recently when he said that the referendum will be on Taiwan's self-defence rather than on independence. The key will be to watch what happens immediately after the elections in end March.27

Island and Boundary Disputes

As far as territorial claims go, there are roughly six competing resource, territorial, and boundary claims that are sources for concern. These claims include the Spratlys, Paracels, the Kuriles, demarcation of maritime boundaries in the Gulf of Thailand , the Senkaku or Diaoyu Tai islands, and the Liancourt Rocks area. Of the six, the dispute over the Spratlys remains the most troubling due to the number of claimants involved and the strategic locations of the islands along the strategic sea-lanes in the South China Sea.28

Development of A Web of Relationships in East Asia

Despite the challenges posed to resource and trade security through piracy and maritime terrorism, and the possibility of inter-state maritime conflict, recent developments have made the resolution of these challenges more likely. The increased cooperation through the development of a web of relationships in East Asia increases the security of access to resources and trade and decreases the likelihood of inter-state maritime conflict.

The region as a whole is beginning to be more integrated politically and economically with constant dialogues and summits being held to discuss regional issues of concern. Asean's expansion to include all 10 South-east Asian states and the upgrading of dialogues with Japan , South Korea and China to summit level heralded a new era of cooperative engagements. The Asean Regional Forum also serves to bring the US , Russia , and China in a multi-lateral forum to discuss security issues of regional concern. The acceding of China and India to the Treaty of Amity and Cooperation (TAC) at the Asean summit in Bali in October 2003 and Japan's decision to accede to the TAC in the Japan-Asean Commemorative Summit in December 2003 promote stability in the region as the signatories commit themselves to working for peace and stability in the region by seeking cooperation, renouncing force in settling disputes and using the High Council to settle disputes. The trend towards dispute settlement in accordance with Inter-national Law is a positive development that will contribute towards stability.

In tandem with the increase in political dialogue between the regional countries, a web of economic relationships has also been developed in the form of bilateral Free Trade Areas (FTAs). China offered to establish a FTA with Asean within 10 years. Japan is proposing a comprehensive economic partnership with Asean and is starting negotiation of FTAs with the Philippines , Thailand and Malaysia . India , intent to remain engaged, also intends to sign an FTA with Asean within the next 10 years. Asean itself is also working towards bringing about an Asean Economic Community by 2020.

Military maritime cooperation has also increased, primarily using the anti-terrorist or piracy platform as a rationale for cooperation. The key powers, China , India , Japan , and the US , have shown a desire to increase their maritime influence in the region. The web of relationships between the US, regional powers like Japan, China, India, and the Asean countries, together with Naval and Coast Guard presence serves to act as a deterrence and dissuade potential actors from conducting acts of maritime terrorism or piracy.29 The web of relationships in the political, economic and military spheres, when fully matured, will also provide a mechanism for the resolution of conflicts before they arise.

Towards an Inclusive Globalisation Scenario

The Asia-Pacific century looks set to be established, and fuelling the Asia-Pacific engine will be the economic growth of China , India , Japan , and the US . As a by product, and because of regional economic growth, we will see a change in focus from the land to the sea as maritime power shifts to East Asia . The increase in intra-regional and extra-regional trade flows, as well as energy demands will result in an increase in regional maritime traffic, and the majority of the merchant ships plying the regional sea-lanes will not only be built in the region, but will also be owned by regional corporations. To safeguard their maritime interests, regional players will seek to modernise their maritime forces, and may increase deployments in the region to assert their interests, safeguard their trade corridors, and deal with the prospect of piracy and maritime terrorism. How this surge in regional maritime power is accommodated, and how regional and extra-regional countries, like China, India, the US, Japan, Russia, and the Koreas, manage the power politics that emerge will be a key determinant of regional stability. Nurturing the as yet infant regional multi-lateral frameworks to maturity in order for the regional conflicts to be resolved in accordance with the rule of international law, and moving towards an inclusive globalisation process where the majority of people benefit should therefore be a goal for all concerned to strive towards.

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Singapore And The Revolution In Military Affairs: An Outsider's Perspective

by Dr Tim Huxley

Singapore's military capability is, by most measures, the most advanced in Southeast Asia . The build-up of Singapore's armed forces and its national defence industry, as well as local defence R&D, reflects the determination of the People's Action Party government to ensure the city-state's survival in a potentially hostile regional environment. Over the last decade, the key advantages of a highly-developed economy and a relatively highly-educated population, reinforced by increasingly intense interaction with the armed forces and defence industries of advanced industrial countries, have allowed Singapore to begin taking advantage of the opportunities offered by the contemporary Revolution in Military Affairs (RMA). The Singapore Armed Forces (SAF) has fielded increasingly sophisticated systems, particularly in the RMA-critical areas of precision weapons, command, control, communications and computer-processing (C4), and intelligence, surveillance and reconnaissance (ISR). Integrated logistic support (ILS) is also well-developed.

At the same time, several factors constrain Singapore's efforts to exploit the RMA more fully. Crucially, the vital doctrinal and organisation innovation required to maximise the benefits of the RMA is so far rather less well advanced. Secondly, Singapore's defence planners need to focus on adapting the RMA to the city-state's strategic circumstances, in terms of the need to respond to an expanding range of potential asymmetric threats as well as increasing military capabilities within the region. Thirdly, the modernisation of Singapore's military capabilities is taking place in circumstances of budgetary stringency, exacerbated by the financial implications of major procurement programmes aimed at enhancing conventional deterrence and war-fighting capability. However, the notion of military transformation, which is currently taking root in Singapore's defence establishment, offers a framework for mitigating these factors.

Singapore's Defence Posture Geopolitical circumstances have forced Singapore's government to take defence extremely seriously since the city-state separated from Malaysia in 1965. Though the government sees security holistically and the strategy of Total Defence provides for the wholesale mobilisation of the population and national resources in time of crisis or conflict, the military component of defence has always loomed large. Despite Singapore's small size and population, by the late 1990s its armed forces were probably the best-equipped, best-trained and potentially most effective in South-east Asia . The government routinely devotes 25 - 30% of its total annual spending (roughly 5% of GDP) to the armed forces. In 2003/4, Singapore's defence budget amounts to S$8.25b (US$4.7b), by far the largest national defence effort in Southeast Asia.1

In developing the city-state's armed forces, Singapore's leaders have increasingly stressed the im-portance of exploiting technology to compensate for the lack of strategic depth and shortage of professional military manpower. The SAF prizes its "technological edge" , which has almost certainly provided it with conventional military advantages over any likely adversaries in its immediate region. In part, this technological edge has derived from purchases of advanced military equipment from overseas suppliers (for example, F-16C/D fighter/strike aircraft from the US during the 1990s) but it is also a product of Singapore's own highly capable defence industry and substantial defence R&D efforts.

Clearly, Singapore's defence establishment recognises the RMA's significance. According to Defending Singapore in the 21st Century (DS21), Ministry of Defence's (MINDEF) most recent comprehensive defence policy statement (issued in February 2000):

The revolution in military affairs will change the nature of warfare. Superior numbers in platforms…will become less of an advantage unless all these platforms can be integrated into a unified, flexible and effective fighting system using advanced information technologies. At the same time, the ever-increasing reliance on information technology means that protecting one's own information systems and disrupting the enemy's will become a major aspect of warfare…2

Placing the SAF's future development firmly in this new context, DS21 promised that the SAF would "exploit developments in the RMA, such as the integration of information technology into weapon systems" to achieve battlefield superiority.3 As for Singapore's defence industry,"the digital battlefield of the future and the need for commercial technology in IT and communications will influence the approach we take to ensure that we sustain a technological edge."4

Organisational and Doctrinal Issues

In purely technological terms, Singapore is evidently acquiring many of the necessary pre-requisites for participation in the RMA. However, MINDEF and the SAF have not so far implemented the doctrinal and organisational innovations that are probably necessary to absorb these technologies into an effective "system of systems" . While there are important indications that the SAF has begun laying the foundations for major doctrinal shifts and organisational restructuring, there is clearly still a long way to go.

Even before discussion of the RMA became voguish, the SAF 2000 planning blueprint adopted in 1988 as the result of a major force structure review brought significant changes to Singapore's military organisation and doctrine, particularly in the army. Under Army 2000, a single-service derivative of SAF 2000, army doctrine stressed offensive combined arms operations and the conduct of a "24-hour battle" . In organisational terms, the most important change under Army 2000 was the introduction of genuine (as opposed to nominal) combined arms divisions, each including an armoured brigade as well as two infantry brigades, even in peacetime. Another innovation was the establishment of 21st Division, a light rapid deployment formation trained for air-mobile and amphibious operations. In the mid-1990s, the organisational evolution went a step further with the integration of reservist and active units within the three combined arms divisions.5

SAF 2000 also brought much greater emphasis on joint-service cooperation, and from 1994 established the Integrated Warfare concept as the basis for a doctrinal framework which attempted to integrate and exploit synergies in the three services'capabilities through a joint-service command and control system. Because of the SAF's relative youth as an organisation, small regular cadre and the lack of strong single-service traditions, institutional obstacles to joint operations are rather weaker than is the case in many longer-established national armed forces. As a result of this new emphasis on joint-service operations, in 1989 the air force established a Tactical Support Wing, which became Tactical Air Support Command (TASC) in 1991 with responsibility for planning, co-ordinating and providing air support for the army and navy. One key TASC activity is operating UAVs in support of the army. The increasing emphasis on joint-service cooperation was also clear in the establishment in 1995 of a tri-service officer training academy, the SAFTI Military Institute. In addition, the Tri-Service Staff Course, which is conducted six times a year for a total of up to 240 officers, is aimed specifically at furthering the SAF's Integrated Warfare capability.6 Joint-service exercises have been held routinely since the 1990s.

MINDEF's commitment to exploiting new information and communications technologies to give the SAF a "strategic edge" in the area of C4 and ISR was clear even in the late 1980s and early 1990s.7 In 1992, it was reported that the SAF planned operations based on a "radio electronic combat" doctrine that integrated electronic warfare with reconnaissance, physical disruption and deception.8 However, this doctrinal emphasis increased greatly under Army 21, the planning blueprint which has guided the development of the SAF's land component since April 1999. Army 21 was written in the context of the RMA and emphasises the development of information capabilities, deriving from the "integration of command, control, communications and sensor systems", sufficient to achieve "dominant battlefield awareness".9

Senior MINDEF officials (from ministerial-level downwards) and many SAF officers speak the language of the RMA with a high degree of fluency, and evidently recognise the military component of a broader problem with which Singapore's leaders have been grappling since the 1990s: how to encourage Singaporeans to be more creative in order to retain and enhance the city-state's competitive advantages. A key problem in relation to the RMA is that Singapore's military command and control have in the past tended to be rigid and strictly hierarchical, with effective authority concentrated at the higher levels of MINDEF and the SAF. A reluctance to delegate authority to middle-level and junior commanders has been characteristic. For example, air force squadron commanders have reputedly hitherto been able to exercise little operational initiative compared with their Australian or British counterparts. The SAF's lack of organisational flexibility has been reinforced by not only the political and administrative system, which has tended not to reward individualism or creativity, but also by the local cultural milieu in which respect for elders and seniors, and considerations of "face" , have traditionally been central features.

As in other areas of competition, it is evident that, in the field of defence, technological superiority alone is not sufficient for Singapore to come out on top. New information and com-munications technology has evidently stimulated much thinking within the SAF about the need for new command and control doctrines and new forms of military organisation. In 1999, the Singapore air force's Chief of Staff, Brigadier-General Rocky Lim, pointed out that, by providing rapid access to more information, the latest IT applications increase the pressure for decision-making at lower levels in the chain of command. According to Lim, this "could change your entire doctrine of air warfare".10 The influence of intensified interaction with Western armed forces, which already practise more decentralised command and control, may also push MINDEF and the SAF to delegate operational authority to lower levels of

command more effectively. This applies most obviously in case of the air force's long-term training programmes in the US , Australia and France , but elements of all three services train with Western forces that are themselves going through fundamental doctrinal and organisational change.

However, glimpses of internal debates within the armed forces, revealed in sources such as POINTER, suggest some impatience amongst younger middle-ranking officers for doctrinal and organisational change which would lend greater substance to Singapore's incipient RMA. As early as 1992, one young army officer (the commander of a Guards battalion) argued that the SAF could gain an edge over opponents by adopting the German military philosophy of Auftragstaktik, involving considerable decentralisation of command and control, and greater expectations of initiative on the part of lower-level commanders and even individual soldiers:

Our Asian heritage has unfortunately...put too much premium on the value of "face" . We are exceedingly hierarchy-conscious to the extent that constructive criticism is extremely rare from bottom-up. It will take much time and deliberate effort to dispel the fear of ... subordinates to speak up if they think their superiors are in the wrong, and for the latter to accept constructive criticism.11

Writing almost a decade later, a more senior SAF staff officer returned to this theme, pointing to both the German army's Auftragstaktik and the Israeli army's similarly decentralised command system, both based heavily on the initiative of commanders and soldiers, as examples to be followed in implementing Army 21.12

More recently, several POINTER articles have argued for major organisational change within the SAF in response to technological developments. The essence of these arguments is that the SAF should adopt what one officer termed a "flatter and more network-based system".13 More specifically, another officer has indicated that Army 21 may just "put new wine into old bottles" , and argues in favour of "streamlined and flattened military organisations" which will "allow the SAF to compress the time needed for battle-procedure and decision-making" while at the same time reducing the vulnerability of the army to a pre-emptive enemy attack. Following the examples of the US Army's Force XXI and the French brigade-based army, he proposes that the Singapore army's basic combined arms units should be organised around brigades rather than divisions.14

Singapore's Strategic Future: How Relevant is the RMA?

Another key challenge for MINDEF and the SAF is to develop new doctrines and organisational forms that enable exploitation of advanced technologies in ways that are relevant to the city-state's evolving strategic predicament. Singapore's regional security environment has deteriorated significantly since the economic recession of 1997 - 98 and there are few signs that the city-state's strategic circumstances will improve significantly in the foreseeable future.

