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**Smaller Air Forces and the Future of Air Power –
A Perspective from Singapore**

by MG Ng Chee Khern

2007 CDF Essay Competition Top 3 Essays

Dynamic Followership

by CPT(NS) Elijah Wee Xun Ming

Strategy in Transformation?

Refocusing and Refining Strategic Thinking

by LTC Kerk Kim Por

**Communicating 3rd Generation SAF:
An Intercultural Challenge?**

by COL Kelvin Koh



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EDITORIAL

In this issue of *POINTER*, we have lined up six feature articles that dealt with a diverse range of issues from Military Transformation to Followership and that of the Environment.

As our lead article, we are honoured to have a contribution by our Chief of Air Force, MG Ng Chee Khern, entitled “*Smaller Air Forces and the Future of Air Power – A Perspective from Singapore*”. As the air force of a small country without much space and natural resources, the Republic of Singapore Air Force (RSAF) has lived by the twin principles of international cooperation and maximisation of our assets via force multipliers. Through participation in maritime security, wargames and humanitarian missions, the RSAF has demonstrated commitment to international cooperation. These frequent interactions with foreign partners has created both goodwill in defence relationships and opportunities for increased learning, contributing to the drive to modernise and upgrade ourselves. In this win-win situation, the RSAF has been able to grow and develop over the years. MG Ng then concludes the essay with insights on the future challenges for small air forces from the viewpoint of the RSAF, and how they can continue to stay relevant in the ever-changing geo-strategic environment.

We are also pleased to publish the top three essays of the 2007 Chief of Defence Force Essay Competition. “*Dynamic Followership*” by CPT(NS) Elijah Wee,

is the first prize winner of the essay competition. This well-written piece examines how the role of followers has changed in today’s context and touches on two dimensions of followership – responsibility and ethical conscience. The present-day follower is a knowledge-worker, characterised by independence, readiness for change and desire for meaningful work and work autonomy. Therefore, the concept of transformation has to evolve to facilitate the emergence of “distributed intelligence” – the collective network of the organisation’s human and social capital. This is made even more urgent as we face a volatile, uncertain, complex and ambiguous military operating environment. In this essay’s thesis, success and effectiveness will depend on the alignment of both leaders and followers to the SAF Core Values, mission and purpose.

The second prize essay, “*Strategy in Transformation? Refocusing and Refining Strategic Thinking*”, is written by LTC Kerk Kim Por. He puts forth the point that it is important for the military to look back upon strategic history in order to move forward. In recent times, the emphasis on innovation in linking technology with military structures and concepts, due to discontinuities in the strategic environment, has tended to neglect other pertinent aspects of the transformation process. Focusing on strategic fundamentals and the leadership’s acumen for coherent strategy-making, the essay proposes certain modifications to the strategic analysis framework,

through employment of alternative analytical lenses to the rational decision-making construct. Furthermore, the essay suggests the inclusion of strategic habits of the mind into the SAF Officer Corps to ensure a common direction for the SAF.

The third prize was awarded to COL Kelvin Koh's entry entitled "*Communicating 3rd Generation SAF: An Intercultural Challenge?*". In the SAF's quest for transformation, it is essential to pinpoint the areas where one can implement changes to ensure the entire organisation with its personnel are able to transit effectively into the new concept. The essay attempts to shed more light on cultural dimensions within the SAF by utilising pertinent information from Hofstede's research on organisational culture and its variations and differences to influence individuals', organisations' and societies' behaviours under different contexts. With these observations, several solutions to bring about improvements in the areas of behaviours, processes and structures are proposed, with an emphasis on the continuity of the change process.

Recent armed conflicts have shown the increasingly urbanised environment of operations and enhanced operational tempo; thus making the battlefield demand for logistics highly uncertain in nature. To overcome this obstacle, the SAF has been intensifying efforts on enhancing operational readiness and force modernisation. However, in his article, "*Making Sense of Sense-and-Respond Combat Service Support for the Singapore Army*", MAJ Sean Tan notes the lack of emphasis on the transformation of Combat Service Support (CSS) and aims to put across the significance of

CSS and the need to implement changes. Using examples from the recent wars in the last and present century, the author highlights several key points for the reader, before aptly placing them into the SAF's context.

One of the momentous movements taking place in this new century is the Green movement. Celebrities, politicians and world bodies have raised concerns about our endangered planet which has caught the attention of many. At first glance, no one would place any responsibility upon the military to effect any significant changes. However, in "*The Environment: An Important and Increasingly Urgent Military Concern*", MAJ Ng Pak Shun attempts to draw the links between the military and the environment. Some of these links such as pollution and natural disasters, can lead to problems affecting Singapore. Hence, in addition to protecting the nation's sovereignty, the SAF has an environmental role to play.

In the Personality Profile section, we continue with the third of our four-part series, "*Against the Odds*". *POINTER* will be examining the achievements of Brigadier General Bernard Freyberg during World War One.

Lastly, we would like to encourage our readers to take part in the 2008 Chief of Defence Force Essay Competition. The competition is now open for entries. Do check our website for more details. We look forward to receiving your entries.

We hope you will enjoy reading this issue. Happy Reading!

Covering Editor, *POINTER*

nature. As the problems transcend national boundaries, the solutions have to be international in scope too.

Singapore is strategically located where the Indian Ocean meets the Pacific Ocean, a crucial transit point of sea and air routes. Our location and availability of suitable facilities make us a natural choice as a transit node for our partners when they deploy to this region and beyond. Foreign aircraft and ships are frequently deployed to our air and naval bases on short term rotations. Singapore is a hub through which many air forces and navies from Australia, China, France, India, Japan, Russia and the US use regularly. Paya Lebar Airbase has also hosted numerous deployments by our partner countries under the Five Power Defence Arrangements (FPDA).

The FPDA is the longest security arrangement that Singapore has been party to. When the FPDA was formulated in 1971, it was mainly a mechanism for Australia, New Zealand and the UK to play a part in defending Malaysia and Singapore in case we came under attack. However, today, the extra-regional powers have found the FPDA a useful arrangement for them to continue to stay engaged to the region. Over the past 37 years, the FPDA has played an important role in enhancing regional security, and it

continues to be an important component of the regional security architecture. The FPDA member countries derive much mutual benefit and professional value from participating in FPDA exercises, which have progressed to become more joint and complex in nature. The FPDA has also demonstrated its ability to evolve and adapt itself to remain relevant to the changing strategic environment as well as the needs of its members, for instance in the FPDA's cooperation against non-conventional threats, especially in the area of maritime security. Most recently, the FPDA Defence Ministers agreed that the FPDA explore ways to build capacity in the area of HADR.

To promote maritime security in the region, Singapore has over the years forged many useful collaborations with partners within and beyond the region. The long-standing arrangements include the Indonesia-Singapore Coordinated Patrols, the Malacca Straits Sea Patrol and the Western Pacific Naval Symposium (WPNS), which consists of 22 participating countries. More recently, the SAF, together with its Malaysian and Indonesian counterparts, kicked off the "Eyes-in-the-Sky" (EiS) programme as a joint initiative to combat piracy in the Malacca Straits. Together with the Malacca Straits Sea Patrols, these are collectively known as the Malacca Straits



The EiS is important as an open arrangement that could, with time, pave the way for cooperation not just among the littoral states.

Patrols. The EiS is important as an open arrangement that could, with time, pave the way for cooperation not just among the littoral states but with other user states as well, subject to the consent of the three littoral states and in accordance with international law. There is scope in the future for Thailand and other countries not in this region to contribute to this arrangement. In addition, Singapore is actively collaborating with other members of the WPNS to share information under the Regional Maritime Information Exchange (ReMIX) and Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) initiatives, aimed at improving situational awareness to combat piracy and other maritime incidents.

By maintaining a high state of operational readiness and leveraging on the ability to inter-operate with our counterparts, the RSAF has made important contributions in worthwhile causes such as peace-support and disaster relief operations. Since 1999, Singapore has been participating in the various UN missions in East Timor and later, Timor Leste. We were among the first countries to commit our forces and over the years, we have contributed Liaison Officers, Staff Officers, medical



The RSAF has made important contributions in worthwhile causes such as peace-support and disaster relief operations.

detachments, helicopters and a company of peacekeepers. In 2002, one of our Army Officers was also appointed Commander of the UN Peacekeeping Force. In September 2006, two of our Staff Officers were attached to the currently ongoing United Nations Mission in Timor Leste.

In the aftermath of the Boxing Day Tsunami in Aceh, the RSAF together with our Army and Navy forces were able to quickly deploy transport and helicopter assets to support relief operations in the critical first days after the disaster, before the rest of international assistance arrived. We also offered our air and naval bases for use as a staging area for relief and reconstruction efforts in tsunami-hit countries. Singapore was an ideal place because it is situated near to the disaster area and has the necessary infrastructure support.

Contributing to Peace and Security beyond Southeast Asia

The initiatives discussed thus far are centred in Southeast Asia, but Singapore's contribution to peace and stability extends beyond our immediate region. Both Singapore and Australia are active members in the Proliferation of Security Initiative (PSI). Australia was one of the key participants in the PSI maritime interdiction exercise, Ex. Deep Sabre, which Singapore hosted in August 2005. Singapore also participated in 2006's Ex. Pacific Protector, a multilateral air-ground interdiction exercise held in Darwin, which included participants from Japan, New Zealand, the UK and the US. This exercise simulated the interception, escort and subsequent search of a commercial aircraft suspected of carrying WMD-related materials. In November 2005, Singapore hosted the

2nd Regional Special Forces Counter-Terrorism Conference, following the inaugural conference held in Australia a year earlier.

In the Middle East, RSAF C-130s and KC-135s have participated in peace support operations in Iraq since 2004. In addition, Singapore recently sent two five-man teams to undertake humanitarian and reconstruction projects in Afghanistan as part of the New Zealand Provincial Reconstruction Team in Bamiyan Province, central Afghanistan. We have also conducted relief operations in places as far away as the US, when our Chinooks based in Texas were deployed to New Orleans in the aftermath of Hurricane Katrina.

Hence, Singapore has been actively building up a web of cooperative relationships with partners in various parts of the world to combat terrorism and piracy, as well as to save lives and livelihoods through peace support and humanitarian operations. The ability and willingness of the RSAF in being able to work with partner nations and air forces in these OOTW operations both within and beyond our region underscores our commitment to play a useful role in the international community. As a small air force, we have taken the approach to collaborate in these operations with like-minded partners to make a useful and significant contribution to peace and security in various parts of the world. Our participation reflects our moral and political support to the international efforts. We are glad that despite our small size, we have been useful to our partners in these operations.



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Making Ourselves a Capable Air Force

Overseas Training

While we engage in international cooperation, we are always conscious that others would find it useful to engage us only if we have useful expertise and assets to bring to the relationship. Hence, we have always striven to better ourselves. One of the inherent constraints that the RSAF faces in building up our capabilities is the lack of training airspace in Singapore. The way we have overcome this is none other than to reach out to our partners from all over the world; to train and exercise with precisely the people whom we see ourselves operating with.

We have been able to work effectively with many partner nations and air forces partly because of the generous access to training airspace our partners have provided us. A large proportion of the RSAF's flying training – in fact close to 50 percent – is done overseas. In Australia, the RSAF has a training squadron in Pearce Airbase and a Super Puma detachment in Oakey. With the

generous support of the Australians, we have also been able to conduct large-scale air-land exercises together with the Singapore Army in Rockhampton, something that cannot be done in Singapore due to the lack of training areas. Elsewhere around the globe, we have detachments in France and the US, and we deploy regularly to Australia, India, Indonesia, New Zealand, South Africa and Thailand.

With many detachments based overseas, bilateral and multilateral exercises are common features in our training calendar. In Ex. Pitch Black in Australia, we have the opportunity to exercise with air forces from Australia, Thailand and the US. In the US and Canada, the RSAF takes part regularly in the Red Flag and Maple Flag series of exercises, involving air forces from countries such as Canada, France, Italy, the UK and the US. Closer to home, RSAF F16s, F5s and E2Cs are regular participants in the annual multilateral Cope Tiger exercises in Thailand. These frequent interactions with advanced air forces have greatly accelerated our learning curve and ensure that we can hold our own even when operating with the best in the world.

Through overseas training and joint exercises, the RSAF has not only been able to greatly increase our capabilities, but also been allowed to build strong relationships with defence partners. This policy of constant engagement has allowed us to develop a good understanding of how other air forces operate, while achieving greater interoperability with many of our partner countries in the world.



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Leveraging on Our Internal Strengths

While we reach out to our overseas partners, we have also leveraged on internal strengths within our system to ensure that the RSAF develops into a militarily effective force. Part of this hinges on having the right political and societal conditions. We have been able to build up our capabilities in a relatively short space of time due to a stable political environment and socio-economic conditions that are conducive to our development. A vibrant economy has helped to sustain the rapid growth of Singapore’s commercial and defence science industries, which in turn provided the human capital and technical expertise to develop new capabilities. Most importantly, the SAF has benefited tremendously from a stable political environment, strong commitment to security, as well as sustained and steady financial backing. In this aspect, we have been fortunate to have political leaders who possess a deep understanding of the capabilities and limitations of military power. Regardless of how the economy performs, up to 6% of Singapore’s Gross Domestic Product is dedicated

annually to military development. The stable political environment and rapid economic progress over the years have thus allowed the RSAF to remain focused and take a long-term planning approach in our force structuring and capability development efforts.