In these uncertain circumstances, Singapore's leaders - while never pointing at any specific threats - have repeatedly emphasised the continuing importance of the republic's military instrument for deterring conventional threats from other states. The ability of Singapore's defence establishment to continue developing and integrating operational concepts for the advanced information and communications technologies extensively employed for command and control, satellite and other surveillance systems (including airborne early warning, maritime patrol and tactical reconnaissance aircraft, UAVs, and ground-based radars), and precision-guided weapons – in other words, RMA-type capabilities - will be key to the SAF's continuing regional military superiority. The aim will be to allow the SAF (particularly the air force, navy and artillery) to locate, target and destroy targets more effectively in the context of round-the-clock combined arms and joint-service operations. At the same time, greater emphasis on criteria of range and endurance in selecting major platforms (principally ships, submarines and aircraft) will provide Singapore with an artificial form of strategic depth by allowing the SAF to fight at greater distance from home.

However, like their counterparts in other states attempting to engage in the RMA, Singapore's security planners have needed to take into account possible asymmetric challenges to their probable conventional military superiority. Since the 1990s, social and political developments in Indonesia , in particular, have posed a new type of security concern for Singapore . Continuing social, economic and political instability, together with intensifying secessionist and inter-communal conflict around Indonesia's periphery, have raised the possibility of a "complex emergency" on Singapore's doorstep involving a breakdown in law and order, warlordism, communal conflict, piracy, hostage-taking, unregulated population movements, famine, rampant disease and environmental catastrophe. It is conceivable that the SAF could be drawn into diffuse, long-term low-intensity operations.

Other new challenges - from either governments or non-governmental groups - might include various combinations

of bombings, the use of weapons of mass destruction (particularly chemical or biological agents) or information attacks, aimed at Singapore's civilian population and national infrastructure as well as military targets. Contamination of Singapore's water supply, for example, could be a particular effective asymmetric weapon. Though countering such asymmetric threats would largely be the responsibility of "Home Team" non-military agencies under the Ministry of Home Affairs (principally the police and civil defence force), the SAF has a range of capabilities relevant to such contingencies (for example, the army's Special Operations Force in the anti-terrorist role). According to Deputy Prime Minister and then-Minister for Defence Tony Tan, during 2000 - 2001 MINDEF and the SAF, working with the "Home Team" , "made good progress" in developing "concepts, frameworks and operational plans" in relation to potential low-intensity conflict.15

The September 11 attacks in the US and the Singapore authorities'arrest in December 2001 of 15 members of Jemaah Islamiah (JI), the Southeast Asian terrorist organisation allied with Al-Qaeda, in connection with a plot to attack local targets accentuated concerns over potential asymmetric threats. The main impact on Singapore's security and defence planning was to reinforce the validity of the long-established idea of Total Defence, which involves non-military agencies as well as MINDEF and the SAF in ensuring Singapore's security.16 In November 2001, the government announced that it would implement a "homeland security" strategy involving closer cooperation between MINDEF and the home affairs ministry, and the SAF and police.17 The JI attacks on Bali in October 2002 and on the Marriott hotel in Jakarta in August 2003 further exacerbated Singapore's acute concerns over the threat from terrorism.

Particularly in light of recent regional developments, it is clear that Singapore's developing RMA-type capabilities do not provide a panacea for its widening security requirements. However, they are not necessarily irrelevant to emerging low-intensity security challenges. For example, the greatly-improved ISR capabilities likely to be generated by Singapore's investment in UAVs and satellites will be highly germane to the monitoring of population and shipping movements in the Malacca and Singapore Straits . Moreover, technological improvements in the capability of ordinary infantry soldiers, ranging from the SAR-21 rifle to the Advanced Combat Man System, have a wider utility than simply on a high-intensity battlefield against a conventional enemy. Information security systems may be as useful in protecting critical national infrastructure such as public utilities and air traffic control against "cyber-terrorism" as they are in defending military C4I systems against attacks by opposing armed forces.

Budgetary Constraints

A third major factor complicating the SAF's ability to benefit from the RMA is that Singapore's resources for military procurement and R&D are slim, particularly when compared with those available to the major Western military powers. To put Singapore's military budget in perspective: in approximate terms it amounts to less than 2% of the United States'or 12% of Japan's military spending. The RMA offers huge improvements in capability, but at great cost: even the United States'close military allies in Europe , such as the United Kingdom (which spends more than seven times as much as Singapore on defence) themselves face con-siderable difficulties in keeping up with US technological advances and ensuring inter-operability. With the deceleration of Singapore's economic growth and the emergence of new demands imposed by counter-terrorism measures on the overall security budget, there is little prospect that defence budget can expand significantly in real terms as long as the govern-ment maintains military spending within the long-established self-imposed cap of 6% of GDP. Already, it appears that the current budget crunch has not only restricted spending on overseas exercises and other training activities, but has also forced the deferment of some major procurement projects. Senior defence officials have highlighted the potential impact on the SAF in the longer-term of the escalating cost of replacing existing equipment.18 For MINDEF and the SAF, developing RMA-type capabilities in the prevailing tough budgetary environment is clearly a major challenge.

Transformation

At the beginning of the present decade, Singapore's defence establishment began considering broader issues related to the SAF's modernisation, and participation in the RMA has sub-sequently been presented as one component of a thoroughgoing process of military transformation. Key senior MINDEF officials and SAF officers see such transformation as imperative if the SAF is to develop its operational flexibility in an "uncertain and complex security landscape" , make the most of a limited defence budget in the context of escalating equipment costs, compensate for a demographic shift that will reduce personnel strength, and exploit the RMA as fully as possible - thereby maintaining its capacity to deter and defend against both conventional and unconventional threats.19

Writing in a recent issue of POINTER, Andrew Tan, formerly Director (Policy) in MINDEF, assessed the implications of transformation for the SAF. While Tan's comments were general rather than specific, they do provide some

insight into the way that the SAF may develop in the future. Importantly, he argues that change in the SAF will involve "a series of adaptations to an evolving security environment" – in other words, more of an evolutionary than a revolutionary transformation. While maintaining its capacity to deter conventional attacks, the SAF will need to "move away from core competencies based on any form of numerical advantage" towards developing a "portfolio of capabilities" in which it maintains a "qualitative edge" that will provide Singapore's political leadership with a range of options in coping with an increasingly diverse threat spectrum.20

A significant indication of the potential for radical change in Singapore's military thinking and organisation came in early 2003 when MINDEF and the SAF established the Future Systems Directorate (FSD). FSD, which is commanded by a one-star officer known as the "Future Systems Architect" and has been allocated responsibility for managing 1% of the defence budget (ap-proximately S$83m in 2003 - 2004), is charged with challenging established military thinking to enable the SAF to cope effectively with the rapidly changing and unpredictable strategic environment. The Directorate is complemented by the SAF's Centre for Military Experimentation (SCME), which will use sophisticated simulations in its "battle labs" to "develop and evaluate new war-fighting concepts by creating an environment for exploration, experimentation and demonstration".21 CME's emphasis, at least initially, is on exploiting C4I systems more extensively as force multipliers.

Two monographs published during 2003 under the auspices of POINTER underline the extent of officially-encouraged new thinking within MINDEF and the SAF and indicate ways in which Singapore's defence sector could change as a consequence of the transformation initiative now under way. Building on recent debates in POINTER over how the SAF might become a more effective "learning organisation",22 the first monograph - Creating the Capacity to Change: Defence Entrepreneurship for the 21st Century - argues for a major cultural change that will create "C2C [capacity to change] space" alongside existing organisational structures in the sector. The intention would be to encourage "defence entrepreneurship" in order to facilitate "constant change and innovation" in strategy, capability and warfighting. In the area of strategy, suggested "first steps" include building links with experts in critical national infrastructure, creating a new MINDEF/SAF forum and introducing relatively short-lived project offices to produce scoping studies of potential military innovations, and measures to nurture alternative viewpoints within the system. In the capability sphere, the monograph argues for "a capability innovation eco-system" which generates multiple, competing ideas. At the warfighting level, suggestions include setting aside "existing norms and practices" to establish new commands and formations, using modular forces which can quickly be reconfigured for new tasks, and developing wider intelligence networks.23 The second monograph presents the case for the Integrated Knowledge-based Command and Control (IKC2) doctrine – intended to allow the streamlining and sharing of C2 resources throughout the SAF - as a central element of trans-formation efforts.24

In the medium-term future (perhaps by the year 2010), this radical thinking about the SAF's structure, equipment, and training, combined with the force multiplication effect of new C4I systems, implies that the SAF may evolve substantially. There will, of course, be considerable continuity in some areas of defence policy: for example, conscripts and reservists will continue to provide the great bulk of the SAF's manpower. However, large formations (most obviously the army's divisions, or at least some of them) may well disappear, while smaller formations could be better-equipped and more powerful. There are likely to be more specialist formations such as the Chemical, Biological, Radiological and Explosives Defence Group, established several years ago. At the same time, there is likely to be even closer cooperation between MINDEF and the SAF on the one hand, and non-military security agencies on the other.

Major items of older equipment are unlikely to be replaced one-for-one, as much more capable weapons systems extensively networked with ISR assets, are procured (or in some cases developed locally). For example, a single squadron of highly-capable fourth-generation Next Fighter Replacement (NFR) combat aircraft, due for selection in early 2005, might be judged sufficient to replace three squadrons of F-5Ss and A-4SUs. At the same time, new systems not previously fielded by the SAF may substantially increase its firepower: cruise missiles could provide a lethal and accurate but cost-effective option for long-range strike.25 Remotely-controlled systems, such as naval UAVs or the LALEE airborne platform being considered as a successor for the RSAF's E-2Cs, may also play considerably more important roles in the future SAF. Overseas training will remain important, but may involve new locations that allow for exercises against less familiar adversary forces.

Conclusion

For little more than S$8b annually, MINDEF and the SAF provide Singapore with a remarkable range of military capabilities. In Singapore's immediate regional context, these capabilities presently outclass those of any potential opponent in conventional military terms. Singapore possesses highly educated and IT-literate military, research and industrial personnel, and its defence-industrial and R&D establishment has set up an extensive network of

international links. For these reasons, it can almost certainly sustain its conventional military advantage for the rest of this decade. Not-withstanding bilateral and multi-lateral confidence-building efforts, however, in the longer-term Singapore is likely to face growing challenges from the modernised and expanded military capabilities of other regional states. In these circumstances, the city-state will need to develop smarter, more hard-hitting military capabilities to stay ahead of the game and maintain the SAF's deterrent and defensive capacity.

So far, the need for greater doctrinal and organisational innovation, the requirement to develop and adapt new technologies and military thinking in response to emerging uncon-ventional challenges (such as terrorism and complex emergencies) as well as conventional threats, and budgetary constraints have prevented Singapore from leveraging the information-led RMA to maximum benefit. However, these factors have encouraged MINDEF and the SAF to mobilise the defence community's collective imagination to consider how to transform Singapore's military doctrine, organisation and capabilities in a more profound manner than simply by importing elements of RMA technology and thinking from overseas. Effectively, transformation will provide a context for adapting the RMA to Singapore's particular national requirements. Though the impact of this transformation is likely to prove evolutionary rather than revolutionary, its impact in the medium- to long-term will probably be far-reaching, ensuring that the republic's military capability is as well-adapted to new challenges as the budgetary and demographic constraints allow.

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Critical Mass: Weighing in on Force Transformation & Speed Kills Post-Operation Iraqi Freedom

by MAJ Irvin Lim Fang Jau

Newton's Second Law:

Force = Mass x Acceleration

Wars are won at the operational and strategic level. And equally important, force structuring decisions made at the highest policy levels that drive the overall force capability development of any military also critically shape force-fighting orientation and by corollary, future mission success. In distilling the lessons of the recent Gulf War II, it is important not to overstate the commonplace observation that speed overdrive by way of "knowledge-driven" time-sensitive targeting through the use of high-tech weaponry increasingly substitutes the need for mass in the final force-combat power equation. Ignoring the right lessons and learning the wrong ones can result in disastrous mental Maginot lines in force structure and doctrine development. Deadly striking speed without sufficient mass to sustain any war effort up to and beyond culminating point can result in hollow forces with fatal consequences.

This article's cautionary refrain is that the "utility of critical mass" - of quantitatively and qualitatively superior concentration of "boots to the ground" forces, tightly integrated with air and naval forces - still matters ultimately in packing a powerful winning punch on and off the future battlefield. In other words, having a critical mass of superior force-mix ensures greater operational flexibility and sustainability for meeting the conventional and unconventional challenges of contemporary and future military operations; a point especially salient for small armed forces formulating force re-structuring policies in a milieu of increasingly lean manpower resources and budget constraints.

Fast forward Into the Future: Force = SPEED x mass?

In the realm of Newtonian physics, the amount of power (force) is derived from mass multiplied by acceleration (speed). When one applies the logic of physics into the realm of military strategy, there appears to be a tendency to assert that the rapid technological transformation of new economy Just-In-Time (JIT) speed makes the old economy Just-In-Case (JIC) paradigm (labour-manpower, inventory-supplies) obsolete.

The above analogy may well be true as a mantra for everyday life in the IT Age. In the foggy and frictional realm of warfare, however, it may be one thing to assert the triumph of overwhelming speed enabled by the (t)winning combination of knowledge warfare[1] with high precision technologies to wage swift and decisive effects-based warfare. It is quite another to declare conclusively that the former decidedly supercedes or obviates the need for massive forces in winning future battles such that even the traditional wisdom of having an attack-defence force ratio of 3:1 goes straight out the window.

It has been said that lesson number one in Operation Iraqi Freedom (Gulf War II), is that speed kills – the adversary, that is. The draw of deadly speed with joint precision firepower has become a normative modus operandi in the application of decisive military force, and will no doubt be both emulated and further exploited in the years to come. Increasingly, defence establishments and analysts have come to advocate with increasing conviction: "The watchword is that quantity no longer matters; what the weapons can achieve is now all-important".[2]

That said, the sharp technological focus on speed and precision should not blindside the need to maintain a powerful critical mass of manpower reserves and capabilities – the operationally ready standing force in being. After all, speed and mass are not mutually exclusive force impact issues. This is especially true for small countries with little geographical strategic depth and their relatively small populations.

From an operational art perspective, small countries can ill afford to trade space to buy time. For such states, maintaining a strong and sufficiently sizable standing military by sheer appearance makes for credible deterrence and stout defence. With fiscal constraints imposed by shrinking defence budgets, coupled with negative indigenous demographic growth rates draining an already limited human resource pool, the real challenge for increasingly lean armed forces like the Singapore Armed Forces (SAF) is how to transform to meet the future threats while retaining the credible capability to punch above its weight.

To overcome the challenges of the future battlefield, the SAF has initiated the process of "deconstructive" trans-

formation. It stands to reason that this process will entail redefining and sustaining the critical mass of man-power and firepower required to fulfill its key operational missions well into the future. To be sure, such a deconstruction3 or transformative effort will involve the R&D-cum-rapid insertion of cutting-edge technologies, to at least maintain, if not increase its overall future force capability and lethality.

As Defence Minister RADM(NS) Teo Chee Hean put it, the SAF cannot rely on numerical superiority4 for the obvious reason that it is not a viable option for a country with a relatively small population. In addition, the SAF's latest effort at transformation is occurring in an era of tight military budgets and mounting ancillary missions like homeland security. This critical transformation effort also comes at a critical juncture whereby "the SAF has reached a certain critical mass" to be "one of the most advanced and well-equipped armed forces in the region".5

There is no magic number to what constitutes critical mass for a military force, except I would hazard a possible broad definition - it is the optimum fighting mass necessary for securing both swift and decisive battlefield victory and backed by sufficient vital force structure reserves to successfully wage and sustain protracted conflict across the spectrum of conflict (from high to low intensity). The force structure challenge of ensuring critical mass is therefore a moving target, dependent on domestic demographics, internal organisational mission demands and external interactive threat dynamics. Already, one analyst has argued that: "Regardless of how the SAF tweaks its order of battle to deal with the smaller National Service intakes – or how it chooses to leverage on technology to augment its man-power – there will be a threshold below which the SAF's ability to engage and sustain combat operations will be compromised."6

In tackling such challenges, the force-planning choices on the issue of critical mass invariably impact on vital operational force structure, power posture and deterrent strength. Over time they can have significant cascading effects on downstream operational outcomes and strategic success. Force planners now face an even more delicate challenge balancing lean allocation to fund current military programmes and operations, while ensuring experimental development of a future force-mix necessary for meeting the challenges posed by emergent threats and potential adversaries.

A Template for Transformation - The Trident of a Titan

Transformation – is the latest buzz-word-of-choice coined by the US military to describe its on-going systemic renovation across the services. "Transformation" takes over from the well-worn but more familiar term – the Revolution in Military Affairs (RMA). In his oeuvre on US Military Transformation, US Secretary of Defence, Donald Rumsfeld, laid out the strategic roadmap for US force structure transformation which called for the execution of swift and decisive joint effects-based warfare.7

One of the key features is the focus on leaner, smarter and more mobile forces, equipped with high-tech precision munitions and network-enabled by integrated Command, Control, Communications & Computer Intelligence (C4I). Following the lesson of the war in Afghanistan , the synergistic and symbiotic role of Special Forces8 in dramatically increasing the effectiveness of aerial combat power has been quickly acknowledged: "Afghanistan showed that precision-guided bombs from the sky are much more effective if we get boots and eyes to the ground to tell the bombers exactly where to aim."9

This key observation was repeated in the recent Gulf War when guided precision-munitions rained in on "kill-boxes" and pounded the three Iraqi Republican Guard divisions – the Medina , Hammurabi and Nida divisions - arrayed south of Baghdad , before US Coalition land forces steam-rolled into the "softened" capital. Again, overwhelming US technological superiority and wizardry was vital to the rapid conventional military success, on top of a war plan which stayed "Baghdad-centric" .

During US top brass debates on force structure and strategy for conducting the latest Gulf War, Rumsfeld, had reportedly insisted that a smaller, faster-moving attack force, combined with overwhelming air power would suffice. But when stiff Iraqi resistance appeared to hamper US military plans, criticisms were quickly levelled at Rumsfeld for his apparent rejection of initial military plans calling for the involvement of a wide range of forces. Initial plans called for at least four or more Army divisions which Rumsfeld had reportedly rejected as "too big".10 Criticisms for sending what had appeared to be "too small" a ground force into battle also noted Rumsfeld's strident advocacy for urgent US military transformation that privileges greater speed and light forces. Rumsfeld is well known for resisting political pressure to increase the size of the 1.4 million-strong US military.

Furthermore, to critics, the Pentagon's strategy of effects-based decapitation had appeared initially to have been

ineffective and its selection too hasty and risky. For example, the 4th Infantry Division – the US Army's most modern mechanised division – spent weeks waiting in the Mediterranean (due to Turkey's access denial) and eventually had to be diverted to the overtaxed port in Kuwait . On top of that, the high-tech 1st Cavalry Division which had just shipped out of Texas a few days before was not yet in theatre even though the US forces were already knocking on the gates of Baghdad by 3 April 2003 . Reportedly the division needed almost 23 days sailing time to reach the theatre of operations. Besides these delays to operational fielding, many in the Army held that the active-duty force of 480,000 was already too small and were worried that occupation duty in Iraq would sap the US Army's strength.

However, the initial consternation was overtaken by subsequent combat success that matched the long odds. Rumsfeld's and General Frank's preferred speedy roadmap for military success in Iraq appeared to have been validated when Baghdad fell swiftly into Coalition hands after somewhat surprisingly light organised resistance. As a senior US military official put it: "No one expected them to smash the Republican Guards to bits so quickly".11 That US military commanders and analysts wanted more time and more forces may suggest that they were too conservative and the conventional war was actually fought and "won" by much fewer forces than was thought possible. Major military objectives were virtually secured within a month. In contrast, Gulf War I took over 42 days with the more limited aim of liberating Kuwait .

On the ground, operational success was achieved. Saddam's defence plan was exposed as fatally flawed in its heavy reliance on citizens in Baghdad taking up arms and their failure "to anticipate the speed of US forces".12 The Coalition's "rolling-start" strategy proved to be a bold and risky venture that paid off with an impressive military "victory" for the US coalition forces.

From a potential disaster, the armoured rush to Baghdad was quickly heralded as a brilliant operational move that threw off enemy operations and put Baghdad at risk from the third day of war.13 The "thunder-run" tactic basically brought a quick end to Saddam's regime with what was essentially a coup d'etat14 executed with half the number of ground troops and two-thirds the numbers of attack planes compared to Gulf War I.

The much-discussed strategy that has since become much clearer was to move heavy forces quickly to Baghdad to destroy the Republican Guards while using lighter special operations and airborne forces to secure cities and supply lines in the rear. Coalition forces drove northwards and en route, they secured Iraq's southern oilfields, took out terrorist camps in the north and south, secured large areas of western Iraq preventing the regime from firing Scud missiles at it neighbours.

The idea was to avoid combat on the way to Baghdad and to seek out Saddam's forces once there15 - adhering, as it were, to Sun Tzu's maxim to "attack where the enemy is unprepared and sally forth where he does not expect you…What is of the greatest importance in war is extraordinary speed".16 Robert Pape had discussed the strategic-shock effectiveness of decapitation strikes to swiftly and decisively attain the political goals: "The first Gulf War is…the real test of a new coercive air strategy, decapitation, which seeks to achieve both punishment and denial effects by destroying a small collection of crucial leadership targets."17 With the military success of Gulf War II, proponents of "Shock and Awe" appeared to have won an important argument in heralding the dawn of a brand new age of effects-based warfare.

In other words, there was over-whelming force when the Coalition forces needed it. Compared with Gulf War I, even more deadly and precise ordnance was delivered with airpower / naval strike power, backed up by relatively lighter and more mobile, but no less, lethal land forces. In overall relative terms, the combat force ratio was slightly changed between Gulf War I and Gulf War II – 600,000 (Coalition) – 1.2 million (Iraqi) compared with 280,000 (Coalition) – 437,000 (Iraqi) respectively. At the declared end of the conventional battle, Operation Iraqi Freedom cost the lives of 171 coalition fighters (138 US and 33 UK – almost comparable to Gulf War I casualty figures), with thousands suffered on the Iraqi side.

The stark reality is that even in the current age of hyper-speed warfare, it still takes time for forces to conquer territory (space) and any expectations of a bloodless cakewalk is unrealistic and hubris. Any practitioner of operational art conversant with the factors of space-time-force would know that war is executed in different phases of accomplishment over time and space. Fog, friction and chance are inherent in the nature of warfare. As Field Marshal Helmuth von Moltke, Sr. had once put it baldly:

No plan of operations extends with certainty beyond the first encounter with the enemy's main strength. Only the layman sees in the course of a campaign a consistent execution of a pre-conceived and highly detailed original concept pursued consistently to the end. 18

Having said that, it is arguable that the Gulf War II plans perhaps come very close to achieving its war aims with minimal fog and friction and within schedule. And by most accounts, the conventional war did end swiftly and was a run-away success at the operational level. Overwhelming force surgically applied by deadly cutting-edge technologies significantly increased the speed towards the attainment of the stated operational objectives.

In "Shock and Awe Misunderstood" , Harlan Ullman argued that the doctrine of "Shock of Awe" had not actually, initially at least, been applied fully according to how he and his study team (veteran generals of Gulf War I) had originally envisioned it in their doctrine development work after Gulf War I. He argued that their version of "Shock and Awe" , called for "360-degree, non-stop campaigns using all elements of power to coerce the enemy regime into succumbing rapidly and decisively".19 There were two reasons for the difference between conceptual intent and subsequent application. The first was that "the opportunity to target Saddam accelerated the war's start before all of the military elements were in place" . And second, "the decision to pause to see whether Saddam's generals would choose not to fight tempered the intensity of the initial onslaught".20

Despite the strategic restraint and initial scaled-back intensity, the administration's restrained version of "Shock and Awe" was applied with a sustained strategic air campaign and quick ground advance on the centre of gravity (Baghdad) – a contemporary manifestation of blitzkrieg, as it were. The relatively swift and "decisive" military victory appeared to show that just the right critical mass of forces, rather than the sheer mass of over-whelming forces was applied at the right time, pace and space to win the conventional war for the Coalition forces.

Although Operation Iraqi Freedom did not quite manifest the full-blown application of "Shock and Awe" , it was nevertheless a harbinger for US force transformation. In this regard, there are three important aspects to "Shock and Awe" that warrant re-visiting to see how future wars could be fought even more speedily, decisively, and with leaner forces. Based on Ullman's team study21, I have surmised that the following capabilities will be critical for achieving "Shock and Awe" warfare. Additional qualifications have been inserted (in italics).

Pin-point Intelligence and Speed of Striking at Distance. The possession of unprecedented real-time and accuratejoint civil-military intelligence about the enemy (leadership, military and population) is critical for formulating decisive offensive strategies involving successful time-critical decapitation targeting. Achieving operational surprise of ' first shot-first kill', if not strategic surprise, will be especially critical for operational success in achieving strategic aims.

Constantly Tilting at the Right Tipping Points. Effects-Based targeting for striking at critical nodes to collapse an adversary's military and political power rapidly should be applied with overwhelming force right from the onset of battle and unrelentingly applied with extreme prejudice throughout its continuum.

Munitions of the Mind with Weapons of Mass Communication. Besides inducing physical incapacitation and dislocation, the enemy should be completely rendered impotent and defenceless to force it to surrender as soon as possible. This can be done by conducting offensive Psychological and Information Operations to erode an adversary's combat morale, public support and leadership confidence; albeit causing intense psychological disorientation and extreme distress.

From the strategic and operational standpoint, the prescription above for critical mission success in future war-fare will no doubt be followed closely by armed forces of the world, already busy assessing the operational and strategic offence-defence ramifications of such an elaborate and expensive force structure transformation for their respective armed forces.

The American way of war which substitutes firepower for manpower had shown that stunning military success with low casualties can be achieved with a strategy of precision long-range lethality. As retired US Army General Bob Scales had put it: "We expose as few troops as possible to close contact with the enemy. We do that by killing as many enemy as we can with precision weapons."22

Others like Bruce Berkowitz have even asserted that: "Gone is the reason to create overwhelming mass of troops – now, troops concentrations merely present easier targets. Instead stealth, swarming and zapping (precision strikes on individuals and equipment) are the order of the day."23 This latest mantra may well be true for a towering Titan with unrivalled (s)trident-power on the global stage. But in emulation, the world's military "minnows" would do well not to throw all caution to the new "Transformation" wind of fighting - fast, furious and light.

A Cautionary Model for "Minnows"?

Events as they had played out in Iraq may have vindicated somewhat Rumsfeld's faith in the lethality of decisive speed accorded by high-tech precision weaponry from the air and sea with the fielding of lean mobile forces on the ground.24 They may also have invariably reinforced the view that it is possible to boost the fighting strength of the military without increasing its size, in part by outsourcing some "tail" jobs and moving more soldiers to the ' teeth'- combat units. But there is still room for paying heed to some speed-bumps; especially for smaller armed forces with no superpower pretensions.

One of the most dangerous lessons often overlooked in the flush of victory is to learn the wrong lessons from the last conflict. Every conflict must be planned and assessed on its own unique merits and shortcomings, even though invaluable general lessons can be distilled from each one. One key risk about watching the recent US-Iraq war is making the erroneous analogical reasoning that the way of war waged by the world's sole super-power can necessarily be repeated or replicated by minnows, albeit writ small. As Milan Vego had warned: "Lessons should be learnt by avoiding over-emphasis of one factor over the other. Perhaps the most serious error is to exaggerate the role of a single service or a single weapon system by under-estimating or completely ignoring other factors that contributed to the victories."25 For example, while US forces were much leaner than the 1991 forces in absolute terms, they were undis-putedly a much more sophisticated, better equipped and deadlier force. The enhanced capability made the already wide disparity in US military superiority over the Iraqi military even more stark in comparison.

The other big factor was also that US forces faced an adversary that was demoralised, disorganised and ineffective. Furthermore, the US forces had unchallenged air and naval supremacy. The same cannot always be said of smaller countries with a few key airbases that are well within reach of hostile enemy scoot-and-shoot artillery, air and special operations disruption/destruction during proximate conflict. With a thriving global arms trade making long range precision weapons available on the open (and black) market, keeping an adversary at arm's length and one's strategic air strike assets out of reach poses strategic challenges for small states facing proximate threats.