To stretch this dollar and make every dollar count, we have a rigorous planning and procurement process, coupled with a strong culture to hold down O&S costs. This has allowed us to have a sustained and rapid force renewal and modernisation – to be able to acquire and develop the best that money can buy and to know when to retire assets that are no longer cost-effective. For example, over the past 10 years, we have drawn down the UH-1H, Fennecs, A4 Super Skyhawks, radars and C2 systems. In their place, we have phased in the F16D+, Chinooks, Apaches and two new radar systems, and we will soon phase in our F15s, Naval Helicopters and will look to replace our E2Cs. Because we are small, we aggressively retire old systems that are no longer relevant, so as to free up the manpower and logistics resources to develop modern capabilities.

This process of renewal is part of a mindset to emphasise quality over quantity. In operations and combat, there is no substitute for having the best. The concentration on quality is underlined by an organisation-wide emphasis on achieving the best in our equipment, training and people. By not settling for second best, we aim to achieve a decisive qualitative edge.



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The emphasis on quality over quantity is evident in the manner we have built up a balanced force structure. We have more than 100 multi-role fighters supported by airborne early warning platforms and air-to-air refuelling tankers, together with a sizeable and versatile fleet of transport and helicopter aircraft. The RSAF is a well-balanced air force. An air force with balanced and diverse capabilities is versatile and will be effective in a greater range of operations – from peacetime defence against terrorist and low-intensity threats, peace support operations, humanitarian assistance and disaster relief operations, to the traditional missions of deterrence and war.

The Future of Small Air Forces

Having gone through the key principles that have shaped the development of the RSAF, I will now share some thoughts on the challenges today and the RSAF's responses to these challenges.

The first challenge is in the evolving strategic landscape characterised by the Revolution in Strategic Affairs (RSA). This RSA has seen the proliferation of irregular warfare and operations involving weak and failing states, militia groups and terrorists. The operational challenges in the application of airpower will therefore widen.

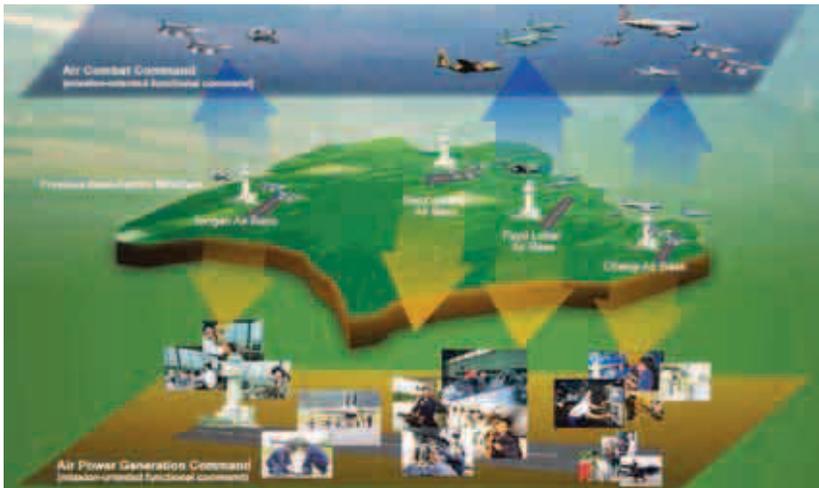
The second challenge lies in fully exploiting new technologies and concepts. Emerging technologies in the domains of unmanned warfare, precision weapons, sensor and information systems will improve the OODA loop of those able to exploit the technologies. These advances in air power can be especially important to small nations such as Singapore. UAVs, precision weapons and C4I systems, if properly harnessed and assimilated within our force structure, will shrink geography and help us overcome the lack of strategic depth inherent in many small countries.

The response of the RSAF in meeting these challenges is to transform. The RSAF is transforming into what we have termed the 3rd Generation RSAF, a full spectrum and integrated force. The response to being effective in the widened spectrum of demanding political and operational environment is to be full spectrum. This entails developing our people to not only be good in their military skills, but also to understand strategic imperatives and be politically savvy, to be good “strategic corporals and captains”.

The response to being effective in exploiting the new technologies is in being more closely integrated. The new technologies respect no Service-domain boundaries – for example, the Air Force’s precision weapons and UAVs can be

equally critical to the Army’s success; the Navy’s long reach can complement the objectives of the Air Force and the Army. In addition to Service stove-pipes, we have identified the need to break down functional stove-pipes, in particular the operations-intelligence and the operations-logistics stove-pipes. If we bridge the operations-intelligence divide well, we will conduct operations with timely and accurate intelligence updates, and we will proactively gather intelligence with a thorough understanding of the information that operations require. If we bridge the operations-logistics divide well, we will conduct operations with proper understanding of logistics capabilities and limitations, and logistics support for operations would be responsive and effective. Hence, the result of integration would be an Air Force able to bridge divides across Services and across functional expertise areas.

To achieve focus in operations across a wide spectrum, and to become more integrated, the RSAF has embarked on the most fundamental restructuring of its organisation set-up in the last thirty years. This involves moving away from a geographically-based airbase set-up to create a series of functional commands for greater mission or task focus. Under this restructuring, five functional commands have been set up. They are: Air Defence and Operations Command, Air Combat Command, Participation Command, Air Power Generation Command and UAV Command. To achieve the desired level of cross-Service and cross-domain integration, each of these commands will be manned by Officers from the Army and the Navy, in addition to Air Force Officers from different functional backgrounds.



To achieve focus in operations across a wide spectrum, and to become more integrated, the RSAF has embarked on the most fundamental restructuring of its organisation set-up in the last thirty years.

Conclusion

As a small air force, the RSAF has contributed to peace and security by actively engaging international partners in relationships which have been mutually beneficial. We do not take these relationships for granted. Hence, we continue to modernise and improve the RSAF so that we would continue to be a useful partner to other air forces in operations in the future, both within our region in Southeast Asia and also in other parts of the world. In fact, large parts of this article were not just about the RSAF, but how we are deeply embedded and integrated with the rest of the Singapore Armed

Forces and the Singapore government in contributing to peace and security. Our efforts to improve our capabilities have been greatly helped by the generous offer of training airspace and basing by our foreign friends and partners. We have also continued to actively seek out opportunities to cooperate in bilateral and multilateral training with partner nations so that when we are called upon to operate together, we would not be found wanting, and would be able to work in easy familiarity and confidence with others. We will continue to foster good relations and create mutual benefits with our friends within and beyond the region. 



MG Ng Chee Khern assumed his current appointment as Chief of Air Force on 24 Mar 06. A qualified F-16 and F-5 Fighter Pilot, he has served as Director of Joint Operations and Planning Directorate, Chief of Staff (Air Staff) and Commander of Tengah Air Base. MG Ng is a President's Scholar and SAF Overseas Scholar. He graduated with a Bachelor of Arts Degree in Philosophy, Politics and Economics, and a Master of Arts Degree from University of Oxford, U.K., and attained a Master in Public Administration from Harvard University, U.S.A. MG Ng has also attended the prestigious Air Command and Staff College in the U.S.A. For his significant contributions to Singapore and the SAF, MG Ng was awarded the Public Administration Medal (Gold)(Military) in 2005.

Dynamic Followership

by CPT(NS) Elijah Wee Xun Ming



*Who built Thebes of the seven gates?
In the books you will find the names of kings.
Did the kings haul up the lumps of rock?
And Babylon, many times demolished
Who raised it up so many times?*

*The young Alexander conquered India.
Was he alone?
Caesar beat the Gauls.
Did he not have even a cook with him?*

*Excerpt from the poem,
Questions from a Worker who Reads,
by Bertolt Brecht,
(seminal theatre practitioner of 20th Century)*

As a society, we are often enamoured with heroic leadership – we are attracted to individuals known for their character, who meet challenges and overcome adversity with much adroitness and charisma.

This romanticised view of leaders in the daily press, business publications, and popular writing may have influenced society's perception of leadership.¹ With much attention to the leaders, what is the role of the followers in leadership? What then, is followership?

To shed some light on the role of followers, it is useful to take stock of how leadership has evolved. Reflecting on the nascent of leadership literature, interest in leadership is piqued by the parallel development of three distinct perspectives: leader-focused, relational-focused² and contingency-focused. The first perspective is leader-focused. Leader-focused perspective seeks to address the question of "What are the attributes of a leader?" Examples of such perspectives include transformational leadership³,

leader's competencies⁴, leader's self-awareness⁵, value-based leadership⁶ and leader's personality traits.⁷

The second perspective on leadership focuses on the explicit one-on-one relationship, motivations and identities that develop between the leader and the follower. Proponents of the relational perspective examine how follower response can be influenced through the quality of mutual trust and respect between the leader and follower. Seminal work in the leader-member exchange (LMX) theory of leadership by Graen and his colleagues⁸ encapsulates this relational perspective. This perspective frames leadership as a "process".

The third perspective on leadership, contingency-focused, examines the conditions in which leadership best takes place. For example, Fiedler's contingency model⁹ specifies the group atmosphere shaped by followers' loyalty and support in the leadership process, while Hersey and Blanchard¹⁰ incorporated followers' competence and maturity into their situational leadership model.

Insofar, a common assumption in these theoretic perspectives of leadership is the passivity of the follower. These perspectives continue to advocate for the leader's dominance in the leadership process. In a meta-analysis of extant leadership theories, Lord, Brown and Freiberg keenly asserted that, "The follower remains an under-explored source of variance in understanding leadership processes".¹¹ Many social scientists have also acknowledged that leadership is a symbiotic relationship jointly produced

by leaders and followers¹², rather than purely leader-focused. A symbiotic relationship implies that the follower holds a complementary functional role in relation to the leadership process, instead of perpetually at the receiving end of the process. To extend this proposition further, an increasing number of researchers have argued that the followers do assume a more active role in the leadership process.¹³



Leadership is a symbiotic relationship jointly produced by leaders and followers.

Notably, Chaleff, in *The Courageous Follower*, describes how the term follower "conjures up images of docility, conformity, weakness, and failure to excel".¹⁴ He goes on to envision a more edifying perception of a follower in today's context, "Often, none of this is the least bit true. The sooner we move beyond these images and get comfortable with the idea of powerful followers supporting powerful leaders, the sooner we can fully develop and test models for dynamic, self-responsible, synergistic relationships in our organizations".¹⁵

What is followership then? According to the *Compact Oxford English Dictionary*, a follower is defined as "a person who follows; a supporter, fan, or disciple".¹⁶ Such a definition provides a traditionalist perspective to the functional role of the follower in any leadership process – to obey and follow. In today's

organisational context, this definition has failed to capture the essence of followership. On the other hand, Jacobson's definition of followership as "the commitment to collectively act with courage, intelligence, responsibility, and self-reliance to accomplish the organisation's purpose and goals"¹⁷, accentuates the active role of the follower in the leadership process.

For the scope of this article, dynamic followership is used to describe the type of active followership that is relevant to the Singapore Armed Forces (SAF). Followership is dynamic: in the leadership process, the follower needs to appreciate the value of the leader and know how to support the leader in service of the common good for the organisation; yet the follower can be an active participant in the leadership process, contributing to the common good or purpose of the organisation.



In the leadership process, the follower needs to appreciate the value of the leader and know how to support the leader in service of the common good for the organisation.

The thesis of this article is that dynamic followership is integral to the leadership process in the SAF for the organisation to extend its competitive edge in the 3rd Generation operating environment. This article examines how the role of followers

in today's context has transformed. Two dimensions of followership (responsibility and ethical conscience) will also be discussed in this article. To conclude, the article will propose ways in which dynamic followership may contribute positively to the leadership process and effectively support the mission and purpose of the SAF.

The Rise of the Followers

What forces then have transformed the "passive" follower characterised by the attributes of conformity and docility to that of the "active" follower who is courageous to shape the outcome of leadership? This article is of the view that the mode of production in the knowledge-based era and complexity in the operating environment provided the impetus for transformation.

Mode of Production in the Knowledge-Based Era

The differences in the mode of work production and the leadership needs of the followers shape the contextual premise that determines what model of leadership is relevant.¹⁸ In the industrial mode of production, leaders design roles and processes, set tasks, and evaluate performance and efficiency within hierarchical bureaucracies. The industrial age in the 80s and 90s promotes the paternalistic role of the leader: the leader knows best. In relation, the role of the followers is merely to be compliant to the established roles and processes as the followers have limited autonomy; the knowledge and expertise resides in the leaders. The knowledge mode of production in the present era is different. The follower very often

possesses knowledge and expertise in greater depth compared to the leader. Furthermore, the follower in this knowledge-based era is influenced by different sets of shared political, sociological, demographic and economic conditions as compared to the follower in the industrial era.¹⁹ Coined as the “knowledge worker” by Peter Drucker, followers in the knowledge-based era are characterised by their independence, readiness for change, desire for meaningful work and work autonomy.²⁰

Organisations operating in the knowledge-based era are also facing increasing pressure to function with reduced human resources.²¹ Working within a leaner workforce, most followers are required to assume many of the functions traditionally performed by leaders. In addition, when the knowledge and expertise required for work is distributed to the followers, the followers begin to have the legitimacy and motivation to engage actively in the leadership processes.

The result is reminiscent of what management guru, Peter Drucker, envisaged in his book, *The Effective Executive*. In an era dominated by knowledge workers rather than manual workers, expertise can – and often does – surpass position as an indicator of who is really leading and who is really following.²²

Complexity in the Operating Environment

Today, simple cause-and-effect models are no longer perceived as adequate explanations for both physical

and social phenomena. The operating environment today is one that exists as non-linear and organic, characterised by uncertainty and unpredictability.²³

What does complexity bring to leadership? The nature of the challenges faced by organisations is plagued with uncertainty and unpredictability. Leaders now do not have the absolute grasp of the convoluted relationship between the interacting systems in the environment. The focus of leadership, as a result, is to facilitate or catalyse the emergence of “distributed intelligence”: the collective network of the organisation’s human and social capital.²⁴

Role of Followers in the SAF

The military operating environment, arguably experiencing similar market forces in the business domain (i.e. knowledge-based workforce, leaner human capital), is one that is aptly described as Volatile, Uncertain, Complex and Ambiguous (VUCA). Since the initial theorising of Revolution in Military Affairs (RMA) from 1970s to 1980s²⁵, modern militaries in the world have attempted to harness the complexity of network-centric warfare through the judicious integration of technology (information, weapon and control systems), social-political mission demands and organisational structures.

The SAF command and control structures and systems have metamorphosed over the last decade to meet the demands of domestic and international operations in a 3rd Generation network-centric environment, with sensitivity to issues

of force reductions, future capacity and strategic imperatives. Joint operations to integrate the warfighting capabilities of the Services (Army, Air Force and Navy) have increasingly exacerbated the complexity within and between the networked systems.

Rigid control mechanisms (e.g. rules of engagement, Standard Operating Procedures) communicated one way from the leader to the follower may not be as useful in the VUCA operating environment today. The leader can no longer assume to be the most knowledgeable or skilled individual. In fact, technical expertise of the followers usually must exceed that of the leaders if the unit is to be successful in such operating environments.²⁶ It is becoming clearer that today's complex operating environment demands a collaborative, team approach to problem solving. The leader will not be able to account for all the variabilities within the VUCA operating environment. The leader will have to depend on the feedback from dynamic followers who actively

operate within the networked sub-systems of the larger VUCA operating environment to make informed decisions on the battlefield.



It is becoming clearer that today's complex operating environment demands a collaborative, team approach to problem solving.

Followership and leadership therefore, exist in a continuum, rather than discrete dichotomies in the VUCA context. Leaders need to engage the followers through a leadership process that encourages the follower to actively participate in the leader-follower relationship by bringing his or her strengths, expertise and commitment for the common good of the organisation. Figure 1 summarises the comparison between traditional leadership process and dynamic followership.

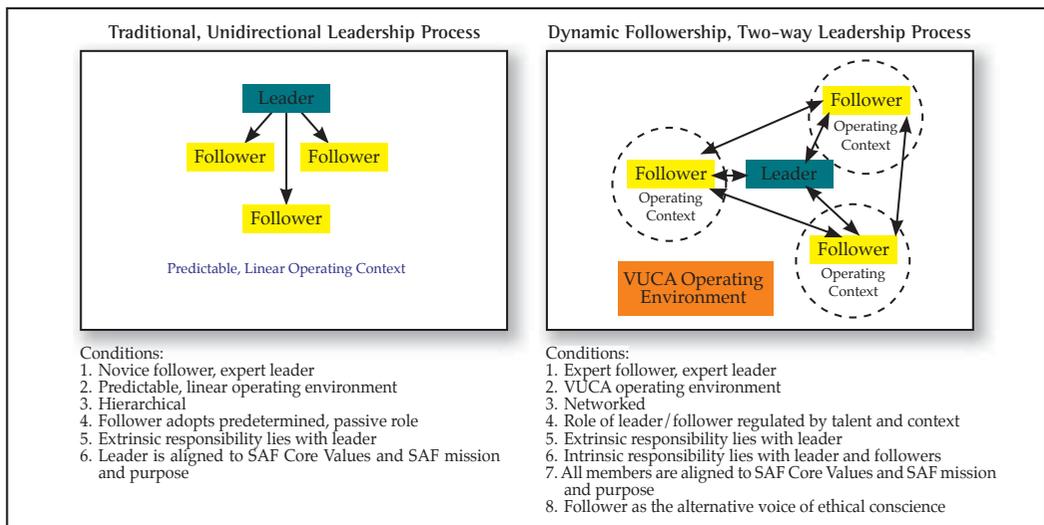


Figure 1. Comparison between Traditional Leadership Process and Dynamic Followership

In the VUCA operating environment, the impetus is for the SAF to develop both good leaders and good followers. Furthermore, dynamic followership is a prerequisite to developing good leadership. Valuing followers and their development is the first step towards cultivating effective transformational leaders – people capable of motivating followers to achieve mission requirements in the absence of hygienic or transactional rewards (i.e. immediate payoffs for visible products). Dynamic followership produces followers who, when the moment arrives, seamlessly transition to contribute actively while simultaneously fulfilling their follower roles in support of their leaders.

In essence, the concept of dynamic followership is in tandem with SAF's definition of leadership. SAF relates to leadership as a process of influence that involves three components: the leader, the follower and situation or task.²⁷ Leadership is not about the individual, position or rank. It is important to make the distinction between leadership and command responsibility: in the leadership process, the follower may demonstrate certain leadership behaviours in relation to the context, though the leader holds the ultimate command responsibility to his or her followers and the organisation.

A dynamic follower must first be aligned to the SAF Core Values, mission and purpose. Such a follower takes ownership over the outcome of the leadership process and develops the moral courage to stay the moral course, even if the leader advocates for deviation. A dynamic follower is also both confident and competent in his

or her domain of work and provides insights and depth to augment the quality of decisions made by the leader. If the follower is not competent in his or her domain or has questionable character, dynamic followership will not take flight.



A dynamic follower must first be aligned to the SAF Core Values, mission and purpose.

Dynamic followership promotes an authentic two-way leadership process between the leader and the follower. Principally, dynamic followership points to the way where leadership function (i.e. the process of influencing people to fulfill the mission and improve organisation) is detached from the organisational labels of “leader” bestowed within the hierarchical structures.²⁸ The purpose is to allow more latitude for inputs from the followers in the leadership process: where the talents and expertise of the follower in the appropriate context may be recognised and leveraged on by the leader. In doing so, the leader reinforces that leadership is a collective process in which different members in the relationship at different contexts – depending on the relevance of their strengths to the operating environment or task at hand – step up to influence the group towards the common goal. Outcomes of dynamic followership include heightened levels of trust between leader and follower²⁹, and active engagement of the follower.³⁰

Two dimensions of dynamic followership, responsibility and ethical conscience, are highlighted in the following paragraphs. Two questions arise: first, how does the dynamic role of the follower in the leadership process define the distribution of responsibility between the leader and the follower? And second, can the ethical conscience of the organisation be shared between the leader and follower?

Leader-Follower Responsibility

In many situations, regardless of the degree of partnership or empowerment that exists within the leader-follower relationship, the leader has the ultimate authority and responsibility. The CEO of a business empire, the commander of a fleet, all have certain inalienable responsibilities that are not transferable.

Nevertheless, other writers argue that this increasingly egalitarian society that we live in does not allow the followers to comfortably shirk responsibility by pillorying the leader.³¹ Society and organisations may have grown beyond authoritarian models of leadership that strip followers of any responsibility or accountability. For dynamic followership to occur, followers must thus accept responsibility for both their roles and the roles of their leaders.

The military organisation is unique in that the military leader has tremendous authority over the followers not normally extended to leaders in the civilian sector. This is a result of the high calling of unlimited liability that members of this Profession of Arms must live by. Members of the profession may be

obligated to perform acts that transcend the human nature that are contrary to powerful human instincts (e.g. self-preservation). In this view, it is crucial for both the leader and follower to be clear of their respective responsibility in the leadership process.

The issue of responsibility is largely debated among writers.³² Pigeau and McCann succinctly addressed the issue of responsibility in the context of command in the military, and they proposed to focus on two dimensions of responsibility – intrinsic and extrinsic.³³ Extrinsic responsibility is associated with the accountability up the chain of command for military leader. It is the leader's willingness to be accountable for the legal authority that comes with the position he or she holds. Even in the context of dynamic followership, the follower will not and cannot, assume extrinsic responsibility on behalf of the military leader. Extrinsic responsibility has to commensurate with the degree of legal authority vested on the individual. Without legal authority, the follower does not have the legitimacy to be held fully accountable for the outcome of the leadership process. The ultimate responsibility for the success or failure of any military mission falls squarely on the leader's shoulders, including the legal and ethical obligations to the military profession and society for his or her followers' actions.

Intrinsic responsibility, on the other hand, is the degree of self-generated obligation and accountability the individual experiences towards the military mission. This is the mettle, motivation and clarity of the military's

mission and purpose that the individual brings to the mission. Although leaders assume extrinsic responsibility by virtue of their legal authority and accountability, both leaders and followers must develop the sense of intrinsic responsibility towards the mission and take ownership over the desired outcomes of the mission. To this end, the responsibility to help the followers find meaning and purpose in their work lies with the leaders.

Follower as the Alternative Voice of Ethical Conscience

The leadership process is especially fraught with ethical challenges.³⁴ Both the academic and management literature are replete with compelling examples of the unethical behaviours by leaders, in domains of business, education, politics and military.³⁵ This begets the question, how can the dark-side of leadership be contained? Proponents of the concept of self-leadership assert that leaders should engage in the process of self-reflection, self-monitoring and feedback-seeking in order to be aware of potential deleterious impact of their leadership behaviours.³⁶ In doing so, leaders will have the clarity and resolution to make the right, ethical decisions.

Unfortunately, such a perspective pays too high a premium on the leader's motivation and desire to engage in the necessary process of self-monitoring and self-correction in order to weed out the roots of vileness in his or her thoughts and actions. The complexity in the military operating environment often present ethical challenges that are ambiguous, where leaders have to

make decisions on moral principles that are not too obvious. In contemporary expanded spectrum of operations, especially Operations Other Than War (OOTW), members of the SAF do not find themselves embroiled in high intensity combat. Leaders and followers are more likely to operate in a scenario where there is less distinction between acceptable and unacceptable conduct. In OOTW, extraneous factors such as routinised boredom, an ill-defined enemy or no enemy at all, the use of psychological terror by the opposition, vague and broad mission intent and exit strategy compound the likelihood of moral disintegration among the leaders and followers deployed.³⁷ To add to this moral quandary, when followers demonstrate absolute obedience and subjugate their moral reasoning to the leader, this may reinforce the leader's belief that his or her decision is one which is ethically-sound and universally-agreed upon.³⁸

A dynamic follower who bears intrinsic responsibility for the common good of the SAF can be the alternative voice of ethical conscience to the leader. Leaders and followers are bound together by an implicit social contract to pursue the common purpose and mission of the organisation. Guided by the organisation's values and purpose, both leaders and followers have the responsibility to help each other honour this contract. If the follower is not sensitive to the leader's dysfunctional behaviours, not only will the purpose of the organisation be undermined, the follower's esteem for the leader will also suffer.



Leaders and followers are bound together by an implicit social contract to pursue the common purpose and mission of the organisation.

Dynamic Followership in the SAF

For dynamic followership to happen in the SAF, the leader's role is critical. Dynamic followership is largely modelled by the authentic leader's desire to produce heightened levels of self-awareness and self-regulation in the follower, leading to positive leadership outcomes.³⁹ The leader can interpret his or her role in the leadership process as facilitating and coaching followers, rather than adopting a conventional, directive approach. The leader fosters a culture that celebrates the talents and strengths of the followers. The

three processes to enable the practice of dynamic followership in the SAF are proposed in Figure 2.

Firstly, the leader needs to ensure that the followers orbit tightly around the mission and purpose of the SAF, guided by the SAF Core Values. When leaders begin to imbue the sense of purpose and meaning in the work that the followers partake in, the followers will develop the deep sense of intrinsic responsibility for the outcomes of the leadership processes. Dynamic followership demands a higher degree of responsibility and judgment calls from the leader. To practice dynamic followership, the astute leader needs to discern who should lead in the given context; constantly articulate the SAF Core Values and purpose that will guide the team; develop the talents and strengths of followers so that they will flourish in the role; manage group dynamics and tensions; and set clear parameters and boundaries for the team's leadership outcomes. In the VUCA operating environment, the leader must

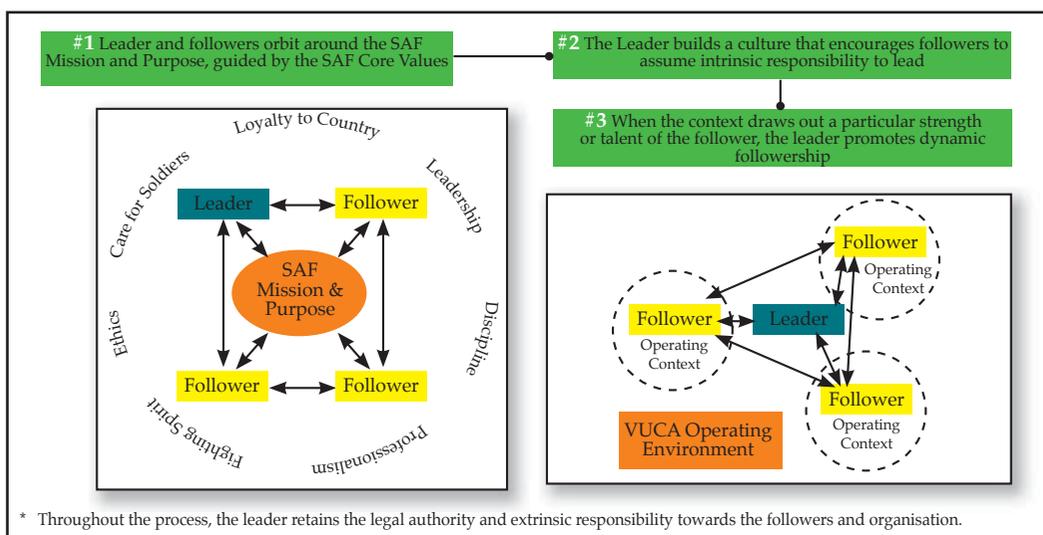


Figure 2: Three Processes to Enable Dynamic Followership in the SAF.

set clear parameters to bind the possibly infinite space of solutions along the axes of legality, military professionalism and ethics⁴⁰ in the forms of the SAF Core Values, SAF mission and purpose and the commander's intent (both explicit and implicit).