Another key issue not to be overlooked is that more than a decade of economic sanctions had taken its toll on the combat morale and capability of the Iraqi forces. Non-lethal operational fires in the form of a massive informational warfare campaign were also waged before and during the conflict. However, there are limits to the success of Coalition information operations (propaganda) trying to leverage on Saddam's brutal reign for justifying its moral high ground of "liberation" , evidenced by the subsequent emergence of pockets of Iraqi resistance and sporadic demonstrations.

Detractors less sanguine about the speedy effects-based warfare basically question the wisdom of short-circuiting the prudent build-up of ground forces (mass) before launching overwhelming military force to secure a quick decisive victory, and whether there was sufficient forces on the ground, in the rear and along the flanks, to secure the key nodal cities in the long dusty road rushing to Baghdad. The size of the invasion force had reportedly been reduced through a series of high level decisions where two units – the tank- heavy 1st Cavalry Division and the fast-moving 3rd Armored Cavalry regiment – were dropped from the war plan months before. Coupled with the no show of the 4th Infantry Division from Turkey , the Marines and Army's V Corps had exceptionally large areas of operations to cover with relatively few men.26 As a former US intelligence officer had put it: "The military is not like a corporation that can be streamlined. It is the most inefficient machine known to man. It is the redundancy that saves lives."27

Initial worries and commentaries had focused on how pushing too hard, too fast, too far without sufficient reserves (mass) had actually risked over-extending supply lines without sufficient protection, making them vulnerable to attack. Concerns over shortages in fuel, water, spares and ammunition, coupled with serious maintenance problems at the front-line were on the minds of US military planners. At one point, three days of monstrous weather with high winds and blinding dust virtually stopped all helicopter flights and some units of the 3rd Infantry Division were "black" on food (i.e. down to within a day or two of empty larders).28

There were indeed justifiable worries over force protection and whether the rapidly advancing US "wave of steel" over the Iraqi desert could provide enough force protection for supply lines and more importantly, whether they could hold out until reinforcements arrived. Plans that appear "brilliant" and "on-track" can quickly derail when the bright and shiny locomotive runs out of steam without sufficient resources, redundancies, replacements and spares (i.e. sustainment provision) to meet contingencies on the battlefield. After all, the Clausewitzian fog and friction of war is timeless on all battlefields. As a case in point during Gulf War II, Civil Affairs units of Coalition forces taking over Umm Qasr never expected that their first crisis would be in providing drinking water to the local population – "It was a mission that came up suddenly".29 Fighting and shifting missions on the fly requires flexibility and sustainment. Having the right mass at the right place and time with the right expertise to get the mission done enhances operational flexibility. That may well be the fly in the ointment for forces that do not possess the critical mass to

mount sustained operations at distance, complicated by critical vulnerabilities like supply lines and far-flung C4I in-frastructure. The key words are tempo, persistence, flexibility and sustenance which US Army COL Larry Harman has referred to these challenges as "Asymmetric Sustainment".30

Post-conflict phase, US military ground commanders had also reportedly complained that although Rumsfeld's desire to fight the war with smaller numbers of fast-moving troops might have been a wise battlefield strategy, it had left them with too few personnel to police a country of 25 million people. Army LG David D. McKiernan, the Commander of US ground forces at Baghdad asked this question: "Imagine spreading 150,000 soldiers in the state of California and then ask yourself, 'Could you secure all of California , all the time, with 150,000 soldiers?'"31

US management of the post-conflict situation in Iraq has not been an easy task, as US forces spread thinner than planned to get a better grip on the bloody challenge posed by Iraqi guerrillas. The nature of the Iraq war has changed from one of hot-war to one of troubled peace, forcing many to revisit cosy assumptions about swift and decisive victory with a better enduring peace. And as the US becomes bogged down in an increasingly bloody quagmire, detractors have unsurprisingly questioned whether Iraq would be America's next Vietnam.

Admittedly, in the current age of terrible asymmetric warfare, winning the peace is often a messy affair and arguably much more challenging than winning the war. Despite Saddam's surprise capture and his brutal regime's collapse, the guerrilla problem still festering in US-occupied Iraq looks set to make the war another case-study for war termination and exit strategy. Granted the morass of problems is not just military per se, but deeply socio-political in nature. But they can only be compounded by a lack of critical mass and underweight operational forces on the ground.

Another important point is that the war, although unlimited in aims (regime overthrow and occupation) is nevertheless a limited one in means and a short one at that. However, often on the receiving end, smaller countries engaged in military operations may not have the luxury of fighting limited wars posing a threat to their vital national interests. In other words, wars of national survival are not to be waged lightly and they invariably require the full weight of the nation to be thrown into the war effort. Furthermore, limited wars can stretch out longer than anticipated and even become unlimited ones through escalation and miscalculation; despite Sun Tzu's adage that "there is no instance of a country having benefited from prolonged warfare" . Wars for small countries are by default, total in effort and enterprise.

Conclusion:
Trim Down & Speed-Up, But Watch that Mass

As a general rule, the accomplishment of higher-level operational or strategic objectives requires the employment of larger and more diverse forces than does the accomplishment of tactical objectives at the lower levels of war. But history has also seen small forces accomplishing strategic results. At the risk of contradiction, exceptional minnows can sometimes prove the rule despite lighter mass. As was seen in Afghanistan and Iraq , big mass makes for big targets by smaller, agile and networked tech-smart forces. The old saying – "the bigger they are, the harder they fall" - resonates well with this line of reasoning. US defence transformation advocates who believe that the Army needs to shrink have a strong case when they argue that sheer "mass is no longer a strength on the battlefield, because it simply presents a larger target".32 And they are probably right. After all, a large mass of land forces without the necessary integration with air and naval elements is worst off compared to a smaller and jointly integrated adversary who moves fast and packs a wallop where it matters.

In World War II, forces no larger than an army corps conducted major operations. The German Panzer-Luftwaffe force, with their radically different force structure and doctrine, cut off the major part of French and British troops in Northwestern France even though they had fewer tanks and aircraft in total than the Franco-British forces. Another example from the same era is the Japanese 25th Army with only three divisions, totalling some 35,000 men strongly supported by air and naval forces dispatched any opposition and conquered Malaya in only three months (8 December 1941 - 15 February 1942), despite confronting a larger British force of some 70,000 troops.33

In the end, many complex variables and contingent interactive forces (superior planning, operational art doctrine, leadership, morale and even the element of luck) account for the various successes. It is generally acknowledged that by avoiding time-consuming and costlier attrition warfare, "operational warfare can allow the smaller but better trained and skilfully-led force, guided by sound strategy, to defeat a much stronger opponent relatively quickly and decisively".34

In our current age, swiftly-and decisively-waged strategic dislocation warfare conducted in an integrated and joint

fashion can yield significant strategic dividends for smaller militaries. After all, favouring the quick victory path of least resistance with clean surgical speed intuitively makes for a sound strategy-of-choice anytime over bloody brute force.

On that note, the deadly application of high technology in warfare is an indispensable force multiplier. However, the question still remains as to just how much hyper-technology can substitute for having "boots to the ground" critical mass to mount decisive operations, take the fight to the adversary and secure the durable peace sought beyond.

In the case of post-Operation Iraqi Freedom, Kenneth Pollack argued that with US troops bogged down in Iraq and deployed at hotspots all over the world35, the US army had "tapped out" . He further argued that stabilising Iraq would require doubling 140,000 US troops deployed there. Similarly, top US army generals have also voiced concerns that US troops in post-war Iraq had been stretched too thin, and were short of much needed infantry and military police.

Despite the concerns, General John Abizaid, the American Commander in Iraq maintained that "[t]he number of troops – boots per square inch – is not the issue."36 But as others like former British Foreign Secretary Robin Cook have noted that, there is increasingly, a recognition that "a military ' lite'option does not work after victory".37

Prudence and necessity dictate that small countries with lean armed forces will continue to do well by leveraging on superior technology and training to compensate for limited demographics and strategic depth. But the challenge remains in determining and maintaining a critical military mass that will ensure there will be no force (combat power) imbalance that could have negative strategic consequences. Strategic deterrence and operational flexibility / agility / endurance will rest on a credible force structure with a critical mass of standing forces and ramped-up forces, able to face-down or fend-off any threat by mounting effective operations on multi-fronts along the spectrum of conflict.

Whether or not deadly hyper-speed technologies can help to reduce mass or even serve as a decisive force-multiplier ultimately lies in its smart and decisive application in relation to a specific interactive force-field of combat engagement. Even Sun Tzu, with his emphasis on indirect strategies, had not been remiss in pronouncing on the real value of mass: "When 10 times to the enemy's one, surround him; When five times, attack him; If double his strength, divide him; If equally matched, you may engage him; if weaker numerically, be capable of withdrawing; and if in all respects unequal, be capable of eluding him, for a small force is but booty for one more powerful."38 And as military historian John Keegan had concluded in his latest book on Intelligence in War: "ultimately, it is force, not fraud [deception] or forethought [intelligence], that counts".39

This article avers that small countries that are more likely to fight close-proximity wars - rather than far-flung ones - would do well to have a prudential force structure policy that ensures the development of a critical mass of force-mix and combat capability. In any case, such states must have sufficient redundancy in mass for credible deterrence.

In the drive to deconstruct militaries and transform into leaner, more lethal and mobile forces, there is a need to keep an eye on any potentially deadly imbalance – more lethal speed but less long-distance mass - in force structure that can degrade the capability to meet the full spectrum of threats not amenable to swift and decisive victory. As the recent wars in Afghanistan and Iraq have shown yet again, when the strategic and military objectives are finally attained, there is still the precarious question of whether the desired political end state has been secured.

Any plans for swift and decisive victory must also prepare for a slow and inconclusive victory. Having the right capability mix and force mass will be not just necessary but critical for meeting the increasingly complex challenges thrown up by the fog and friction of warfare, and new or unanticipated missions. In addition, at the operational manning level, actual manning status at both the tooth and tail ends of the force organisation should match up with force manning structures approved on paper in so far as possible, to prevent the hollowing out of forces and creation of paper tigers.

In the end, Mass still matters. After all, the surest way to victory is still when the right forces are amassed at the right decisive points to overwhelm the objective, thereby adding decisively to the swift application of deadly force. Mass or the concentration of force remains a key principle of war, even if economy of force and speed of command are the others that have been on the operational ascendant of late. Ultimately, the operational art in warfare planning is to balance all the principles of war to achieve the desired strategic objectives. But by going beyond the notion of mass as "concentration of force" per se, having a critical mass of military capabilities facilitates both the concentration and flexibility of force employment and political options.

In terms of maintaining a healthy grip on strategic reality, one should be careful of the tendency to speed with

blinkers-on towards the latest "sound of the big guns" in the on-going doctrinal debate on transformation. One of the potential pitfalls in learning from the last conflict, or applying the lessons of one conflict to another in a different context is that the particular lessons considered to be salient can be highly personalised and even politicised; in other words choosing what to learn and ignoring other lessons can lead to partial conclusions. In this regard, over-emphasis on the precision high-speed technologies seen in the decade-long US-Iraq conflict can obfuscate the important role played by mass. Decisive speed is increasingly crucial to securing victory with the minimum of own casualties in the battlefield and bringing armed conflict to swift closure for political resolution. But it can leave blind-spots in the blitz to victory. Mass should not be relegated to a small-print footnote in the future way of war, even as force structure gets more fleet-footed with lighter footprints.

That said, mass is not an end in itself and neither is speed. There can be no shortcut to swift and decisive victory without critical mass. True enough, force structure development premised on more lean, faster, smart, agile and flexible forces are increasingly integral operational imperatives in an age where "doing more with less" makes not just good economic sense, but a normative budgetary and demographic necessity; especially for small states. However, there should be no fundamental disconnect between strategy and policy when it comes to maintaining a critical mass of military force-in-being for deterring, fighting and winning the next war if it should come calling. In the end, there are limits to what downsizing with rapid technological augmentation can accomplish. That is worth remembering in the deconstructive dash to trans-form. The strategy-policy challenge will be in being clear-eyed about what those limits and deliverables are. Force planning choices that scrimp or, worst still, sacrifice critical mass do so at future peril.

The unabridged version of this article is also available as IDSS Working Paper No. 58 (January 2004) at http://www.idss.edu.sg/WorkingPapers/ WP58.pdf

Endnotes

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31 As he went on - "The answer is no. So we 're focused on certain areas, on certain transportation networks we need to make sure are open." See Rajiv Chandrasekaran and Peter Slevin, "The Ragged Reconstruction of Iraq", at WashingtonPost.Com, (8 May 2003).

32 Ricks, Op Cit.

33 Vego, Op Cit, p11.

34 Milan Vego, Joint Maritime Operations Syllabus, (Newport: Naval War College, 2002-3), p3.

35 Global deployment of US military personnel at end 2003 – Iraq: 140,000; Kuwait: 34,000; Afghanistan: 10,000; Balkans: 5,000; South Korea: 37,000.

36 "America 's Military Stretched to its Limits", The Straits Times, (26 Aug 2003), p7; and "US Troops in Overstretched", Today, (26 Aug 2003), p18. See also Fareed Zakaria, "Here 's a Bet for Rumsfeld", Newsweek, (6 Oct 2003), p13.

37 Melissa Roberts, "Leading Lights", Newsweek - Special Issues 2004, (Dec 2003-Feb 2004), pp18-19.

38 Sun Tzu, The Art of War, Griffith, Op Cit., pp79-80.

39 Cited in Evan Thomas, "Spy Games Uncloaked: A Great Military Historian Says Intelligence is Oversold" in Newsweek, (1 Dec 2003), p52D. Clarifying definition in parentheses mine.

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The Effect Of Material Inferiority: An Analysis Of Japanese Defeat In The Battle For Imphal, 1944

by Mr Wong Chee Wai

The battle for Imphal, codenamed Operation U-Go by the Japanese, consisted of a series of battles fought over a wide front from the banks of the Chindwin river to the road beyond Kohima over a five-month period in March - July 1944. This battle marked a turning point in the Second World War in Southeast Asia . The Japanese Army suffered their greatest defeat with 53,000 casualties (compared to 16,700 on the British side) as well as massive material destruction.1 The loss of a significant portion of the Japanese forces paved the way for the British to re-occupy Burma in less than a year. Given the magnitude of the Japanese defeat, it is pertinent to ask why the Japanese launched the attack on Imphal in the first place.