Secondly, the leader deliberately builds a culture of empowerment. Empowerment is the process of unleashing the power in the followers and channelling the power to achieve positive outcomes for the organisation through the leadership process. Empowerment is not about relinquishing the leader's executive power to make decisions. Rather it is "the creation of an organisational climate that releases the knowledge, experience and motivation that reside in people".⁴¹ An empowered culture will require much greater intrinsic responsibility from followers than a hierarchical culture. Followers need to grasp with the fact that the price of autonomy is the sharing of risks and responsibilities. The first step to building a culture of empowerment is through the sharing of information to foster trust. This transfer of information happens bi-directionally: from leader to follower, and from follower to leader. Often, leaders failed to appreciate the importance of feedback from followers. Follower's feedback is critical in VUCA operating environment, as leaders do not have a complete appraisal of the situation. Unlike the restrictive, rigid boundaries of a hierarchical culture that command obedience and conformity from followers, boundaries in an empowerment culture regulate when followers can exercise their autonomy and responsibility, and when the executive power to make

decision remains with the leader. Empowerment does not happen overnight. The boundaries set are based on the follower's competence level and it is up to the leader's ownership to coach the follower.

Thirdly, the leader demonstrates his or her perspicuity and authenticity when he or she recognises the strengths and talents of the follower in a particular context that may bring greater leadership to the team. Retaining the ultimate responsibility and accountability for the outcome of the team's actions, the leader steps aside to empower the follower to contribute actively to the team. The leader must be comfortable sharing the leadership function with his or her followers and is able to recognise and draw out the extraordinary potential in them, while balancing idealism and pragmatism in making decisions in a complex environment.

Conclusion

This article attempts to discuss the concept of dynamic followership in the SAF. With the rise of the followers and the complex operating environment, this article proposes that dynamic followership is one of the key thrusts for SAF to extend its competitive edge in the 3rd Generation operating environment.

The discussion featured in this article can be extended in several ways. First, the dynamic followership is one of the thrusts to engage and develop people in the SAF. A dynamic follower is one who has a deep sense of intrinsic responsibility and who is attuned to the SAF's Core Values, mission and purpose. Leaders, the key driver of dynamic

followership, will have to lead at a higher level. With greater authenticity, clearer vision and deeper resonance to the Profession of Arms, leaders will be constantly challenged to build the culture of empowerment that forms the foundation to dynamic followership.

Second, leaders come from the ranks of followers. Few leaders can be stellar without first learning the skills and processes of followership. The concept of followership augments the leadership process by scaffolding the follower's leadership potential through operating boundaries positioned by the leader.

Lastly, leadership is neither an exclusive function of the leader nor the follower. With today's complexity, it is hard to imagine how the SAF can thrive in the VUCA operating environment without the shared expertise, passion and responsibility of both leaders and followers. Empowered people working together for the common good of the organisation will always remain as the foundation of the 3rd Generation SAF. 

(Ed note: This essay is the first prize winner of the 2007 CDF Essay Competition)

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Strategy in Transformation? Refocusing and Refining Strategic Thinking

by LTC Kerk Kim Por



Same Questions, Different Answers

Albert Einstein was visited one day by one of his students. “The questions on this year’s exam are the same as last year’s!” the young man exclaimed. “Yes,” Einstein replied, “but this year all the answers are different.”

The answers to questions about state security and military effectiveness have changed considerably due to discontinuities in the strategic environment; armed forces around the world have been in the throes of finding new answers in response to the complex challenges that have

arisen. This search for new answers has often been codified under the ambit of military transformation.

This article first argues that besides addressing the discontinuities in the strategic environment that requires innovations in linking technology with military structures and concepts, it is equally important for the military to look back upon strategic history in order to move forward. Upon reflection it would be evident that the most important ingredient for attaining success in war and peace in the 21st century is not likely to be cutting-edge warfighting methods, but rather, the

focus on strategic fundamentals and the leadership's strategic acumen. For example, the US and Israel, for all their well-recognised military might, has been found wanting in coherent strategy-making.¹ This article will then propose certain refinements to the strategic analysis framework, through employing alternative analytical lenses to the rational decision-making construct.

The Past as Future

Much has been said about the “new” nature of war in the post-Cold War, knowledge-based, globalised era. The Four Generations of Modern War (4GW) framework is one prominent example. The authors focused on warfare as waged by non-state actors that directly attack “the minds of enemy decision makers to destroy the enemy’s political will”², and that the potential adversaries of modern military will be adaptive to counter the superior industrial-based military strength with asymmetric methods.³

4GW has observed the trends and challenges of modern warfare well, but has nothing novel to say about the supposedly “new” nature of war. War in all its “generations” has been about the contest of wills⁴, and the *matérielly* weak have always sought asymmetry to negate its competitor’s strength. The underlying logic of *matérielly* weak actors applies across the ages. Irregular forces invariably exploit their amorphous nature, and rely on their staying power and the resonance of their causes with the population for success. Finally, war in any “generation” may be state against state (Gulf Wars), state against non-state (colonial wars), or state against both state and non-state

actors (Vietnam War, Lebanon War 1982). What is contemporary is how the current myriad of tools, conduits and politico-social contexts would continue to be exploited by non-state forces to express, propagate and exert their wills and counter the strong’s *matériel* superiority.

Similarly, the central idea behind the Effects Based Operations (EBO) is not novel but can be seen as a codification of Clausewitz’s dictum that war should not be pursued as an end unto itself but viewed as an instrument of policy, inferring that other instruments of policy should be leveraged to achieve the strategic outcome desired.⁵ Past theorists had long recognised the need for the coordination of all instruments of national power to achieve political objectives⁶; the importance of producing a psychological effect on the enemy to undermine rather than destroy the enemy (J.F.C. Fuller and Andre Beaufre); and the connection between physical events and cognitive impact, and the importance of shaping the adversary’s perceptions.⁷ Nevertheless, good ideas need not be new. The concept is a timely reminder of unchanging strategic imperatives and their challenges, amplified by increasing complexities in the knowledge-age, and connecting these to the opportunities provided by the advances in technology.

The point is not that history repeats itself or that nothing new in military theory is worth pursuing. On the contrary, the present can never be exactly analogous to the past, and new understanding is always required, regardless of the strategic context.⁸ Instead, the points to be made are:

1. All new knowledge is founded upon existing knowledge. Any investigation into new ideas and concepts for seemingly novel situations should begin with research into existing wealth of knowledge in applicable fields.⁹ Understanding context is all important, no “old” lesson can be applied unadulterated in all contexts.¹⁰ What is critical is to gain new insights from deconstructing “old” knowledge in relevant domains or subjects, and synthesising the elements across domains¹¹ with reference to the novel features in the strategic context.

2. The dominant dimensions – the political, social, cultural and technological – that shape historical developments are ever present albeit with different degrees of saliency in different times. The grammar of war, which is the ways and means of prosecuting war, will always be shaped by the contexts of the time and the belligerents’ specific circumstances, and therefore guaranteed to change. But this is not so for the primacy of the logic of policy.¹² All forms of military operation are judged ultimately by the strategic effect generated that accrues to the achievement of political objectives. The nexus between the grammar and logic of

war would produce the “meaning” for war. This nexus – to be forged by strategy – refers to the design and arrangement of military actions (grammar) to produce meaning at the political level (logic).

Refocus: Strategy as an Internal and External Dialectic

The cardinal role of strategy cannot be overemphasised. While one might recover from tactical or even operational blunders, the same could not be said of strategic miscalculations.¹³ Hence amidst transformation efforts, the military need to refocus on the fundamentals of strategy and build the necessary conceptual framework for strategic enquiry and thinking. Nevertheless, the nexus between grammar and logic of war only reflects one side of the strategy coin. The other is the interactive and dynamic nature of strategy when deployed in a duel of wills with an opponent. Thus, strategy should be conceptualised as both an internal and external dialectic that seeks to enhance the state or non-state political entity’s survivability and power (as defined by the state/entity) through the threat or the use of force.



Thus, strategy should be conceptualised as both an internal and external dialectic that seeks to enhance the state or non-state political entity’s survivability and power (as defined by the state/entity) through the threat or the use of force.

Strategy as Internal Dialectic

Strategy, being the bridge between military power and political purpose¹⁴, depends on the quality of discourse, collaboration and harmony between politicians and soldiers. Its instrumentality lies in providing the conceptual link that translates military actions into strategic effect that fulfils the political objectives. This link must be strengthened through the dialectic between policy ends and military means, and maintained throughout the planning, conduct and conclusion of military operations. Political considerations must provide direction to strategy, and strategic considerations must shape political ambitions to realistic proportions. The strategic calculus thus generated determines the concept, form, scale, scope and duration of the military operation(s) to be undertaken in conjunction with the political entity's instruments of power to achieve the ends of policy.¹⁵ Nevertheless, the reality often taints these normative observations – as the article will discuss under alternative models to rationality.¹⁶

Strategy as External Dialectic

Framing strategy as an internal political-military discourse and rationalisation of own and rival's strategic “ends, ways and means” is essential but incomplete. Strategy is also an external dialectic of force and will. The external dialectical nature of strategy thus also impacts the course of the internal dialectic. Both processes are enmeshed. And because war eternally consists of “violence and hatred” and “chance and probability” besides “reason”¹⁷, strategy is necessarily a

“process, a constant adaptation to shifting conditions and circumstances”.¹⁸ Besides physical factors, moral and psychological factors would always play a part, if not in the outcome of the fight, then in the state of post-war “peace” that ensues.

While Clausewitz's conception of strategy embraces the “triad of time, space and mass to decide where and when a battle should be fought and with what forces”¹⁹, John Boyd's conception of strategy defines the strategic environment as a composite of mind-time-space.²⁰ Strategy to Boyd is about operating in the mind-time-space dimensions against the moral-mental-physical bastions and connections of the adversary as an organic whole, while enhancing and guarding our own.²¹ Therefore he emphasised not just the physical and psychological (moral) factors of the dialectic, but also the cognitive (mental) realm and the connections between the three. Hence Boyd's conception captured the interactive essence of strategy well, as a competition for survival or power between two or more organic moral-mental-physical systems.

Vietnam War – An Illustration of the Dialectics of Strategy

In the influential book, *On Strategy: A Critical Analysis of the Vietnam War*, Harry Summers saw the Vietnam war in essentially conventional terms and claimed that it was the politicians who lost the war, by misinterpreting the conflict as a counter-revolutionary war and by failing to establish clear objectives for the military. As a result, the fact that American forces had never lost a battle on the ground was

“irrelevant”. He cited the victory over South Vietnam by North Vietnam with the conventional military offensive in 1975 as evidence that the revolutionary war model was an improper one.²²

However, the conventional conclusion of the war in Vietnam is anticipated in the major writings of Asian theorists of revolutionary war and Western counter-insurgency experts like Mao Tse Tung, Vo Nguyen Giap and Sir Robert Thompson, who wrote that revolutionary wars would start with the building of revolutionary fervour, followed by guerrilla warfare and before maturing with conventional warfare, which would be decisive.²³ The Vietnam War nevertheless defied neat characterisation into purely conventional or non-conventional categories. Perhaps General Bruce Palmer described it best as “...a devilishly clever mixture of conventional warfare fought somewhat unconventionally and guerrilla warfare fought in the classical manner”.²⁴

With the given political objectives of “preventing Communist domination of South Vietnam; and to create a viable and increasingly democratic society in South Vietnam friendly to the United States”²⁵, it was the responsibility of both the policy-makers and the military to work in concert on the conditions the military must create to attain a strategic end-state that commensurates with the political intent; and how to create those conditions with the means available, taking into cognisance the “devilishly mixed” character of the war. Hence, as an internal dialectic, the US’s strategy formulation process faced substantial shortcomings, from the clarity of the political objectives, to the translation

of the strategic context and political intent into a viable operational frame for implementation.

President Lyndon B. Johnson and Secretary of Defence Robert McNamara had initially hoped to bomb North Vietnam into submission. In their conception, the Vietnam crisis they were facing were analogous to the Korean War, where President Truman had acted decisively to intervene in the North Korean invasion and checked the communist spread.²⁶ However, the Johnson administration underestimated the sense of nationalism among the North Vietnamese and their resolve and tenacity to unify Vietnam. It was a fight for existential reasons for the North and the US simply could not match the will of the North. Whether a predominantly military solution is applicable in such a context is debatable. The US armed forces’ “victory culture” through the use of overwhelming combat power for the destruction of enemy forces in the battlefield²⁷ also predisposed them to think in the same mode when planning for Vietnam.

Hence from the external dialectic perspective, US military actions in Vietnam failed to unhinge the moral, mental and physical bastions and connections of the North Vietnam communists and its supporters. One of the biggest mistakes of the US policy makers and military commanders in Vietnam was failing to properly address the will, ends, ways and means (moral-mental-physical) nexus of the North Vietnam communists that generated their staying power at the onset of war. In the end, it was the dissipation of the US popular will as the war dragged on that handed strategic victory to the communists.²⁸

Refining Strategic Analysis: Beyond Rationality

Rational Actor Model – Action as Political Choice

One of the key requirements of strategic planning is to understand the strategic environment and the relevant actors operating in it. Contemporary strategic scholarship typically applies the underlying logic of the Rational Actor Model (RAM) to analyse international strategic affairs, including effectiveness of deterrence and the causes of wars and their outcomes. The RAM presupposes nation-states or governments and non-state political entities as unitary, rational decision-makers. Actions chosen by a political entity in response to threats or opportunities in the strategic arena are framed as the outcome of selection between alternative choices generated, with the aim of maximising gains and minimising costs. The alternatives generated are based on the actor's objectives, which in turn are guided by its internally consistent value system.²⁹

Hence if a strategic analyst knows the ends of some decision-making body, "he can predict what actions will be taken to achieve them by calculating the most reasonable way for the decision-maker to reach his goals", and "he assumes this way will actually be chosen because the decision maker is rational".³⁰

Organisation Behaviour Model – Action as Organisational Output

Graham Allison and Philip Zelikow, authors of the seminal *Essence of Decision*, have argued, using the Cuban missile crisis of Oct 1962 as a case study, that alternative conceptual models

are required besides RAM to analyse international affairs and explain strategic events and outcomes, including crises, conflicts and wars.

The RAM provides the conceptual framework for analysing the objective, and subjective, strategic context that creates perceptions of threats or opportunities for a political entity to choose particular courses of action. Perceptions of national or political interests and the entity's strategic culture and ideology create propensities to react in certain manners.³¹ However, because a state operates through its various organisations, the RAM has its limitations in explaining and postulating strategic occurrences. While the RAM "fixes the broader context, the larger national patterns, and the shared images", it would be necessary for the Organisation Behaviour Model (OBM) to illuminate "the organisational routines that produce the information, options, and action" within this context.³²

Under OBM lenses, political actions are analysed as results of organisational output rather than as a unitary actor making purposive choice. In this model the actor is not a unified or monolithic political entity or state, but rather a "constellation of loosely allied organisations" on top of which political leaders sit. These organisations are created for specific purposes and for efficiency from specialisation. Systemic structures, routines and standard processes are developed to achieve reliable and repeatable performance based on the organisation's mission. Specialised organisational programmes and repertoires are built for their specific roles, and organisational cultures or

belief systems are imbued over time. These features, among others, act together to 1) restrict the information that could be provided by the entrenched procedures; 2) constrain the range of strategic options available in the near term; and 3) set the limits of adaptability to changing circumstances. Hence within the broader framework provided by RAM, OBM further refines the strategic analysis by studying organisational capacities and constraints that impact the choice and its implementation.³³

Governmental Politics Model – Action as Resultant of Internal Political Process

Because states are led by individuals, the Governmental Politics Model (GPM) also does not see state or non-state polities as unitary actors. It sees many actors as players in the intra-governmental political process. These players do not act out of a consistent set of strategic objectives but each bring to the table their conceptions of national, organisational and personal goals, and perceptions about the issues(s) at hand. Governmental actions are seen as a resultant of the bargaining process between these players.³⁴

In analysing strategic affairs, the GPM would want to know who are the individuals that count in the political process; what factors shape each of their stands on the issue; how can each player impact on the choice and action; and what are the action channels “for aggregating competing perceptions, preferences, and stands of players in making decisions and taking action”.³⁵ Though so named, GPM can also be applied to non-state political entities that are actors in the international stage,

although a lack of information about their structures, political processes and players in them would make their actions harder to analyse. Again, GPM refines strategic analysis within the broader context provided by RAM, by focusing in greater detail “the individuals who constitute a government and the politics and procedures by which their competing perceptions and preferences are combined”.³⁶

The Second Lebanon War³⁷ – A Discussion on the Utility of Alternative Models

While this conflict was too recent for sufficient open sources to be available for in-depth analysis, it would be useful to serve as a backdrop to investigate the proposition that alternative models to the RAM can enable a more robust analysis of strategic issues. The approach would be to ask the questions framed through OBM and GPM filters to suggest the additional explanations and insights that could be generated.

From the rational actor perspective, analysing Israel’s decisions in the war would entail asking the following questions: What were the strategic circumstances (objective or perceived) that Israel conceived as threat? What were Israel’s strategic goals? What were the options for addressing the issue? What were the strategic costs and benefits of each option? What should be Israel’s best choice given the conditions? Israel’s performance would then be evaluated and mistakes analysed, against the yardsticks provided by rationality.³⁸

Nevertheless, many lessons highlighted in the Winograd report³⁹ were curiously familiar ones reflected

in Israel's previous campaigns, most notably the Lebanon War of 1982.⁴⁰ The recurring patterns of shortcomings in strategic performance indicate a deeper malice that warrants further study.

The Winograd report charged that the IDF was "not prepared for the conflict" and the Chief of Staff "did not offer information, assessments and plans that were available in the IDF". The decision-makers, chiefly the Prime Minister and the Defence Minister were apportioned with much of the blame. At the political-strategic level, "the failure to update and fully articulate Israel's security strategy doctrine" by successive governments was a chronic affliction.⁴¹ A retired Lebanese General also noted that the Israeli intelligence about the areas adjacent to the Israel-Lebanon border was inadequate.⁴² Using the OBM as a lens, questions could be framed around the organisational structure, organisational intelligence, organisational options and implementation to analyse Israel's decisions and actions.

1. Organisation Structure. Structure drives behaviour. It was noted that Israel does not have a "specific formal structure to define the decision-making process in national security matters". Strategic planning was left in the hands of a handful of office holders.⁴³ Secondly, the cabinet "depended almost exclusively on the IDF, its Chief of Staff, and the intelligence community to provide information on and analyses of national security issues".⁴⁴ Hence over time, the pathological lack of longer term logic and strategic planning, possible in-breeding of ideas and homogeneous organisational outlook

deprived the crisis planning in the Second Lebanon War the coherence and strategic perspective it required.

2. Organisational Intelligence. For Israel, the military intelligence organisation is the "major source of intelligence and the sole coordinating body of all intelligence estimates and reports, including political intelligence".⁴⁵ What then were the intelligence organisation's priorities, focus and SOPs prior to the war? And what were the constraints in the intelligence organisation's existing repertoire and programmes that limited its ability to produce the required information in sufficient fidelity? How did the above impact the purported lack of intelligence in the border areas so critical to IDF operations, particularly land operations?

3. Organisational Options and Implementation. The options available to the decision-makers depend on the capabilities and limitations of the instruments available. The Israeli Air Force was in a high state of readiness.⁴⁶ In contrast, the land force was ill-prepared for a major operation into Lebanon due to the shift in focus to low-intensity conflicts and security operations since the last "real" war.⁴⁷ Did these facts, coupled with the lure of quick success via airpower⁴⁸, constrain the range of strategic options presented and skew Israel's choice to massive air strikes? Did these influences and constraints lead to the lack of "creativity in proposing alternative action possibilities"? And was the IDF failure to "adapt the military way of operation...to the reality on the ground" also caused by the long lack of exposure to and training in large-scale offensive operations?⁴⁹

No. of Seats	Party	Orientation
29	Kadima	Centrist, Pro-disengagement
19	Labor	Leftist, Social-democrat
12	Likud	Rightist, Anti-disengagement
12	Shas	Sephardi Ultra-orthodox
11	Yisrael Beiteinu (Our Home Israel)	Russian-speakers, Nationalist, Secular; Against unilateral withdrawals, but for exchange of populations and territories to create two homogeneous states
9	National Union (NU) / National Religious Party (NRP)	National Religious Party (NRP) Nationalist, Ashkenazi Orthodox; Seeks to annex the West Bank (Land of Israel) and transfer Palestinians to Jordan
7	Pensioners	Single-issue: guaranteed pensions for all; Supports unilateral withdrawal from West Bank
6	United Torah Judaism (UTJ)	Ashkenazi Orthodox, Anti-withdrawals
5	Meretz / Yahad	Leftist, Anti-occupation, Civil libertarian
4	United Arab List	Israeli-Arab, Islamist
3	Hadash	Israeli-Arab, Communist
3	Balad	Israeli-Arab, Islamist

Table 1. Parties in the Knesset

Now let's turn to the GPM. As mentioned, Israeli strategic decision-making is restricted to a small number of players and heavily influenced by military opinion. Such a system would be more susceptible to "individual attitudes, perceptions", vagaries of personal interests as well as interests of organisations they might represent.⁵⁰ Furthermore, "Israeli democracy has given rise to a tangle of fractious small parties that cannot agree even among themselves".⁵¹ There are presently twelve parties in the Knesset, most of which champion different issues (see Table 1). The small parties also yield disproportionate power.⁵² How did the political dynamics (or bargaining) between key players affect the strategic decisions? Who were the key players in the decision-making process? What shaped their perceptions and what accounted for each player's weight on the choice and action? What pressures

and baggage did the two of the players, Prime Minister Ehud Olmert and Defence Minister Amir Peretz, have that shaped their decisions or recommendations? How did the Chief of Staff, General Dan Halutz's predispositions to airpower⁵³ impact the choices and actions?

Conclusion: Different Questions, Different Answers

Strategic fundamentals dictate that firstly, states must look into their strategic planning process as an internal dialectic, and review its structure and action channels in peace and in war to properly balance the discourse of its ends, ways and means. Secondly as an external dialectic, strategy aims to undermine the opponent's moral-mental-physical cohesion while protecting your own. Appreciating the strategic situation, which includes assessing the intentions of rival(s) and

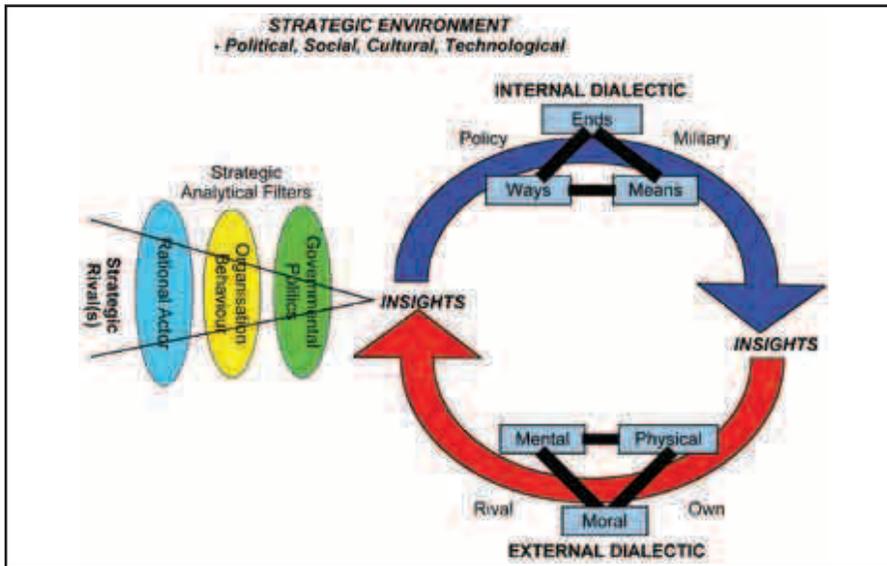


Figure 1. Conceptual Framework for Strategic Enquiry

forecasting future trajectories, would do well with the employment of additional filters apart from that of rationality. In this regard, both the OBM and GPM give special meaning to Clausewitz’s dictum of “war is an instrument of policy”, where the “policy” in question might not be derived through purely “rational choice”. Finally, transcending both dialectics are the political, social, cultural and technological conditions that are the most important determinants of warfare.

To be sure, insightful strategic analysts do look beyond the rational actor paradigm in their analysis. What is suggested here is a deliberate framework to incorporate two other paradigms (Figure 1). Departures from the rational strategic calculus (sometimes dismissed as “irrational”) would be better understood by asking different questions. That said, one challenge is that the information requirement for OBM and GPM would be heavier and more difficult to obtain than that for the RAM.

From the perspective of enhancing our moral-mental-physical bastions, the moral and physical aspects have been well addressed by the SAF, with efforts in strengthening our Core Values and commitment to defence, and harnessing technology to push the physical envelope of warfighting. From the “mental” viewpoint, it is proposed that imbuing strategic habits of mind in the SAF Officer Corps begins early.⁵⁴ The reasons are twofold:

Firstly, strategic thinking and perspective should be a broad-based ability, although typically only small groups of officers are charged with the formal responsibility of strategy analysis and planning. This is because it is imperative that all officers understand the *raison d’être* of the SAF and the missions entrusted to them, have the ability to link these to national interests and are able to locate the logic between their conduct and performance, and organisational purposes and national interests.



It is imperative that all officers understand the raison d'être of the SAF and the missions entrusted to them.

Secondly, strategic thinking is a discipline that has broad applications, and requires critical habits of mind that need time to be inculcated. By the time the officer attends the Command and Staff Course, he would ideally have been imbued with a sense of military history, a baseline research competency and a formative strategic perspective, which the course would further hone through introducing more sophisticated frameworks and concepts, generative discussions and application.

In an era when even corporals are expected to be thinking soldiers, the cognitive ability of our officers to think strategically would be one key asset for the SAF. 

(Ed note: This essay is the second prize winner of the 2007 CDF Essay Competition)

Endnotes

¹ Michael Handel, "The Evolution of Israeli Strategy: The Psychology of Insecurity and the Quest for Absolute Security", in *The Making of Strategy: Rulers, States and War*, ed. Williamson Murray, MacGregor Knox and Alvin Bernstein, (New York: Cambridge University Press, 2007), pp553-562. Another example was the performance of Op Iraqi Freedom, General Tommy Franks, Commander-in-Chief of the United States Central Command, "was almost wilful in his pursuit of rapid operational success at the expense of long-term political goals", which contributed to, or at best did

not help in, the post-combat quagmire in Iraq. See Hew Strachan, *Clausewitz's On War: A Biography*, (New York: Atlantic Monthly Press, 2007), p4.