Why Imphal?

Japanese leaders at the various levels have different motives for supporting the thrust into Imphal. The invasion of Imphal, however, did not receive unanimous support. For instance, Major-General Inada, the Vice-Chief of General Staff of the Southern Army, thought that the whole idea was absurd and the possible losses incurred could result in the overthrow of Japan. In June 1943, Prince Takeda, who represented Imperial General Headquarters during the discussions on Imphal, felt that the supply problem was insurmountable.2 Yet, despite such reservations, the invasion of North-east India was given the go-ahead by Tokyo in January 1944. The reasons why the Japanese were keen to seize Imphal could be categorised as political, diplomatic, strategic and personal.

The proposal to move into India received a favourable reception from the Japanese leaders in mid-1943 against a backdrop of Japanese reverses in the Second World War. In the Pacific theatre, the Japanese suffered devastating defeats at Mid-way in June 1942 and Guadalcanal in November 1942. There was thus political pressures on Prime Minister Tojo to find a victory somewhere to make up for these setbacks. The Imperial Army Headquarters was fully aware of the political pressures faced by Tojo and supported the Imphal move. The idea to capture Imphal thus surfaced at an opportune time in mid-1943.3

There were also diplomatic considerations. Since the World War began, the Japanese tried to undermine the western colonialists and win the cooperation of the Asian people by displaying support for independence movements. A conference was held in Tokyo in November 1943 which pledged support for the cause of Asian independence. One of the Asian leaders at the November conference was Indian nationalist Subhas Chandra Bose who had illusions of liberating India with his Indian National Army(INA) assisted by the Japanese. Bose's design fitted in well with Tojo's desire to show the world that Japan was helping to liberate India from the British.4 If the Japanese could succeed in raising the flag of free India in the north-east, "it will be an embellishment for Tojo's war leadership."5

Tokyo certainly would not have given the green light if there were no great strategic advantages in capturing Imphal. The Japanese were aware that the Allies were preparing for a major offensive into Burma. To pre-empt an Allied invasion, the ideal solution is to move into the Imphal Plain, destroy the Allied base and capture the supply depots supporting the Allied offensive. The capture of the Imphal plain and its two all-weather airfields would enable the Japanese to threaten the traffic on the air ferry route to China, the Assam lines of communications and the whole air position in Northern Burma.6 A successful thrust into the heart of Assam could also provide a launching-pad for Bose, a Bengali leader, to foment an uprising against the British in Bengal. It was hoped that from Bengal , the flames of rebellion fanned by the desire for independence would spread to the rest of India . The result would then be a subversive and unmanageable India making it difficult for Britain to use India as the base for continuing the war against Japan. This could knock Britain out of the war; a demoralised China deprived of military support would be forced into a separate peace; and an isolated US may then end her war effort.7

The Japanese plan to take Imphal was also driven by the personal ambitions of Mutaguchi. He was fully aware that a successful invasion of North-east India would bolster his personal reputation immensely. Mutaguchi had participated in the Marco Polo Bridge Incident in 1937 as a regimental commander which led to Pearl Harbour and the Pacific War. As a divisional commander in 1941, he had taken part in the capture of Malaya and Singapore. If he could force Britain to withdraw from the war with the capture of India and the unleashing of Bose, his rapid advancement and historical stature would be assured. To achieve his ambitions, Mutaguchi tried to enlist support from the Emperor's brother, Prince Takeda, and targeted the capture of Imphal by 29 April 1944, the Emperor's birthday.8 Mutaguchi's role was important as the idea for moving into India was initially rejected by Southern Army in

October 1942 (due partly to Mutaguchi's objections).9 He played an instrumental part in reviving the Imphal scheme at the various levels. Mutaguchi succeeded because the Imphal plan which satisfied his personal ambitions also coincided with the political and strategic imperatives of Tokyo in late 1943.

Japanese Defeat

Despite a good start in the Battle for Imphal, the 15th Army's offensive petered out by mid-April 1944. The British and Indian forces eventually prevailed in a battle of attrition and on 5 July 1944, Mutaguchi was allowed to call it a day. The Japanese defeat was not due to the performance of their soldiers. As Lieutenant-General Slim, 14th British Army Commander, commented, "there can be no question of the supreme courage and hardihood of the Japanese soldiers...I know of no army that could have equalled them."10 Japanese defeat was attributed to faulty strategic planning, poor generalship and inferior military resources.

Faulty Strategic Planning

The Japanese plan for Operation U-Go was to use the 15th Army comprising 33rd Division, 15th Division, and 31st Division to encircle and cut off Imphal (held by the British IV Corps) from the south, east and north respectively. Prior to the launching of U-GO, the Japanese 28th Army attacked first in Arakan (Operation Ha-Go) in February 1944 with the aim of tying down British forces and preventing reinforcements to Imphal. The British IV Corps would then be defeated in a decisive battle and the supply depots captured at Imphal would sustain the Japanese for a long period against future Allied invasion. Once the Japanese were established in North-east India , they would unleash Bose to create political difficulties for the British which would hopefully knock them out of the war.

The overall strategic concept was sound. Advancing into Imphal-Kohima was the most economical defence for the Japanese as they did not have enough divisions to guard the long line of the Chindwin against an anticipated British attack.11 Slim was convinced of the strategic significance of a Japanese seizure of Imphal: "they were right in thinking that victory in Assam would resound far beyond that remote jungle land; it might change the whole course of the world war."12 The Japanese strategy came close to success. The British were surprised on two important occasions. First, the British made an error in estimating the timing of the Japanese offensive with the result that 17th Indian Division was encircled and nearly prevented from with-drawing to Imphal. Secondly, the British under-estimated the Japanese forces moving towards Kohima and Dimapur and did not garrison these places sufficiently. The fall of the British supply base and railhead at Dimapur would jeopardise the relief of Imphal, lay open the Brahmaputra Valley with its airfields, and cut off supply to China. Fortunately for the British, the Japanese forces concentrated on Imphal and Kohima.

Though the strategic concept was sound, flaws in strategic planning contributed to the failure of the Japanese in the battle for Imphal. Failure in strategic planning due to incompetent and sloppy staff work was reflected in under-estimation of the enemy, lack of contingency planning and the timing for Operation U-Go. Under-estimation of British strength and fighting capability was due to intelligence failure and over-confidence resulting from past experiences. The Japanese failed to realise that the British forces of 1941 - 42 were very different from those in 1944. They assumed that when surrounded, the British would cave in or withdraw as were done in the past. Their intelligence apparatus did not know that British troops had improved greatly in training and morale under the leadership of Slim. The British were no longer afraid of encirclement as they could be supplied from the air. For instance, though the 7th Indian Division was surrounded by the 55th Japanese Division during Operation Ha-Go, the British and Indian troops fought on. This episode should have warned the Japanese that they were facing a different enemy but its lesson was ignored.13

Though the Japanese realised that the British would be using tanks, Burma Area Army did not provide their fighting divisions with sufficient anti-tank guns. This was partly due to under-estimation of the British and partly to lack of resources. Lieutenant-General Naka, the Chief of Staff of Burma Area Army found out that the British forces had tanks just before 15th Division crossed the Chindwin. By then it was too late to equip the division. During table manoeuvres at the 15th Army HQ in December 1943, the possibility of British having tanks was discounted.14 The lack of tanks and anti-tank guns resulting from shoddy staff work contributed greatly to their defeat in the battle of the Admin Box (Operation Ha-Go), and in the defeats at Kohima, Nungshigum and other locations around Imphal.

Another serious flaw was the absence of contingency planning in the event that the 15th Army failed to obtain "Churchill's rations and ammunition" within three weeks. This was the fault of the staff of both 15th Army and the Burma Area Army. They assumed that Imphal would be captured by mid-April which gave 15th Army time to consolidate before the monsoon broke. With Imphal in their hands, the 15th Army would be independent of air and land line of communications.15 The Japanese staff officers did not plan for the worst case basis knowing full well the difficult terrain, monsoon conditions, inferior air position, and inadequate transport units. Such incompetence

resulted in a logistics nightmare since the troops had carried only three weeks' supply of food and ammunition with them. After their initial supplies ran out, very little food and ammunition reached the fighting troops. The worst hit was Sato's 31st Division with its impossible line of communications. Sato defied Mutaguchi's order and withdrew his forces from the Kohima front after 10 weeks of battle. Sato felt he had no alternative as his troops had to scrounge for food and to carry on fighting without logistics support would mean certain annihilation.16

The Japanese would have a better chance of an early victory if the timing of Operations Ha-Go and U-Go was properly coordinated. Operation Ha-Go was meant to tie down British divisions in Arakan so that no reinforcements could reach Imphal after Mutaguchi's 15th Army launched Operation U-Go. The problem was a delay to Operation U-Go which was originally scheduled to start in the first week of March. 33rd Division started their advance on 7 - 8 March but 15th and 31st Divisions only crossed the Chindwin on 15 March 44 . This was because 15th Division was delayed by road-making duties (ordered by Southern Army) while on its way from China through Thailand to the Chindwin . Since Operation Ha-Go was decisively defeated by end February, this gave the British just enough time to move troops by air from Arakan to Imphal to replace IV Corps reserves.17 If the start of Operation U-Go could be timed to coincide with the end of Operation Ha-Go, the British IV Corps would face a very difficult time indeed. Poor staff work at Southern Army HQ and Burma Area Command was to blame.

Weak Generalship

Weak Japanese generalship was another reason for their defeat. In the battle for Imphal, Mutaguchi did not keep any reserves to exploit surprise or cater for the unexpected. He committed all the forces at his disposal and his formations were so dispersed that he was unable to achieve superiority at the critical point. Though Mutaguchi gained an initial advantage by isolating 17th Indian Division forcing IV Corps to use its mobile reserves at the start of the battle, he did not have the reserves to exploit the situation.18 Perhaps Mutaguchi's greatest weakness was his lack of realism. He had over-reached himself by expecting victory with inferior land and air power and over-extending his lines of communications.

By mid-May 1944, the inadequate administrative arrangements broke down with the arrival of the monsoon and increasing Allied counter-attacks. By then, only a large reinforcements of all arms could avert defeat on the battlefield but these were not forth-coming. Despite impending defeat and the toll on his troops from starvation and diseases, Mutaguchi refused to admit that his plan had failed and insisted on further offensives. It did not help that Mutaguchi himself was far from the scene of battle with his HQ at Maymyo, hundreds of miles away in the Shan States. Moreover, Mutaguchi was poor in human management and could not impose his will upon his division commanders.19

The Fundamental Factor: Material Inferiority

Even if Mutaguchi had performed better, his chances of victory were dim as his side lacked the resources to fight a war of attrition. The moment that 15th Army was denied a quick victory, it was doomed by inferior resources. The Japanese 15th Army had three divisions which were not at full strength. The IV British Corps defending Imphal had three divisions, one parachute brigade and one tank brigade and were further reinforced by two divisions from XV Corps in Arakan. The XXXIII Corps defending Dimapur-Kohima had two divisions, one infantry corps, and four special brigades. The British forces could afford relief and reinforcements in the battlefield. In contrast, the Japanese received few reinforcements, no air and tank support and had inadequate artillery. The British forces at Imphal received about 500 tons of supply per day while the attacking Japanese forces received negligible supplies if at all. Hence, the British commanders could use overwhelming air, tank, and artillery support to weaken and destroy the Japanese troops before committing their forces to attack and wipe out the remaining enemies. This was the fundamental factor for the defeat of the Japanese in the battle for Imphal.

A particularly important aspect of weak Japanese resources was lack of air superiority. In the first days of Operation Ha-Go, the Japanese lost a decisive air battle over the Arakan sky. For every Spitfire lost by the Royal Air Force, the Japanese lost 10 Tojos / Zeros.20 As a result, during Operation U-Go, the Japanese could only put an average of 41 fighters a day. In contrast, the allies had 480 fighters, 224 bombers and 31 reconnaissance aircraft.21 The Japanese could not prevent constant attacks on their line of communications and administrative installations by Allied bombers. The result was that Japanese river craft, motor transport and railway trains could only move at night.22

Allied Successes

Japanese defeat was as much due to their own failings as to the triumph of British strategy, good generalship, and military resources. Slim's strategy was to withdraw and concentrate superior forces on the Imphal plain (home

ground), weaken the enemy by stretching his line of communications and then destroying him with a counter-offensive. This was a sound strategy "based on a realistic estimate of Japanese methods and an assessment of how the Allies'material advantages could be used to counter the enemy's skills."23 Slim was aware that if the Japanese failed to win a quick victory, they would be destroyed by the monsoon which made supply impossible. The British with their air supremacy and an all-weather airfield at Imphal would have much less problem with supply.

Slim's strategy was nearly imperilled initially when faulty intelligence and slow reactions of the British commanders resulted in 17th Division withdrawing too late from the Tiddim front and Dimanpur was left thinly defended. Such errors were made good by good generalship on the part of Slim and his superior Mountbatten. These leaders showed flexibility and initiative in overcoming problems encountered during the battle. For instance, Slim ended IV Corps' advance in the Arakan and transferred troops by air to the Imphal front in the early stage of the battle. To resolve the problem of insufficient transport aircraft, Mountbatten made an unauthorised diversion of aircraft from Air Transport Command and held on to aircraft, which the Chiefs of Staff had directed to the Middle-east. The Allies also had superior material resources which they used skilfully to achieve victory. They took advantage of their air superiority to send in reinforcements, resupply their cut-off troops and support their ground attacks.24 The British use of tanks in difficult terrain was effective and proved to be decisive in many engagements with the Japanese.

Conclusion

The Japanese 15th Army gambled boldly for a quick victory in the battle for Imphal. Their strategy was not unsound but once an early victory was denied, inferior military resources made defeat inevitable. Though faulty strategic planning and poor generalship worsened the defeat and increased countless Japanese casualties, the fundamental factor for the Japanese defeat was their inferior military resources compared to the British. Once the battle for Imphal turned into a battle of attrition, the side with air superiority, overwhelming tank firepower, adequate supplies and numerical superiority will prevail. British strategic planning was also faulty in the initial stage, but this was rectified by good generalship and superior material resources, in particular, air power. Thus, for the first time in the Second World War, the Allied forces inflicted a decisive defeat on the Japanese army and shattered forever the myth of Japanese invincibility in the jungle.25

Endnotes

1 William Slim, Defeat Into Victory, (London: Cassell and Company, 1956), p366.

2 Louis Allen, Burma: The Longest War, 1941-45, (London: 1985), pp158-160.

3 Ibid., p160.

4 Peter Calvocoressi, Guy Wint and John Pritchard, Total War, (Harmondsworth: Viking Penguin, 1972), p1121.

5 Louis Allen, op. cit., p160.

6 Woodburn Kirby, War Against Japan, Vol. III: The Decisive Battles, (London: Her Majesty's Stationery Office, 1961), p198.

7 Louis Allen, op. cit., p154.

8 Ibid., p153.

9 As late as February 1943, Lieutenant-General Mutaguchi, then GOC 18th Division, felt that no large scale forces could cross the jungles and mountains into Assam. What changed his mind was the Wingate operation in February 1944 which inflicted heavy casualties on a Japanese battalion during a battle in North-west Burma. As this took place in an area previously thought to be impassable to troops, Mutaguchi changed his mind.

10 William Slim, op. cit., p337.

11 Ronald Lewin, Slim, (London: Leo Cooper, 1976), p148.

12 William Slim, op. cit., p285.

13 Louis Allen, "Mutaguchi Renya and the Invasion of India, 1944" in Brian Bond (ed.), Fallen Stars: Eleven Studies of 20th Century Military Disasters, (London: Brassey's, 1991), p233.

14 Louis Allen, Burma, p247.

15 Woodburn Kirby, op. cit., p447.

16 Louis Allen, Fallen Stars, pp228-232.

17 Woodburn Kirby, op. cit., p448. IV Corps reserves were committed to extricate the 17 th Indian Division from the Tiddim area in mid-March after they were surprised and encircled by the Japanese 33rd Division.

18 Woodburn Kirby, op. cit., p448.

19 Ibid., p451.

20 William Slim, op. cit., p242.

21 Woodburn Kirby, op. cit., p246.

22 William Slim, op. cit., p368.

23 Ronald Lewin, op. cit., p151.

24 Louis Allen, Burma, p233.

25 William Slim, op. cit., p246.

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Realising IKC2: The Limits of Technology in Military Innovation

by LTA Ng Pak Shun

With the publication of the monograph Realising Integrated Knowledge-based Command and Control: Transforming the SAF (IKC2), the Singapore Ministry of Defence (MINDEF) and the Singapore Armed Forces (SAF) signal their clear intent on transforming the Singapore military into a network-enabled and knowledge-based organisation. "Techno-savvy people, techno-logically superior forces and a systems approach" are seen as the fruits of an IKC2 framework that will achieve four goals in future warfare via military innovations: "Pervasive Battlespace Awareness (PBA), Superior Battlespace Understanding (SBU), Knowledge-enabled Decision Superiority (KeDS), and Dominant Battle Management (DBM)."1

This paper argues that "the ability to marry breakthrough technology and concepts"2 does not necessarily lead to successful military innovation. In fact, the use of technology to dictate future battles can backfire on each of the four promised goals of the IKC2 framework because of the inherent limitations of technological developments. Instead of treating technological innovation as an unambiguous good for the military, it is important to recognise possible side effects of a technology-driven military revolution from past and present military transformations in order to understand the strengths and limitations of high technology in the future of MINDEF and the SAF.

OODA and Technology

The IKC2 framework is established upon the logic of the Observation-Orientation-Decision-Action (OODA) time cycle or loop, a warfighting concept that was introduced by the late American strategist, COL John R. Boyd, and has afterwards been quoted many times in both military and business organisations. Boyd argues that an army should work at a faster speed than its adversary or disrupt the enemy's OODA loop in order to win, because such activity will make us appear ambiguous (unpredictable) thereby generate confusion and disorder among our adversaries – since our adversaries will be unable to generate mental images or pictures that agree with the menacing as well as faster transient rhythm or patterns they are competing against.3

For the authors of the monograph, technology across the Command, Control, Communications, Computers, and Intelligence Technology (C4IT) services is the key to Boyd's vision of a victorious force, so that MINDEF and the SAF can "see first and see more… understand faster and better… decide better and faster… [and] act faster and more decisively."4 IKC2 claims that technology will provide relevant battlespace data through various sensor entities and fuse them into useful contextualised information for better understanding (PBA & SBU), so that commanders can make the right decisions together with automated decision support systems to arrive at successful mission accomplishment (KeDS & DBM).

There is no doubt that technology has played a key role in transforming warfare. The invention of gunpowder allowed sedentary armies to dominate nomadic forces in the 1500s, the development of artillery power and precision changed the concepts of fortification in times of war in the 1600s, and the mechanised production displaced weapon artisans to produce standardised arms for mass armies in the 1800s.5 Technology, in the form of computers in the 20th century, changed the course of warfare yet again by producing machines that have in-creasingly replaced human roles in information gathering and decision- making processes. Yet, what marked the rise of computers and technology specifically in the history of the Cold War and beyond are not necessarily successful examples of military transformations. In fact, the engage-ment of technology and the military has had significant detrimental effects on the US military, one of the most innovative armed forces in the world. These unfavourable effects must be placed in the context of the usually acknowledged successes of a technologically-advanced military to understand the costs and benefits of military innovations. An appreciation of the problems and failures of technological development in the US military highlights how PBA, SBU, KeDS, and DBM might not be the natural outcomes of military innovations in MINDEF and the SAF.

Pervasive Battlespace Awareness (PBA)

While improvements in technology have provided a military with increasing amounts of battlespace data, the claim that technology can produce "a sensor and information web that networks all sources of information… to provide… pervasive coverage of the battlespace"6 is highly contestable on the grounds of inclusivity and reliability. While IKC2 lists many types of data that can be generated by machines, a military might ignore many other sources of information or the unintended costs of gathering technology-mediated information, which can have fatal

consequences for the military. Furthermore, the significance of information in the network wars of today and the future has made its possession a premium to all warring sides. Just as technology can be used to obtain battlespace information, efforts of disinformation, either by the enemy, or by the limitations of technology, will prevent a military from gaining a reliable picture of the battlefield.

Technology displayed its weaknesses in information collection during the Vietnam War. As an example of "Technowar" , the US military believed in using technology to solve all questions of warfare in Vietnam, and the abstract technological approach "permeated all phases of war".7 In order to make commanders and weapons aware of their targets on the battlefield, the US forces underwent a defoliation programme to remove all natural foliage on the ground, so that the North Vietnamese would not be able to take cover by creating areas where there would be 50 to 300 metres of "dead bushes on both sides of where the road or track used to be". However, by enabling helicopter observation of defoliated territory to provide information for planes and artillery, it was the Americans on the ground who had nowhere to hide in an enlarged killing zone from North Vietnamese ambushes, as the North Vietnamese chose to shoot in their ambush positions "from 300 meters away instead of five" . Also, as opposed to the relevant knowledge of officers on the ground, the commanding officers' superficial battlefield awareness on helicopter observations made the orders "from the air" unreasonable and unrealistic to execute.8 While technology opened up a new vantage point for the commanders to survey the battlefield and gain enhanced battlespace awareness, this viewpoint was so far removed from reality that the real soldiers of the technologically-advanced military had to suffer for it on the ground.

The wars in Iraq in the past decade are harbingers of how wars of the future will be increasingly focused on having technology demolish infrastructures of communication, rather than destroy cities per se, to deny the enemy of battlespace awareness. The land, sea, and air fronts of warfare have been superceded by the front of information and communication in both Gulf Wars, as "the control of general communications… prevails definitively over the particular 'geophysical' environment of the adversary".9 Yet, the importance of information makes it a prime reference point of military strategies, and disinformation and deception have become the standard method of a technologically-backward force to deny information flow to its technologically-advanced adversary. Therefore, during the first Gulf War, just as the Allied Forces could use missiles and fighter jets to eliminate the communication nodes in Baghdad, Saddam Hussein was able to use his own strategy of deception against the enemy in moving a substantial part of the Iraqi air force to the Iranian airports, deploying decoys to protect bunkers in the desert, and launching mobile Scud missiles for a sustained period of the conflict. With active disinformation, Iraq was able to "confuse both the governments of the coalition forces and their military leaders on the ground" even with a technological disadvantage.10

Even if active disinformation was not possible for an adversary, passive disinformation can still work against a technologically-advanced military. While technology, in the forms of air and space reconnaissance, produces imagery of the battlefield for pinpointing and destroying enemy targets, the coalition forces did not have complete access to the battlefield. The commanders on the field could not interpret the results of the coalition attacks accurately, because remote sensors for Bomb Damage Assessment (BDA) could not ascertain the level of damage caused by aerial bombardments.11 This is not much different from a similar failure of technology in the Vietnam War, when personal reports of pilots were cast aside by inaccurate technological evaluations of bombing missions.12 Also, one requires reliability in each of the machines in the information dissemination network to avoid errors in order to depend on technology to provide battlefield information, but "friendly fire" incidents of the first and second Gulf Wars are stark reminders of machine fallibility.13 Thus, the possibilities of active and passive disinformation make pervasive battlespace awareness hard to achieve even with technological innovations.

Superior Battlespace Understanding (SBU)

By claiming that technology can obtain and present pervasive and accurate information, IKC2 envisions that military commanders will have access to understandable contextualised information from a databank at all times without being subject to information overload.14 Indeed, information can only become useful when it is presented and understood in context. However, the context in which military personnel understand battlefield information of the 21st century will be that of technological assumptions and specifications. War-gaming exercises, while providing a simulation of actual warfare for military forces to practise and hone their skills, can easily skew their perception of reality with their in-built assumptions. Information could also be understood only in the framework on which technology works, making it hard for people who are not conversant in the parlance of technology to table valid counter-arguments against military decisions. Battlespace understanding may become overly mediated in the context of technology without accounting for the actual forces of conflict on the human levels.

With the advent of computers, military strategies have been expressed in terms of mathematical models to identify and evaluate different possibilities of conflicts between nations. However, the imperfect assumptions and analyses

of these models can distort human under-standing of the battlefield with catastrophic consequences. In the 1950s, RAND developed a war game to model nuclear negotiation in the framework of "Prisoner's Dilemma" and showed how it was rational to engage in nuclear conflict even if both nuclear parties would have better payoffs with a mutually cooperative strategy. Even when human players of these computerised war games refused to cross the nuclear threshold in the simulations, they were replaced by computer programmes which were considered more "rational" in choosing nuclear warfare.15 This bias of conflict over cooperation in war games further increased American strategists'paranoia of their Soviet counterparts when computer programmes that could supposedly "think Red" were built to encourage the notion that the Soviets were willing to enter into conflict at the expense of cooperation. Rationality implied in these war-gaming models suggested that the US and Soviet Union should choose the "mini-max" rule of minimising losses over maximising gains in a zero-sum game of nuclear confrontation, where one player's gain was the other player's loss, when "mutual trust is what rationality standards would demand" and how military strategists should understand the nature of a nuclear standoff.16 By artificially biasing decision-making against cooperation, computer models can prevent commanders from understanding the battlespace in the context of its actual dynamics.

Not only does technology bias strategic options irrationally in human understanding of the battlespace, the interaction of technology and strategic thinking can influence how military personnel perceive the battlespace in a way that can be far removed from reality through technology-specific discourses. "Techno-strategic" language, a kind of thinking, a way of looking at problems – formal, mathematical modeling, systems analysis, game theory, linear programming – that are part of technology itself,17

is built upon a set of assumptions and rationales to understand warfare, which necessarily excludes people who do not understand or agree with it. In the field of nuclear strategy, it is important for a military analyst to understand the various acronyms associated with nuclear warfare (SLCM: submarine-launched cruise missiles, SRAM: short-range attack missile, EMP: electro-magnetic pulse) in order to communicate with other military leaders. However, this same language confined discussion of nuclear warfare to a specific set of concepts and reasons because it "does not allow certain questions to be asked or certain values to be expressed." The abstract theories of "strategic stability" and "collateral damage" replaced the more humanistic and understandable references of "peace" and "mass murder" respectively, such that military thinkers were separated from reality to understand incentives of entering nuclear warfare only in terms of surviving weapon strength instead of human deaths. Thus, it is hard to subject to oversight the use of technology in determining the path of military innovations because only the military personnel who are familiar with the language of technology would be capable of analysing its pros and cons, and these same analysts would have been trained in a certain way to understand the context of military innovation in the context of technological capabilities, instead of actual battle-space reality.18

Knowledge-enabled Decision Superiority (KeDS)

Some might still argue that technology can indeed produce both accurate and understandable information consistently with improvements in computer software and hardware. Along with this line of reasoning, IKC2 foresees the involvement of intelligent agents or decision support systems to analyse the complexities of the battlefield so that commanders can make faster and better decisions.19 Yet, the increased speed of information transmission puts commanders under increasing stress in making decisions under a compressed time-frame, which often creates costly mistakes. Also, instead of seeking technology as an advisory system to aid human decision-making, the arguments that trumpet the speed, accuracy and consistency of machines might make humans rely more and more on technological outputs and eventually delegate their decision-making roles to machines. Human beings would eventually have to depend on the calculations and assumptions of pre-programmed machines to dictate their battle moves, and the need for absolutely error-free computations of machines that are themselves built by fallible human beings should make even the proposition of a computer-led war a dangerous thought.

Besides increasing the scale of destructiveness in warfare, technology has also sped up information flow by inventing machines that could transfer information from the battlefield to the command centres. It is true that technological advancements have allowed information to reach commanders now in near real-time to make timely decisions. Yet, the warning and decision time that used to be available to the military command structures has now been compressed, such that there is less time to make "an [sic] reliable assessment of the situation and deciding whether or not to commit the entire country to war".20 The danger of military accidents and false alerts is a real concern of the decision-making capabilities of the human-machine interface as humans are forced to react more and more quickly to high-speed technological systems.21 For example, an integrated circuit chip failure in 1980 caused the North American Aerospace Defense Command (NORAD) computers to broadcast a warning of a Soviet attack to the US. A full-scale retaliatory response would have been launched by the US president 14 minutes from his notification if the false alert had not been discovered earlier.22 The lack of time in confirming the validity of the nuclear attack warning and contacting Moscow to confirm their intentions of a nuclear launch would have made

"decision superiority" an ironic claim, when the push of a button to eliminate tens of thousands of lives in the Soviet Union would have been predicated on false information on a computer screen.