² Thomas X. Hammes, *The Sling and the Stone: On War in the 21st Century*, (Minnesota: Zenith Press, 2004).

³ William S. Lind, Colonel Keith Nightengale (USA), Captain John F. Schmitt (USMC), Colonel Joseph W. Sutton (USA), Lieutenant Colonel Gary I. Wilson (USMCR), "The Changing Face of War: Into the Fourth Generation", *Marine Corps Gazette* (Oct 1989), pp22-26.

⁴ From Clausewitz to Mao Tse Tung to Rupert Smith, military or strategic theorists and distinguished generals have always emphasised "will" as a key determinant of the outcome of war.

⁵ Lawrence Lim, "Effects-Based Operations: Learning from the Past to Revolutionise the Future", (Canadian Forces College Masters' of Defense Studies thesis, 2004), p3.

⁶ Basil Liddell Hart, *Strategy*, (New York: Frederick A. Praeger Inc. Publishers, 1954), pp335-336.

⁷ Frans P.B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd*, (New York: Routledge, 2007), pp182-183.

⁸ For example, studies and research on social-cultural-ideological factors in managing and winning conflicts, and post-conflict security and stabilisation are worthwhile pursuits, given the current strategic context.

⁹ For example, lessons from Vietnam War and the Malayan campaign would offer valuable insights into counter-insurgency warfare. Robert Thompson's *Defeating Communist Insurgency: Experiences from Vietnam and Malaya* (London: Chatto and Windus), remains one of the seminal works on fighting irregular wars. And Mao Tse Tung's *On Guerilla Warfare* (New York: Praeger, 1961) still offers great insights into the principles of irregular warfare.

¹⁰ For example, it would not be possible to import the successful lessons lock, stock and barrel from the British Malayan Campaign against the communists in the 1950s to present-day Iraq. For one, Britain was fighting an organised, more or less homogeneous foe, the Communist Party of Malaya (CPM), whose members were predominantly Chinese. For another, Britain was able to promise independence to Malaya which was ironically what the CPM offered to Malaysians, but through violent means. Nevertheless, there are principles or best practices that could be applied (in spirit if not in letter), in consonance with the Iraqi context. Particularly those espoused by Robert Thompson in the book cited above.

¹¹ Osinga, *Science, Strategy and War*, pp133-134.

¹² Colin S. Gray, *Strategy and History*, p15. Policy here need not refer solely to reasons of state but also the use of power (kinetic or non-kinetic, "hard" or "soft") for objectives of non-

state political entities. It is also worthwhile to note that the advent of nuclear weapons does not negate Clausewitz's claim that "war is the continuation of policy by other means" for two reasons. One is war can still be waged under the nuclear umbrella, albeit with limited aims. The second is that if one can expand Clausewitz's logic and include the threat of war (e.g. deterrence or coercion) besides actual war, then nuclear deterrence gave the threat of war its political utility. See Strachan, *On War*, p24.

- ¹³ For example, Napoleon relied on battlefield superiority to resolve strategic issues, but his operational brilliance was unable to redeem "strategic lunacy". See MacGregor Knox, "Conclusion: Continuity and revolution in the making of strategy", in *The Making of Strategy*, ed. Murray, Knox and Bernstein, (New York: Cambridge University Press, 2007), p616. A century later, the Wehrmacht's "blitzkrieg" warfighting style of swift and decisive movements has gained much praise and credited for defeating France in World War II. But it must be remembered firstly that by and large much of the war's battles became one of attrition, which the German's tactical excellence enable them to adjust to. More importantly though, Germany eventually lost the war due to fatal resource deficiencies caused by serious mismatch between strategic ends and means. No amount of Wehrmacht's operational and tactical brilliance could save failure from strategic poverty. See Milan Vego, "Policy, Strategy and Operations", in *Strategic Logic and Political Rationality*, ed. Bradford A. Lee and Karl F. Walling, (London: Frank Cass, 2003), pp123-125.

- ¹⁴ Gray, *Strategy and History*, p1.

- ¹⁵ As a case in point, Thomas E. Ricks, military correspondent of the Washington Post and author of *Fiasco: The American Military Adventure in Iraq*, "observes a lack of harmony between the military and the executive and legislative branches. The danger is not a coup but rather poor war planning, strategy, and implementation". See Michael P. Noonan, "Mind the Gap: Post-Iraq Civil-Military Relations in America – A Conference Report", Foreign Policy Research Institute (8 Jan 08).

- ¹⁶ For example, these statements are complicated by the fact that political considerations sometimes also include the narrower interest of the leader's political survival or success. Notice the US Democratic presidential hopefuls' campaign promise of bringing back American soldiers in Iraq within a year of taking office, even when it appeared that the surge in US forces is working (according to Pentagon figures). One candidate even declared that his first order of business if elected president would be to call in the Joint Chiefs of Staff to give them a "new mission" to "phase out our involvement there". See Janadas Devan, "No guts, no glory for

Democratic candidates", *The Straits Times* (19 Jan 08), p516. Are these promises based on careful political-strategic considerations and discourse, or more to pander to voters' sentiment? It seems more reasonable that first order of business should be to talk to the military, get a good grasp of the reality in Iraq, then decide whether to get the population behind America's continued involvement in Iraq (particularly if the surge is indeed working) or to pull out.

- ¹⁷ Carl von Clausewitz, *On War*, p75. The full quote reads, "primordial violence, hatred and enmity ... of the play of chance and probability ... and of its element of subordination, as an instrument of policy, which makes it subject to reason alone". This is the higher order trinity referred to by Clausewitz while the secondary trinity is "government, armed forces and people", which the primary trinity is usually related to. It is important to distinguish between the two, because academics have proclaimed that an age of "non-Trinitarian" or "post-Clausewitzian" war has arrived, which is not possible.

- ¹⁸ Williamson Murray and Mark Grimsley, "Introduction: On Strategy", in *The Making of Strategy*, ed. Murray, Knox and Bernstein, p1.

- ¹⁹ Strachan, *On War*, p106.

- ²⁰ Grant T. Hammond, "The Essential Boyd", http://www.belisarius.com/modern_business_strategy/hammond/essential_boyd.htm.

- ²¹ Osingpa, *Science, Strategy and War*, p180.

- ²² Harry G. Summers, Jr., *On Strategy: A Critical Analysis of the Vietnam War*, (Novato, CA: Presidio 1995).

- ²³ John M. Gates, "Vietnam: the Debate Goes On", *Parameters*, Vol XIV, No. 1, pp15-25.

- ²⁴ Jeffrey Record, "Vietnam in Retrospect: Could We Have Won?", *Parameters* (Winter 1996-97), pp51-65.

- ²⁵ Gates, "Debate Goes On", pp19-20.

- ²⁶ Yuen Foong Khong, *Analogies at War: Korea, Munich, Dien Bien Phu, and the Vietnam Decisions of 1965*, (Princeton, New Jersey: Princeton University Press, 1992), Chapter 5.

- ²⁷ Anturio J. Echevarria II, "Towards an American Way of War", *Strategic Studies Institute Monograph* (March 2004), pV.

- ²⁸ Up to 1968, General Westmoreland's theatre strategy did not commensurate with the type of war the North Vietnamese was waging. After General Creighton Abrams replaced Westmoreland, the plan was changed and different measures of success were used, focusing on population control. It was a successful change in approach albeit too late given the diminishing domestic support and resources, exacerbated by the horrifying images from the media of the Tet Offensive in 1968, although operationally and tactically it could not be considered as a success for the North Vietnamese. See

- Peter Macdonald, *The Victor in Vietnam: Giap*, (London: Fourth Estate Limited, 1993), pp260-271.
- ²⁹ Graham Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, (New York: Longman, 1999, second edition), Chp. 1. Examples abound where states and non-state political entities are “personified” as a single actor. Statements such as “U.S. sees China as a strategic competitor” or “U.S. engages India to contain China’s rising clout” assumes that the US thinks and acts as one, and chose this view and the concomitant actions purposefully to fulfil her political interests.
- ³⁰ *Ibid.*, p19.
- ³¹ *Ibid.*, p391. An example of strategic cultural influences would be the US armed forces’ “victory culture” through the use of overwhelming combat power for destruction of enemy forces in the battlefield, which permeated in the Vietnam War. See Echevarria II, “Towards an American Way of War”, pV.
- ³² Allison and Zelikow, *Essence of Decision*, p392.
- ³³ For a thorough discussion of organisation behaviour as a mode of analysis, see Allison and Zelikow, *Essence of Decision*, Chp. 3.
- ³⁴ *Ibid.*, Chp. 5.
- ³⁵ *Ibid.*, p390.
- ³⁶ *Ibid.*, p390.
- ³⁷ Known as the “July War” in Lebanon and also Lebanon War 2006 in other writings. In the consciousness of the Israeli population, the Lebanon War of 2006 was a military blunder that failed to achieve significant political leverage. The international perception of who “won” the war was mixed at best, and certainly the Hizbollah and Syria had seized the opportunity to claim victory. See *Reuters*, “Poll: These Israeli leaders should quit”, *The Straits Times* (26 Aug 06), p29 for Israel population’s polled sentiments. Also see Paul Cochrane, “Hizbollah leader declares victory over Israel; allies emboldened”, *The Straits Times* (16 Aug 06), p12. And *Associated Press* report, “Assad hails Hizbollah ‘triumph’”, *The Straits Times* (16 Aug 06), p12.
- ³⁸ For example, it would be easy to apply one of Clausewitz’s dictums and attribute one of Israel’s failure to not having clear political objectives and a viable military operational concept.
- ³⁹ Retired judge Eliyahu Winograd was appointed to chair a commission of inquiry to conduct a study into the failings of Israel in the Second Lebanon War.
- ⁴⁰ After the 1982 Lebanon War, or First Lebanon War, Prime Minister Menachem Begin was also forced by public fury to appoint an investigative commission, who delivered a similarly devastating report. See M. Thomas Davis, *40km into Lebanon: Israel’s 1982 Invasion*, (Washington DC: National Defense University Press, 1987), p102. It has been charged that the Israeli decision-making process was “irresponsible, haphazard, not thought out and not based on any examination and evaluation of alternatives...” (Shlomo Gazit, former director of military intelligence) and “...The ministers are not presented with sufficient information enabling their vote to take into account all the ramifications of these decisions” (Yossi Beilin, Cabinet Secretary from 1984 to 1986). Quoted in Handel, “The Evolution of Israeli Strategy”, p556. In comparison, statements in the Winograd report included: “...in making the decision to go to war, the government did not consider the whole range of options...” “The support in the cabinet for this move was gained in part through ambiguity in the presentation of goals and modes of operation...The ministers voted for a vague decision, without understanding and knowing its nature and implications.” See Haaretz Staff, “The Winograd Report: The main findings of the Winograd partial report on the Second Lebanon War”, accessed on 5 Oct 07 at <http://www.haaretz.com/hasen/spages/854051.html>.
- ⁴¹ See the Winograd Report.
- ⁴² Brigadier General Elias Hanna, “Lessons Learned from the Recent War in Lebanon”, *Military Review* (September-October 2007), p84.
- ⁴³ Michael Handel, “The Evolution of Israeli Strategy”, p554.
- ⁴⁴ *Ibid.*, p554.
- ⁴⁵ *Ibid.*, p554.
- ⁴⁶ Brigadier General Elias Hanna, “Lessons Learned”, p85.
- ⁴⁷ The Winograd report, p9. The last large scale ground operation was conducted in the First Lebanon War (1982). Since then, the focus has been shifted to counter-terrorism, counter-insurgency and security operations in troubled areas. One reason cited was that Israel thinks that conventional aggression has been deterred, and “since Israel did not intend to initiate a war, the conclusion was that the main challenge facing the land forces would be low intensity asymmetrical conflicts”. In actual fact, the Hizbollah employed mixed modes of warfare. While the concept was strategic defence, it combined fixed defences with guerilla-type operations, operating in depth with the intent of sucking in the IDF and prolonging the conflict to its favour. See Brigadier General Elias Hanna, “Lessons Learned”, pp85-86.
- ⁴⁸ Sarah E. Kreps, “The 2006 Lebanon War: Lessons Learned”, *Parameters* (Spring 2007), p72.

⁴⁹ Ibid., p4.

⁵⁰ For example, in the 1982 Lebanon War, then Defence Minister Ariel Sharon manipulated the decision-making process and presented the cabinet with “a series of *faits accomplis*” to implement his plan “to solve Israel’s problems with PLO once and for all”. See Handel, “The Evolution of Israeli Strategy”, p559-560. Sharon’s close relationship with the Prime Minister, Menachem Begin also offered him some leverage in cabinet dealings. See Davis, *40km into Lebanon*, p66.

⁵¹ Ibid., p562.

⁵² Carol Migdalovitz, “Israel: Background and Relations with the United States”, *Congressional Research Service (CRS) Report for Congress* (30 Apr 07).

⁵³ Kreps, “The 2006 Lebanon War”, pp72, 76.

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Communicating 3rd Generation SAF: An Intercultural Challenge?

by COL Kelvin Koh



“We operate in a highly competitive, fast-moving market. We need to make sure people know where we’re going and what they need to do to deliver our strategy.”

*Helena Norrman,
Vice President Internal Communication,
Ericsson*

Introduction

“Change is a fact of life.”¹ In today’s globalised world, undertaking proactive change initiatives are needed to ensure an organisation’s continued relevance and success. Toyota, Best Buy and even the US Army are just some international

high-performing corporations and governmental organisations that have internalised the need for timely change. This mental shift to embrace change is clearly evident in their respective transformation programmes; “Global Vision 2010”, “Customer Centricity” and “Army After Next”, drawn up in order to stay ahead of their respective competitors. In 2003, SAF too embarked on its journey to “transform from a position of strength”² to deliver the 3rd Generation (3rd Gen) SAF by 2015.