The increase in the speed of information dissemination, together with claims of technological accuracy, could also make commanders be more inclined to delegate their decision-making responsibilities to expert machines. Instead of keeping only planning and advisory roles, computers will be given freer rein in deciding the course of the future battle because of their analytic powers. The huge amount of information that a human commander receives from all his information-collecting machines will produce too much "noisy data" such that he will rather rely on the computer to decipher and decide, both because computers can analyse data faster and because computers would be considered to have a better understanding of the battlefield in terms of working with their own computerised outputs.23 Yet, even proponents of computer-led decisions on grounds of their better and more superior judgment admit that there will be an increase in the pace of events at all levels of combat, to the point where human judgment at the command level will eventually become irrelevant. At that point, soldiers will live and die on the best guess of programmers who attempted to anticipate and code how a battle will unfold in the future.24

Decision superiority from technological innovations might be a goal that becomes increasingly difficult to achieve as the time for good decision-making shortens and the temptation to allow computers to make the best decisions backfire on the limitations of information collection and analysis.

Dominant Battle Management (DBM)

IKC2's claim for dominant battle management (DBM) – to be able to act faster and more decisively – necessarily hinges on securing PBA, SBU and KeDS. However, from the above arguments, it is doubtful that technology will naturally enable battlefield information to be known and understood for superior decision making. In fact, the confidence of success in a technology-led war often rests on the assumption that the opposition will behave in the same logic of technological reliance, with the only difference that its inferior technology will allow the technologically-advanced military to control the battlefield. However, it is precisely this disparity in technology that will force the technologically weaker army to counter the strengths of technology with asymmetric warfare and hold its ground in the battlefield.

In Joint Vision 2020, the planning document of the US military for the 21st century, its authors argue that innovation is an important complement of technology to think of "new ' ways'to carry out tasks" and create the "joint force of the future."25 However, General Westmoreland's deep belief in exploiting technological innovations to ease war fighting in Vietnam backfired. For example, Westmoreland displayed the US'advanced technology in the hope of persuading a North Vietnamese surrender without total force annihilation. However, by observing routinised patterns, the North Vietnamese undermined US helicopter counter-insurgency by simply disabling the helicopter, which was the main factor of success in these US missions, by a relatively primitive weapon: small-arms fire.26 Technology thus failed to communicate technological superiority in Vietnam, because a technologically-backward force can capitalise on the inherent weaknesses of technology to stave off defeat or even secure victory against a technologically-innovative opponent. It is no surprise that adversaries of the US are predicted to use "asymmetric means" to attack Americans both overseas and at home27 by looking for ways to "match their strengths against [American] weaknesses",28 such as the use of "innovative, non-traditional tactics, weapons, or technologies … at all levels of warfare – strategic, operational, and tactical – and across the spectrum of military operations".29 The threat and actual use of asymmetric warfare, as shown in the events of September 11, are severe warnings of the limitations of high technology against human and "primitive" fighters.

Conclusion

When used effectively, technology can certainly enable a technologically-advanced military to meet any challenge. However, the experiences of past military transformations reveal the possible dangers and pitfalls of technological innovations. While a military can use technology to defend attacks that engage its technological strengths, it is open to asymmetric methods of attack along the fault-lines of technological innovations. Even if asymmetric warfare is not waged, an unhealthy emphasis on the use of technology can easily distort battle-space understanding and hamper decisions on the field when commanders could neither appreciate war conditions realistically nor create realistic and applicable means of describing war conditions accurately even with the aid of technology. It is imperative that technology must be viewed in both its successes and failures in guiding warfare; the sceptre of technological misuse / over-use must be a concern that MINDEF and the SAF have to address in its push towards military innovations.

Endnotes

1 Integrated Knowledge-based Command and Control: Transforming the SAF (IKC2), p14.

2 IKC2, p30.

3 Boyd, p5, original emphases.

4 IKC2, pp15-16.

5 De Landa.

6 IKC2, p15.

7 Gibson, p121.

8 Gibson, pp107-108.

9 Virilio (1991), p120.

10 Virilio (1991), pp122-123.

11 Virilio (1991), pp122-124.

12 Virilio (1989), p85.

13 Virilio (1991), p128.

14 IKC2, p15.

15 De Landa, pp84-87.

16 De Landa, pp97-98.

17 Cohn, p690, footnotes.

18 Cohn.

19 IKC2, pp15-16.

20 Hinds.

21 Rochlin.

22 Edwards, p285.

23 De Landa, p81.

24 Bellin & Chapman, quoted in De Landa, p82.

25 US Department of Defense, p10.

26 Gibson, pp104-105.

27 Cohen.

28 Report of the National Defense Panel.

29 The Joint Staff.

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Viewpoints: "What's An Opinion?" by MAJ Alfred Fox

The laughter these days is not as loud as before, neither are the sneers and sniggers so open. Mention the words "POINTER Journal" before and you would have received a sarcastic or snide remark or two.

Late last year, the journal was revived with a big bang, and the editors touted the change as not only cosmetic (it became bigger in size), but also the quality of writing and thought would improve. True enough, many interesting articles were solicited from senior officers and foreign writers to lend credibility to the relaunch, but many have been left wondering if such a resurrection is really sustainable. Indeed, there may be underlying issues which most speak about, but few would acknowledge openly.

The journal has a subscription base and readership of over 10,000, many of whom confess that they usually "just flip through" to look at titles and photographs. Senior officers tend to view the journal as a platform for up and coming junior officers to gain some form of exposure. "It gives them a chance to be heard," said one LTC. But many junior officers scream in disdain that the senior officers hardly lead by example. They are not far from the truth. In the past 20 issues, less than 20% of the contributions have been from officers above the rank of LTC, and many of these have been reproduced speeches and articles for that matter.

"We don't have much time for such pursuits," say many. Well, it's only published four times a year and such enthusiastic attitudes are making the journal that it is.

So what is POINTER supposed to be? It seems that officers are not exactly spoilt for choice when it comes to a platform for expression of opinions. POINTER needs to do what it says it will do – be a platform for transformational thought and opinion. It cannot be a vehicle that reinforces official positions or act as an information conduit, rather it should surface controversy and engage officers in debate. Achieving such status, however, is much easier said than done. This is especially so when traditional mindsets still advocate that winning and publishable essays are determined more by the number of footnotes and citations than by the ability to express alternative views and controversial thinking.

Truthfully, let's ask ourselves how many of these articles are expressing a real opinion or really rehashing what is already open-source. There are many examples to emulate – Parameters and US Naval Institute Proceedings are some of the better ones.

The bottom line is that POINTER must rely heavily on reader participation to make it what we want it to be. We can continue to pass snide remarks or we can try to do something about it.

The Editorial Board, for one, needs to be a little braver in its decision to publish articles which may be controversial or possess radical thinking – naturally within limits of security though this should not be used as a convenient excuse. Perhaps even different forms and styles of writing also need to be encouraged, maybe some journalistic articles, much like those in the Economist or Fast Company.

What is going to make the difference is for some people to start putting pen to paper and fingers to keyboards and saying what they mean. If networks are a force multiplier for the future, then reading and the ability to express an opinion must be the SAF's intellectual force multiplier.

A twist to an old joke comes to mind. Three SAF officers are asked their opinion on freedom of speech in the armed forces.

"Oh, things are changing, the armed forces seem to be becoming more liberal these days," says the first.

"Well, the armed forces is exploring ways to get its officers to speak up," says the second officer.

The third officer replies, "What's an opinion?"

MAJ Alfred Fox

Book Review: Winning the Next War – Innovation and the Modern Military by Stephen Peter Rosen

by MAJ Tan Chee Yong

The inaugural POINTER monograph on Creating the Capacity to Change (C2C) is a manifestation of two things. The first is a reflection of the importance that MINDEF holds on the need to change, or innovate itself, in order to meet the future security challenges and win the next war. The second is the need for a publication on bringing about change that seems to suggest that change is not a natural process. As noted by COL John Mitchell of the British Army in 1839 - "Officers enter the army at an age when they are more likely to take up existing opinions than to form their own. They grow up carrying into effect orders and regulations founded on those received opinions; they become, in some measures identified with existing views, till, in the course of years, the ideas, thus gradually imbibed, get too firmly rooted to be either shaken or eradicated by the force of argument or reflection. In no profession is the dread of innovation so great as in the army." Many social scientists have also argued that military organisations are bureaucratic in nature and are designed to resist change. This leads one to ask the question whether innovation or desired change is really possible in the military.

In reality, military organisations do innovate and history has plenty of examples. So perhaps, the more relevant and practical question to ask is really how does military innovation occur. Stephen Rosen's book, in essence, attempts to address such a question. He approaches the subject from an angle of first understanding what drives the need for a military organisation to innovate itself. He then goes on further to examine what makes the difference between successfully implemented innovations and failed ones. The study is based on 21 carefully selected cases of innovation in the American and British militaries in the early 1900 to 1970s. The book is divided into three sections covering peacetime, wartime and technological innovations. The first two are focused on issues of behaviour changes in the military organisations while the last is on those issues of building new machines.

The first chapter sets the stage for the subsequent analysis in the three sections by challenging the way we normally think about innovations and correcting those simple and straightforward notions that we usually take for granted. Innovation is defined in this chapter to differentiate those that merely improve the efficiency and effectiveness of an existing operational concept and those that involve a fundamentally new way of fighting or doing things. It is the latter that is likely to have a major influence in the events of war over the next 10 to 30 years, and is the focus of the book. It is also the type of change that the C2C monograph probably seeks.

Peacetime innovation is covered in the next two chapters, in which the first analyses the need for peacetime innovation and the second studies the process of making things happen. Rosen shows that the perceived need to innovate is not driven by potential enemy developments as intelligence were frequently too unreliable to be useful for any peacetime military planning. Some examples of successful innovations in fact occurred in the absence of any intelligence or during times of intelligence flip-flopping. Instead, Rosen finds that the driving force behind the need to innovate in the American military is the perception of shift in the security environment, which is largely outside the control of the United States or its potential adversaries. The American strategy that has been quite successful is to focus on those broad structural aspects that are independent of fluctuating policy decisions. It appears that the MINDEF approach is quite similar. This is also evident in the C2C monograph where the authors have identified the driving forces for change as the three emerging trends of discontinuities in technology, asymmetry and globalisation.

The chapter on making things happen gives a pretty in-depth study on three successful cases of innovation in the US Navy (carrier task force), US Marine Corps (amphibious assault) and the US Army (air mobile division), and two cases of innovations that were initiated in the British Navy (carrier task force) and US Army (counter-insurgency) but failed. In here, Rosen refutes the theory that civilian leaders play a major role by intervening in the military to bring about the desired change. He gives the example of President Kennedy who ordered the US Army to develop a counter-insurgency capability during the Vietnam war and highlights the difficulties that civilian leaders have in enforcing a military innovation when the senior military leadership is not convinced. Neither does Rosen subscribe to the more appealing theory on the existence of "mavericks" in the military that act as a go-between for the civilian leaders and the military to bring about change. Using the cases of successful innovation, Rosen argues that the implementation process for innovation involves senior military officers making changes to the promotion structure by creating new paths along which younger officers specialising in the new warfare tasks could be promoted. Over time, values, opinions and concepts in the officer corps gradually change and favour the innovation. The process is long and is only as fast as the rate at which the young officers rise to the top. Rosen's thesis is quite convincing and is coherent with the nature of the military organisation as observed by COL John Mitchell earlier.

The second section covering wartime innovation takes up three chapters, and is based on the British development of

the tank during World War I , US declaration of unrestricted submarine warfare and US strategic bombing force during World War II. Rosen contends that the same long process of peacetime innovation takes place during wartime and makes wartime innovation difficult given that the duration of war is short. However, opportunities do occur during wartime where the promotion of younger officers are accelerated either due to older officers being killed in action or failure to perform in battle. The submarine case where 30 percent of the US submarine commanders operating in the Pacific were relieved because they were unable to switch from the original mission of targeting Japanese battle fleet to sinking Japanese merchant ships gives a good illustration.

While better intelligence on the enemy may be available during wartime, Rosen again finds that it has very little influence on wartime innovation. Instead, Rosen discovers that the structural changes driving the need for wartime innovation is the development of new measures of strategic effectiveness. Once the new measures of effectiveness have been identified, wartime resources were quickly channelled to start off the new way of fighting. However the process of learning simply takes time and payoff usually comes too late and is of limited value to the war. This is even more so when wars today are conducted at a higher tempo and do not last for years as in the two world wars. Rosen concludes that a combination of problems with intelligence collection and delay in learning due to intellectual and organisational problems makes wartime innovation terribly difficult. Given this difficulty, Rosen further concludes that peacetime innovation holds greater importance to the future war than wartime innovation.

The last section on technological innovation investigates the process by which new weapons and military systems are created whereas the first two sections are focused on organisational behaviour. In this section, Rosen shows that technological innovation in the US military is dominated by problems of coping with uncertainties about the enemy capabilities and cost and benefits of new technologies. Notwithstanding these uncertainties and times of tight funding, the success of the US technological innovation springs from a strategy of developing many technologies to the point of procurement, but then deferring large-scale production while other uncertainties resolved themselves. This gives the US military a menu of available technologies to choose from. Rosen finds that the military did not perform much worse than the civilian scientists when it comes to choosing which technological avenue to pursue despite numerous errors and civilian intervention is not necessary. Rosen concludes that the process of technological innovation is quite similar to peacetime and wartime innovation, where intelligence do not play a major role and the main determinant of innovation is the military.

The concluding chapter gives a summary of the major lessons in all three sections. In the final analysis, Rosen urges the US military to look beyond the Five-year Defence Plan (considered long-term planning by the US Department of Defence) to identify new military functions and capabilities. He advocates a strategy of buying information about a range of uncertainties, including learning the strategic culture of emerging powers, investing in Asian language training, conducting imaginative conflict simulations and preparing to innovate rapidly to new requirements when they become better defined or arise out of new security environment.