Understandably, organisational changes are complex and multifaceted. However, common and essential to all

transformation programmes, a study of 100 best-selling organisational change books (as listed by Amazon), almost all “change gurus” stress the importance of gaining “stakeholders’ understanding, alignment and support for the changes” and that communication is key.³ SAF too recognises that communication is the key to solicit stakeholder ownership and support for its change programmes to ensure its success, and this was clearly articulated in the Chief of Defence Force (CDF) workplan speech entitled “ONE SAF”.⁴ However, communicating vision, purpose and mechanics of change alone, though essential, is not sufficient to solicit and sustain stakeholders’ support for change. Communication efforts must also take cognisance of the cultural tensions that “characterise” the organisational changes, especially when the change effort demands embracing a “culture of change”; a shift from the prevailing cultures.⁵ As with public diplomacy, which is only effective if form, style and substance are aligned, synchronised and coherent with the overarching message⁶, communicating change is no different. Coherence must prevail in what is communicated, how it is perceived and the corresponding ground actions. In this regard, this article seeks to illustrate that communicating 3rd Gen SAF should not be treated as a rhetorical exercise, but rather as a continuous and iterative engagement process taking cognisance of the prevailing organisational cultural dimensions, in order to bring about greater engagement and commitment to the transformation process and to realise a “ONE SAF”.

Transformation and the SAF Culture

SAF and the Transformation Effort

The SAF was established some forty years ago to meet Singapore’s immediate security needs, having acquired nationhood in the most unexpected fashion. Since then, the SAF has matured to become the cornerstone of Singapore’s defence policy; as a form of deterrence, providing the political space for the exercise of diplomacy to ensure that Singaporeans continue to enjoy the peace and stability.⁷ In this regard, the SAF constantly seeks to improve and position itself as “one of the most technologically advanced militaries in Southeast Asia”.⁸ However, unlike the two previous changes that the SAF undertook in the 70s and early 90s⁹, this latest change deals not only with the tangibles, i.e. hardware, but also the intangible aspects as well, i.e. culture change, to deliver a SAF that is people-centred, technologically advanced, integrated and networked, and capable of undertaking a spectrum of operations.¹⁰ Also unlike the two previous changes, the imperatives for this change are multifaceted and dynamic; an uncertain security environment, an increasingly more educated population, a resource-tight disposition and a growing technology sector, requiring stakeholders to move out of their stable comfort zones to embrace a culture of change that is associated with uncertainties and anxieties, in order to rise above the flux. However, this presents a “value paradox”¹¹ given the prevailing SAF cultures, as the following segments illustrate.

Power-Distance refers to how society at large accepts and expects that power is distributed unequally but equitably. This implies that inequality is endorsed by the followers as much as by the leaders, though the extent of which varies from society to society.

Individualism as opposed to collectivism is the degree to which society is integrated into groups. In the case of the former, one would find societies where ties between individuals are loose: everyone is expected to look after him/herself and his/her immediate family. For the latter, societies are integrated into strong and cohesive in-groups, with strong sense of loyalty.

Masculinity and *femininity* refer to the distribution of roles between the genders in a society. The IBM studies revealed that masculine societies possess a very assertive and competitive characteristics which differ from feminine societies, which tend to be modest and caring. The assertive pole has been called “masculine” and the modest, caring pole “feminine”.

Uncertainty avoidance deals with a society’s tolerance for uncertainty and ambiguity, and comfort level in unstructured situations. High uncertainty avoiding cultures try to minimise the possibility of such situations with strict laws and rules, and safety and security measures. Conversely, uncertainty accepting cultures are more tolerant of opinions that differ from what they are used to.

Taking cognisance of these four cultural dimensions, the following paragraphs highlight the cultures that describe the SAF and how they affect change.

Hierarchy Prevails. Singapore was ranked 19th in Hofstede’s Power-Distance Index (PDI), a rather high PDI, suggesting that the society thrives best in a hierarchical structure; where rule of the authorities prevail and the principle of equity prevails over equality.¹⁹ Interestingly, this is consistent with Confucius’s prognosis that a society’s stability can only be assured if an unequal relationship between people exists.²⁰ SAF is not unlike any other militaries, a hierarchical structure provides the unity of command that underpins SAF’s operational effectiveness and readiness. However, low PDI countries/organisation would view control as limiting stakeholders’ participation which in turn inhibits stakeholders’ commitment to the organisation; essential in any change process.

A Collective Identity. Singapore’s low ranking on the individualism index (IDV) suggests the presence of a collective society.²¹ Like the country, the SAF prides itself as a united, professional and operationally ready outfit, characterised by the collective spirit that prevails across the different Services: Army, Air Force and Navy. Collectivism is also manifested through the high context communication culture, where communication across Services and among the different levels of hierarchy tends to be indirect and coded, and comprehension by parties/persons outside these in-groups would experience difficulties.²² This collective spirit encapsulated by the core value of “Loyalty” is regarded to be an integral component that underwrites SAF’s effectiveness as a deterrent force. However, there is a need to rationalise the perpetuation of collectivism and

interdependence to achieve unity in strength while encouraging greater individualism; in speaking up and suggesting ideas, which are expected of an organisation undergoing change.²³

Mission Driven. SAF is mission and outcome driven; a virtue shaped by Singapore's geo-security and geopolitical disposition, giving rise to an attitude that nothing is taken for granted and complacency is frowned upon²⁴, sometimes at the expense of the intangibles, i.e. engagement and building relationships. Over the years, the SAF has paid greater notice of the "softer" aspect of management — human capital development, second career options, job redundancy — and it is now one of three pillars of the Army's transformation process, under the ambit of "heartware".²⁵ This is consistent with Singapore's mid-table ranking in the masculinity index (MAS), suggesting a balance between a results and people-oriented organisation.²⁶

Stability and Risk Avoidance. Singapore was ranked lowest on the uncertainty avoidance index (UAI). This could suggest a host of possibilities; Singaporeans are relatively at ease towards ambiguity and uncertainty, tolerant towards ethnic and religious diversity and respectful of the systems.²⁷ While a more detailed study may be required in this regard, in Singapore where the pragmatism of economic survival is often intertwined with the constant warning of vulnerability²⁸, it tends to suggest that Singapore's low UAI score is more as a result of the latter as opposed to the former. At the organisational level, this has manifested itself in SAF's, a multi-

ethnic organisation built on a foundation of meritocracy, disciplined time-management philosophy²⁹ and demand for meticulous work to avoid uncertainties, which in turn have contributed to its "highly professional reputation".³⁰ These inclinations towards stability and risk avoidance can inhibit the very aim of change which is to adapt to an increasingly uncertain global disposition; economically, socially or security-wise. In this regard, there is a need for SAF to rationalise its high risk averseness and monochronic time culture with the need to be dynamic and flexible in the current state of flux in order to maintain its operational edge.

Why is this an Intercultural Challenge?

An organisation's outward manifestations, i.e. behaviours and actions, are shaped by its values, culture and norms, and vice versa.³¹ In the context of organisational change, this could entail a shift away from the steady state to embrace a new culture that commensurates with the desired outcomes.³² This is most pertinent in SAF's context, given the motivations underpinning the change, its prevailing organisation culture and the following developments as well. Notwithstanding, the change is made more challenging by the multiracial and multi-ethnic demography present in SAF.

Challenge #1 – Increasing Uncertainties. Unlike the past two transformations, this 3rd change to deliver the 3rd Gen SAF is taking place amidst "tumultuous" changes in the strategic drivers as highlighted earlier.³³ However, amidst the uncertainties, growth opportunities

prevail. In order to take advantage of the opportunities present, and taking cognisance of an organisation with a preference for stability and low risk, this would demand a cultural shift within SAF to accept uncertainties. Specifically, there is a need for SAF and its rank and file to adopt a more experimental approach in the development and application of new technologies, a more experiential learning approach with emphasis on learning through trial and error and most of all, to develop a “safe to fail” as opposed to “fail-safe” mindset; accepting limited failures where allowable, when developing new warfighting concepts, tactics, techniques and skills to meet the dual paradigm of dealing with the uncertain geo-security disposition and maintaining SAF’s operational edge. To this end stakeholders in SAF need to embrace an “actions precede clarity”, a more dynamic (polychronic) perspective of time and “multitaskable” attitude. In short, we need to think “AND” and not “OR”.³⁴

Challenge #2 – A “New” Generation. Singapore is one of the top five countries in the world whose education system has succeeded in producing an increasingly more educated society.³⁵ While an increasingly more educated generation is one of the reasons why SAF has embarked on this change journey, with greater knowledge, skills and mental capacity to exploit, apply and use these new technologies, these young soldiers are also changing the complexion of power-distance relationship in the SAF, evident from the series of engagement surveys conducted between 2003 and 2006.³⁶ The surveys noted that this “new” generation are more opinionated

and vocal in expressing their views. They also seek to play a more involved role in SAF’s policy-making process. In addition, they hold a different view of leadership, one that is there to advise and motivate rather than one that is simply there to direct and dictate. While this “new” generation recognises the need for unity of command in the SAF, it would be more palatable if these positions of power were more transparent, to reinforce that they are earned and not ascribed. These observations are indicative of a closing in the power-distance gap, which needs to be carefully managed in order to maintain the hierarchical structure as it underwrites the legitimacy of the command and unity of the organisation, while strengthening the collective culture.

Challenge #3 – Assimilation of Migrant Cultures. Minister Mentor Lee contends that in order for Singapore to continue to survive in this ever-changing world, there is a need to draw talent from all over the world and convince them to stay.³⁷ Singapore’s population today numbers 4.5 million, where a million are foreigners.³⁸ With an increasingly liberal immigration policy, this number is expected to reach 6.5 million in 2015.³⁹ In this regard and being a citizens’ armed force, one can expect an influx of different cultures brought about by migration, which may run contrary to the organisation’s prevailing culture and values; such as respect for authority, the principle of meritocracy based on equity as opposed to equality etc. In short, some extent of acculturation will need to take place by all parties; for the migrants to assimilate to the local and organisational culture and for citizens/stakeholders to appreciate and understand the differences of the migrant

culture with respect to the Singapore and SAF's cultures, to maintain the latter's operational effectiveness.

Communicating for Effect – Mind the Cultural Dimensions

Proponents of reception theory would argue that individuals from shared cultural background are likely to interpret information in similar ways, suggesting that communicating change would be methodical and rhetorical.⁴⁰ However, on the contrary, scholars have shown that communication challenges can also exist even within a single society and workplace, especially when it is multiculturally diverse.⁴¹ This is most pertinent and of significant relevance in the case of multi-ethnic and multicultural SAF. In order for SAF to inculcate a “stronger sense of commitment and greater excellence” in its people⁴², it needs to understand that what is communicated (about change) and how it is communicated means different things when perceived under the different cultural dimensions.⁴³

Revisiting the Past

Scholars have contended that internal communication used to be the poor relation of a business⁴⁴, the SAF was no exception. Prior to the turn of century, greater emphasis was given to external communication and less towards internal communications. Since then, significant resources have been committed in this area; with the establishment of physical entities, e.g. the Army Information Centre (AIC) and the Performance and Engagement (P&E) Branch, and inclusion of its processes within the organisation's management

structure and process to strengthen the level of engagement between the management and the stakeholders. These investments have been well-received by the stakeholders, evident from the findings of Employee Engagement Survey (EES) and Organisation Climate Survey (OCS), but more can be done to ensure that communication is not merely a target audience analysis exercise, or “transmission of (key) messages and symbols, and management of social messages; more importantly it is also about developing social relations”.⁴⁵

Positioning for the Future

Leveraging on Pitts's model of cultural change⁴⁶, the following segments detail three areas, namely, behaviours, processes and structures, where improvements can be made at the organisational, stakeholders' or leaders' level; to make communication more “relational”⁴⁷, promote greater participation in the change process, enhance empowerment and strengthen the belief that each can make a contribution to the change process and more importantly to sustain the change process.

Behaviour – Pitts contends that change of culture must be planned, led and managed by the top. Leadership must own the message.⁴⁸ In this regard, the leadership across the SAF hierarchy needs to talk (with the appropriate use of language), behave in ways that reinforces the vision, and possess the competence to communicate cross-culturally so as to create a shared understanding on the intent and purpose of change. SAF leaders also need to be conscious of their non-verbal communication forms, e.g. facial expressions, tone, hand and

body gestures etc., *vis-à-vis* the various cultures that exist in the organisation.⁴⁹ Inconsistencies in verbal cues could contradict the verbal messages, causing confusion and possibly discrediting the leadership; reinforcing the stereotype of an unapproachable leadership. In short, any communication effort is only as effective as the leadership reinforcing the messages that the organisation seeks to convey, verbally or non-verbally. However, the onus of behaviour change in communication does not lie with our leaders alone; stakeholders at every level too have a part to play. By withholding their prejudices and biases of a traditional hierarchy and possessing a more macro view of issues, stakeholders can be more receptive to issues and be more “uncertainty-oriented”⁵⁰; necessary building blocks to bring about change and to sustain it.

Processes – Understandably, the change effort will be a long and tedious journey where periodic reframing will be necessary to maintain relevance. In this regard, a dynamic consultative process where stakeholders can feedback and leaders can respond in a timely manner is needed to refine and provide clarity on issues, e.g. career anxieties. In particular, such measures are necessary to minimise the incidence of lower echelons developing their own theories about the purpose of the change programmes, which may undermine its original intent.⁵¹ While the outcomes of the change effort are important, the processes to build up the level of trust and understanding among the stakeholders regardless of the cultural variations that exist among the different stakeholder groups are equally

important. In this regard, the use of low-context language, i.e. not coded and direct communication style, is essential to reduce ambiguities and enhance the effectiveness of consultation and engagement. Generic statements such as “you are doing fine” or “I think you need to be more active” do not help to alleviate stakeholders’ concern if he/she is next in line to be laid off nor does it encourage participation by the stakeholder to understand how he/she can learn and improve to help the organisation in the change process.