This book does not make for good bedtime reading but is certainly worth poring over. While one can continue to argue over Rosen's various assertions in the book, the underlying value of the book is that it challenges us in the way we think about innovation. It illustrates the greater importance of understanding the process of innovation rather than focusing on any particular change in weapons, organisation or tactics. Whether intentionally or not, the C2C monograph paid very little attention to the process of change despite having outlined an organisational strategy to build the capacity to change. Perhaps, it is one order higher or maybe it is not. Nonetheless, this book makes for excellent reading to complement the C2C monograph.

The above mentioned title is available for borrowing at the SAFTI MI Library. *The catalog references are:*

Winning the Next War - Innovation and the Modern Military

Stephen Peter Rosen

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Featured Author: Stephen Peter Rosen

Stephen Peter Rosen received his PhD from Harvard University in 1979 and is currently the Beton Michael Kaneb Professor of National Security and Military Affairs in the Department of Government, Harvard University.

Prof Rosen is well known for his research into strategic theory, culture and discourse through a wide variety of topics including American strategy during the Second Indo-china War , the political and strategic failure of the Warsaw Pact as well as current issues such as the geopolitical impact of the AIDS epidemic and the strategic implications of ballistic missile defence systems.

Prof Rosen is able to bring a wide range of research and policy experience into his writing, having held many appointments in major US government organisations and military institutions. He was the Civilian Assistant to the Director, Net Assessment in the Office of the US Secretary of Defense and Director of Political-Military Affairs on the staff of the US National Security Council. He was also appointed as a Professor in the Strategic Department at the US Naval War College. Prof Rosen has also participated in the President's Commission on Integrated Long Term Strategy and in the Gulf War Air Power Survey.

His first book, Winning the Next War: Innovation and The Modern Military (1991) was awarded the 1992 Funriss Prize by the Merchon Centre in Ohio State University for being the "best first book on national security affairs". This book, which is reviewed in this issue of POINTER, examines the popular notion that military innovation is much more effective in wartime compared to peacetime. He examines numerous historical case studies and finds that innovation during peacetime can be as effective as wartime innovation owing to risk adversity during actual conflict. Furthermore Prof Rosen argues that technological invention, on its own, cannot be qualified as innovation. Instead he urges the reader to explore the bigger picture, fusing together the political and strategic implications behind the technological advancement. Prof Rosen believes that true innovation stems from the essential concept of strategic effectiveness and innovation must be able to change how strategic effectiveness is conceived and measured e.g. minimisation of casualties, securing of objectives within days as compared to weeks or months. Prof Rosen argues that while technology and innovation are necessary tools to achieve effectiveness, it is also important to have "investment" strategies for them. As one is not always able to accurately predict which technological investments will pay strategic effectiveness dividends, the necessary concepts and framework must be in place to manage and exploit technology to harness the potential breakthroughs for innovations in strategic effectiveness.

Prof Rosen's second book, Societies and Military Power: India and Its Armies (1995), examines the long, fragmented and varied history of the Indian subcontinent's various armies in order to challenge the cultural school of thought in strategic studies as a sufficiently strong explanation of how military strategy and behaviour changes. The cultural view holds that strategic elites of different states and cultures view the same international political factors differently, thus explaining differences in and evolution of strategic behaviour. Prof Rosen argues, instead, that strategic behaviour is mostly influenced by a state's social structures and the distance between the military and its host society. Societies and Military Power draws on the rich tapestry and deep roots of Indian history, including the caste system, ancient India, the medieval period under Mughal rule, the age of the Imperial British Raj and post-independence. This examination of civil-military relations and strategic behaviour over 2,500 years of history tracks how political and military elites have related to each other and how societal cleavages have been reflected in the armed forces, right up to the modern era. This study has significant implications for how theories of international relations and comparative strategic behaviour can be conceived and validated.

Prof Rosen is noted for his thorough and insightful style of historical and theoretical analysis. The methodological manner in which he manages to relate and link key strategic concepts and ideas to examples in military history have been recognised the world over by military professionals and governments alike. His next project is a forthcoming publication, Fear and Dominance in International Politics, which seeks to examine the non-rational aspects of strategic deterrence. Students pursuing courses in military history, strategic studies and international relations will find Prof Rosen's works both intel-lectually stimulating as well as beneficial through their course of study.

All the above-mentioned titles are available in the SAFTI MI Library.

Personality Profile: Chester William Nimitz

Fleet Admiral Chester William Nimitz was born on 24 February 1885, in Fredericksburg, Texas. His early life was spent working as a handyman in a hotel in Kerrville . However, his strong desire for a college education, coupled with an interest in a military career, prompted him to seek admission to the prestigious US Military Academy at West Point. As no appointment was available, the young Nimitz applied to the US Naval Academy at Annapolis instead. He was accepted and eventually topped his cohort. Thus began his illustrious career in the US Navy (USN), culminating in his enduring legacy, which has shaped much of the modern USN.

His early career began with his commissioning as an ensign after a two-year stint on Ohio. His first effective command was onboard the gunboat Panay in the Philippines in 1907. His next tour however, was far less salutary. He ran his ship, the destroyer Decatur, aground and was court-martialled.

More than that, this meant that Nimitz was denied what he had so badly wanted: battleship duty. Instead, he was assigned to serve on a sub-marine. He went on to hold four consecutive commands on submarines, and in the process, gained intricate and detailed knowledge of submarine command and warfare. This was a blessing in disguise as it further expanded his horizons.

With the advent of World War I, Nimitz was promoted to the rank of Commander (equivalent to LTC), and was chief staff officer to Admiral Samuel S. Robinson, Commander of the Atlantic Submarine Force. He was finally granted battleship duty on board South Carolina as Executive Officer in 1919. After WWI, Nimitz underwent naval command training at the Navy War College and developed a plan in the course of war-gaming a scenario for a Pacific War. This experience aided him tremendously in the Pacific theatre of World War II.

Nimitz's creativity was further demonstrated when he effectively created the Naval version of the Reserve Officers Training Corps (ROTC) at the University of California at Berkeley. His idea and model was well received and eventually adopted. The University made him a Professor of Naval Science in 1926 and he retained a close link to it for the rest of his life. Soon after, he was promoted to the rank of Captain (equivalent to COL), where he took command of a submarine division, the San Diego destroyer base and the flagship of the Asiatic Fleet, Augusta. Following tours saw his promotion to Rear Admiral, commanding a cruiser division and, later, a battleship division.

On 7 December 1941, Japanese forces launched their infamous surprise attack on Pearl Harbour. The devastation to the US Armed Forces, particularly to the USN, was almost crippling in both physical and mental terms. The American public was also in a state of near hysteria. As a result, Admiral Husband E. Kimmel, who was Commander-in-Chief of the Pacific Fleet, was replaced by Nimitz. Nimitz's moment had arrived.

Nimitz's legacy has been defined by his pivotal role in the Pacific theatre of WWII, where he was the Commander-in-Chief for the American Pacific Forces in addition to being Commander-in-Chief of the Pacific Fleet. He brought his own perspective of combat and staff leadership into his command. Always the "soldier's soldier" and the "sailor's sailor", his dynamic style of leadership proved effective in motivating his men and thereby, allowing his policies and ideas to be executed with full support.

Over the course of the war, his clashes with General Douglas MacArthur were suitably epic. General MacArthur was the only American commander in the Asia-Pacific region to be independent of Nimitz's jurisdiction. Their disagreements were based on the differing strategies that both men had on how Japan should be defeated. This was further exacerbated by their very different personalities. MacArthur's flamboyant style and charisma made him a favourite with the US media and public. He attained a celebrity-like status in the process. Full of powerful rhetoric, MacArthur undoubtedly lifted the spirits of both the US public and servicemen during the darkest hours of the Pacific War. However, his detractors have attacked his arrogance and eagerness for the limelight. He wanted to be at the forefront of all campaigns and enjoyed claiming credit for successful raids on the Japanese.

Nimitz, on the other hand, while equally ambitious and possessing great leadership qualities, did not have the same charisma or rhetorical flair. Rather, he has been described as a team player, relying on each and everyone of his staff to get their respective jobs done. His priority was always to the task on hand and to his men. Nimitz felt personally responsible for each and every one of his men when they carried out his orders that might jeopardise their lives.

The strategies of the two commanders were starkly different, reflecting their different Service orientations. Especially

after the capture of Guadalcanal, MacArthur favoured a transpacific advance toward Japan executed via an upward thrust by his Army troops from New Guinea to the Philippines and ultimately onto Tokyo. MacArthur, an Army General, had relegated the role of the Navy into mere "taxi-drivers", only involved in ferrying his soldiers from island to island.

This obviously provoked Nimitz, who saw this as a preposterous insult. Nimitz's strategy advocated a tri-service campaign with the Army, USN and Marines advancing across the Pacific, capturing strategic points suitable for the establishment of air-strips and bases, with the ultimate aim of using them to lay siege on the Japanese home islands. This would bypass MacArthur's beloved Philippines, which the General had promised to return to after being driven out in 1942. When the Joint Chiefs of Staff decided to adopt Nimitz's strategy, MacArthur was under-standably enraged. More importantly, Nimitz had effectively created a concept, which would eventually be known as "island-hopping". While this strategy was costly for both the Americans and the Japanese alike, it undoubtedly proved sound and prudent as each island seized moved the Allies closer to the final assault on Japan.

But while the two great men of the US Army and Navy had their fair share of differences, they did cooperate on several occasions, albeit reluctantly. In 1944, the campaign for the Marianas Islands saw MacArthur's forces surging from New Guinea while Nimitz's forces crossed the Central Pacific in full strength. This two-pronged attack smashed the Japanese defence and soon, the Japanese capitulated.

While Nimitz and MacArthur disagreed with the fundamentals of the other's tactics, their show of unity in this instance proved decisive in determining the outcome of the battle and bringing victory to the Allies. This success reinforced Nimitz's belief in a tri-service force.

Another example of collaboration of the two commanders, was the Battle of Leyte Gulf. In this particular campaign, Nimitz's sailors and marines fought valiantly against the fanatical enemy, especially the kamikaze pilots, as they cleared the Caroline Islands, paving the way for MacArthur's soldiers to move onto the Philippines. Indeed, the Battle of Leyte Gulf proved to have the largest Navy engagement in the Pacific theatre.

However, with the re-capture of the Philippines, MacArthur and the Army received most of the credit, leaving Nimitz with mixed emotions. The victory would have been impossible without the sacrifice of the USN and Marines. Nimitz felt for them as their Commander and as a sailor. Nonetheless, Nimitz felt that he scored one for the team, while the star player lauded the applause. Either way, the war effort was now pointing to an Allied victory.

Nimitz was, by this time, itching to stand shoulder to shoulder with his men at the front, preparing to deal Japan the decisive blows that would bring her to surrender. When his command moved to Guam, Nimitz focused on capturing the vital Japanese Islands of Okinawa and Iwo Jima, relishing the chance to be closer to the action. The battle for Iwo Jima was, without a doubt, one of the bloodiest battles fought during World War II. The geographical and strategic importance of the island was crucial to the Allies as they moved towards Tokyo. The capture of Iwo Jima was crucial for the effective bombing of the Japanese home islands.

After 10 days of fierce fighting, Iwo Jima was under US control with more than 22,000 Japanese and 6,800 US troops killed. The price of the victory raised many questions about Nimitz's leadership and strategy. Many felt that the cost was too high and the strategy poorly-conceived. Some newspapers felt that MacArthur would have done a better job and called for him to be given supreme command. This idea made Nimitz livid. But his patient demeanour prevailed and he was more wary of the politics of war, particularly those involving MacArthur and himself.

With Iwo Jima now secured, Nimitz managed to get approval from the ailing President Roosevelt for his plan to take Okinawa. The Okinawa campaign proved to be another problem for Nimitz's sailors and marines. The island was huge by naval standards and mobility was limited by extensive coral atolls. Progress was slow and costly to all Services. The Army and Marines seemed bogged down against the entrenched and tenacious Japanese.

Nimitz was silently furious at the Army's tactical problems and felt that Marine commanders who had more experience in amphibious operations were sidelined by the Army. He even suspected that the Army had been deliberately using slow methodical tactics to save Army lives without due consideration for the USN which bore the brunt of Japanese air assaults. USN ships supporting the attack by enforcing a blockade, supplying the ground forces and providing naval gunnery support were subjected to heavy kamikaze attacks that saw 26 ships sink and 368 put out of action, at an average of three ships every two days. US forces lost about 7,600 soldiers and marines as well as over 5,000 sailors while over 90,000 Japanese were killed.

In addition, he had to deal with the criticism over casualties and the lack of progress as Commander-in-Chief. He, however, playing the political card more shrewdly now, praised the Army's "magnificent performance". He managed to successfully prevent MacArthur from seizing control of all Army forces in the Pacific by going to MacArthur's headquarters in Manila. There the two men managed to put aside their egos and came to a mutual agreement over strategy for the final lap in the war against Japan now that Nimitz was practically at the doorstep of mainland Japan. However, Nimitz's dream of a unified multi-service force could not be realised as the rift between Army and USN proved almost irreconcilable.

With Japan now in sight, a complication arose in the form of the atomic bomb. To Nimitz, the atom bomb was unethical, inhuman and an illegitimate method of war. Thus, he ordered his ships and submarines to lay siege on defending the Japanese troops with greater ferocity in attempt to make the Japanese realise that defeat was inevitable to effect a surrender. However, the consensus was that the Japanese would not surrender if the atomic bomb was not used and the alternative - an invasion of Japan would prove to be too costly. Hiroshima and Nagasaki were bombed on 6 and 9 August 1945 and the Japanese surrendered soon after.

Nimitz signed on behalf of his country at the formal surrender held on board the battleship Missouri in Tokyo Bay and spent the next few years as Chief of Naval Operations. His last appointment in the US Navy was as a special assistant to the Secretary of the Navy in the Western Sea Frontier. He was later appointed as a roving ambassador for the United Nations. Later on, President Truman appointed him as Chairman of the Presidential Commission on Internal Security and Individual Rights.

Nimitz went on to serve as Honorary President of the Naval Historical Foundation and was active in restoring goodwill between his vanquished enemy, Japan, and the US, by raising funds to help restore the battleship Mikasa, used as a flagship by Admiral Togo during the Russo-Japanese War of 1904/05. Perhaps the most fitting tribute was paid when the newest and most powerful class of aircraft carriers being commissioned into service was named the Nimitz class.

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