Structures – Communication structures, such as feedback units and/or websites, provide stability in the face of uncertainty; they also help to reinforce the open and consultative cultures to facilitate change. Additionally, structures such as periodic surveys, e.g. EES and OCS, provide an avenue for myriad of views to be voiced without directly challenging the leadership and also without fear of attribution. It is a face-preserving approach to help foster greater trust and strengthen relationship across the organisation; as such, effort should be made to ensure that the nascent OCS continues to be administered. Thirdly, in order to keep up with the expectations of the “new” generation, SAF can also do well by leveraging on new media, e.g. SMSes and blogs, and informal social networks such as Facebook, MySpace etc., to augment the traditional methods, so as to strike a chord with younger generations, soften its impersonal image and also “de-distance” the gap between the leadership and their charges. In short, the presence of such structures and practices obliges active participation, promotes engagement

with the leadership and alleviates stakeholders' uncertainties arising from the different aspects of the change effort, which in turn resolves the paradox of striving to achieve harmony in a high power-distance, hierarchical organisation.

Conclusion

A former Australian Ambassador once remarked, "Cultures can be many things: age, place, religion, workplace, and so on. So communicating change very often means changing the culture of an organisation or whatever, which means changing the culture of the people in it."⁵² This cannot be truer for SAF as it embarks on its transformation journey to realise the vision of the 3rd Gen SAF, especially when the change is not simply about doing more things but rather about doing things with greater quality, productivity and perfection. In this regard, greater attention to detail and greater commitment is required by all in the organisation, potentially challenging the existing cultural assumptions. Concomitantly, communicating organisational change must seek to integrate, coordinate and control each stakeholder's needs, concerns and contributions so that the outcome(s) is/are satisfying to all involved, while optimising the organisation's functions and resources. It must do so by taking into account the cultural dimensions that exist within SAF, so that communication can be more relational and effective in soliciting commitment, ownership and sustenance for the entire change programme, failing which the result of the change could be "embarrassing,

detrimental or both"⁵³ Additionally, one must not discount the importance of non-verbal communication in this complex area of inter-cultural communications. Reinforcing non-verbal cues will reinforce the desired cultures while contradicting non-verbal cues will only undermine the intent and effectiveness of the verbal messages and generate further uncertainties. Finally, one needs to understand that "while Singaporeans are nationally and politically a collective whole, the cultural delineation of each ethnic group retains its uniqueness"⁵⁴ As such, generic communication strategy would only have limited effect at best. In this regard, where possible, future research could be conducted to revisit existing cultural assumptions and also to better understand how the different individual ethnic and cultural variation can further challenge the process of communicating organisational change in the SAF. 🇸🇬

(Ed note: This essay is the third prize winner of the 2007 CDF Essay Competition)

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Making Sense of Sense-and-Respond Combat Service Support for the Singapore Army

by MAJ Sean Tan Kok Han



Introduction

The inefficiencies of a military supply chain have spurred many studies on a modern scientific logistics system. Many of the early military logistics systems relied on a “push” concept, rather than one that responded dynamically to actual demands. Some of these concepts are still in practice today. With emerging warfare and an expanded spectrum of operations, new threats and challenges are being presented to both the warfighter and combat service support units. From recent conflicts, the environment of operations is increasingly urbanised and operational tempo had gone up significantly. In addition, the modern

battlefield has become non-linear and non-contiguous.¹ Battlefield demand for logistics has become one that is highly uncertain in nature. Having an abundance of supplies on the battlefield or pushing supplies to troops without an ability to respond dynamically is no longer sufficient to support operations today.

To meet new battlefield demands, many military forces have leveraged on the advent of commercial technological advances and innovations. The SAF is no exception. Over the last few years, the SAF intensified its efforts on enhancing operational readiness and force modernisation. Much investment has been made to transform the SAF

into an IKC2-enabled force. However, the IKC2 focus has insofar been lacking in the sense that it had been largely concentrated on the combat and support forces. **The 3rd Generation SAF must also be supported by a highly responsive and effective Logistics², or Combat Service Support (CSS) system.**

In designing the CSS system for the 3rd Generation SAF, successful supply chain models from the private sector as well as leading military forces form the starting point. Commercial companies such as Fedex and Levi's Strauss & Co. have experienced huge successes in organising and managing end-to-end supply chains, resulting in lower costs, greater speed and increased reliability of logistics support. Commercial supply chain management models such as Just-in-Time (JIT) and Total Asset Visibility (TAV) have been well-adopted worldwide. But even such tried-and-tested business models have evolved over time to meet new requirements. The unprecedented advent of Information technologies, especially Internet technologies, together with tumbling costs, led to sweeping changes in the business realm. Leveraging on network technologies, companies have moved from a "Make and Sell" business model to one that can "Sense and Respond".³ The premise of such a radical model lies in using network technologies to "sense" highly dynamic customer demands, and "respond" in a precise and effective manner. The value that can be captured from the Network Era is enormous, as demonstrated by companies such as Microsoft which had grossed outperforming margins of over ninety percent.⁴

In the context of warfare, modern military forces have showed that they have not lagged behind in riding the technology wave. The United States Army (USAR), for example, has invested extensively into "Sense-and-Respond" systems to transform their logistics operations into a network-centric, agile and effective force. The extensive employment of Information technologies has fundamentally altered their fundamentals of operations and processes to meet operational outcomes. This includes end-to-end support from the logistics suppliers to the front-line troops. Past models such as a mass-based approach and JIT have become increasingly irrelevant. These are models that are also still in use by many military forces, including the Singapore Army. However, the fallibility of such concepts during Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) showed an acute need for the military logistics chain to accept stochastic data, analyse and respond dynamically to satisfy demand. That became the impetus for the USAR to embark on Sense-and-Respond systems and initial trials have demonstrated promising results.

Indeed, the promise of Sense-and-Respond holds great potential. But, one must remember that application of concepts and systems must be taken in context. The Singapore Army is not out to generate profits like a commercial company. Neither are our operating requirements similar to that of the USAR. Nevertheless, we can derive much value and many lessons from the private sector and the USAR. This article thus takes cognisance of the

SAF's operating context and unique challenges in developing the ideas of Sense-and-Response.

In this article, we first look at the integral role of logistics (the term CSS would be used thereafter) in past wars using examples from the two Indo-China Wars. By outlining the challenges in modern warfare, we can also see that CSS plays an even more crucial role in sustaining operations today. This would be done through looking at the experiences of the USAR in Operation Iraqi Freedom to explain why a network-enabled CSS system is necessary in the modern battlefield. With that, the article would then delve into the concept of Sense-and-Respond, drawing references from the private sector and the USAR. The benefits of having Sense-and-Respond would also be expounded, putting forward the case that the adoption of Sense-and-Respond model results in a much better combat effectiveness for the Singapore Army. Following that, the key implementation areas and challenges for the Singapore Army would be articulated. Finally, the article discusses how the Army can engage people effectively to engender ownership and commitment. The article concludes that it is ultimately the **people** that would unlock the potential that Sense-and-Respond beholds.

Defining Combat Service Support

To align the reader's understanding of "Logistics or CSS", the definition in the SAF's JSP-10 publication is useful. Logistics or Combat Service Support (CSS) is defined as "[t]he science of planning and carrying out the

movement and maintenance of forces". This involves those aspects of military operations that deal with:

a. Design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of *matériel*. *b.* Movement, evacuation and hospitalisation of personnel. *c.* Acquisition or construction, maintenance, operation and disposition of facilities. *d.* Acquisition or furnishing of services.⁵ From this definition, we can see that the scope of CSS stretches beyond the operational domain into peacetime functions as well.

Combat Service Support – A Key Determinant in Success and Failure for Operations

CSS has often been influential in determining battle victories and failures. To illustrate this, let us first look at the two Indo-China Wars. During the first Indo-China War in 1954, the French Army, with far more advanced weapons and superior might of more than 14 infantry battalions, fell to the significantly smaller and less advanced Vietminh at Dien Bien Phu. How did that happen? The key contributing factors towards the Vietminh's triumph were CSS sustainability and distribution. General Giap was able to depend on local factories to produce small arms ordnance and innovatively used human porters to form the "supply lines" in the austere operating environment (where mobility of trucks are limited).⁶ **The defining difference was that the Vietnamese were able to outdo the French in getting critical supplies to their troops faster and exactly where they were needed.**

During the Vietnam War, CSS demands were yet again significant in impacting operations. The requirements to support American troops of over half a million at the end of a line of communications of over 10,000 miles long, into a country that did not have the essential infrastructure were staggering. Furthermore, the Americans were unfamiliar in operating in a battlefield where there was no front, rear or distinct axes suitable for CSS deployment. The conventional patterns of a combat zone were non-existent and CSS build-up could not keep up with the growing troop strength.⁷ Despite much subsequent effort to bring in large loads of supply, the front-line US troops were still in shortage of supplies due to lack of CSS planning and suitable transportation. Again, as the war persisted, the lack of attention to CSS bore its brunt on the US operations in battles such as the Battle of Khe Sanh and Tet Offensive.

The importance of CSS in shaping operations has not been diluted since WWII and the Indo-China Wars. In fact, with the evolution of warfare, it has possibly even deepened with the increasing sophistication and complexity of weaponry. **It is not about how much**

we stock up for operations, for there are corresponding implications with inventory management and costs. But rather, it is about how responsive the military supply chain is. To examine the relevancy of this idea further, let us take a look at the recent Gulf Wars.

Warfare in the New Paradigm – The Expanding Battlefield

The advent of commercial technological advances and innovations has greatly impacted the way militaries fight today. During the 1991 Gulf War, the “military-technical revolution” made inroads into a “network-centric” concept of operations, enabling Commanders to command and control widely dispersed land / air / sea forces for missions.⁸ Troops can now be orchestrated across distances far more widespread than before. Sensor technology has also improved to the point where unmanned vehicles can be employed to perform reconnaissance, intelligence gathering and strike missions – jobs traditionally done by humans. Moreover, technology has also improved strike capabilities drastically. While it took almost 9,000 bombs to strike a strategic target such as a bridge in WWII, it now only takes one or two precision-guided missiles to do the same job.⁹

Area occupied by deployed force 100,000 strong	Antiquity	Napoleonic	U.S. Civil War	World War I	World War II	October War	Gulf War*
(Square km)	1.00	20.12	25.75	248	2,750	4,000	213,200
Front (km)	6.67	8.05	8.58	14	48	57	400
Depth (km)	0.15	2.50	3.0	17	57	70	533
Men per sq km	100,000	4,790	3,883	404	36	25	2.34
Sq meters per man	10	200	257.5	2,475	27,500	40,000	426,400

Table 1. The Expanding Battlefield¹⁰

Appealing as it may be, such complex operations do have its vulnerabilities. The potential of combat operations can only be unleashed if all systems ranging from the supply of ammunition to the massing of soldiers work with clockwork precision and timing.

The Need for Responsive and Agile CSS

It is important to note that with the evolution of warfare, the traditional methods of using a mass-based approach cannot be sustained anymore. As evidenced in the two Gulf Wars, the concepts of Just-in-Case (JIC) and JIT may no longer be sufficient. In Operation Desert Storm, the stock levels were pegged at 30 to 60 days of supplies for adequate sustainability. The planning for operational requirements was Service-oriented, leading to ill-optimised levels of common-to-user support such as food and water. To meet these demands, the logistics preparation staging period of six months in-theatre was necessary. However, what was more staggering were the 13 months and millions of dollars that the USAR took to repatriate the “Iron Mountains” of redundant supplies.¹¹ In retrospect, the employment of JIC towards meeting operational needs were approximated on past consumption patterns and data. The common metrics of effectiveness are in days of supply, dues-out duration/percentages or turn-around time. These measures tend to be reactive, and JIC can still work where demand is predictable, inventories do not have short expiry dates or risks/costs of inventory are low. However, as

demonstrated in the first Gulf War, the biggest disadvantage is the high costs of supply chain management.

To alleviate the high safety-stock levels and enhance efficiency, JIT was implemented in OEF and OIF. It worked well, as there was total asset visibility from the production lines to the seaports. However, asset visibility was virtually “lost” in the last tactical mile to the soldier due to multiple handling and lack of responsive data. This resulted in either late or wrong supplies sent. The JIT concept is heavily premised upon two inputs – **predictability of demand and product flows**. With these two inputs, only sufficient safety stocks are held to sustain operations till the next resupply run. While JIT has the huge benefit of “cutting redundant stocks”, the supply chain becomes much more vulnerable and brittle as changes in situations can outpace the resupply rates.

A case in point on the vulnerability of JIT was how some units from the 3rd Corps Command was nearly brought to a halt in OIF and OEF due to shortage of batteries, small arms ammunition and tank tracks. **The supplies did not reach the troops on time as planned.**¹² The After-Action Review showed that the hierarchical supply chain was too slow and rigid to deal with the demanding pace of battlefield. Demand forecasting and supply rates were still based on WWII consumption patterns and norms. In addition, **logistical demands (in ton-miles) in OEF and OIF went up by three times**. This is an astronomical rise, considering the fact that Afghanistan and Iraq fell in 23 and 20 days respectively.¹³

It became very clear that current CSS capabilities are insufficient to support future requirements.

While the efforts to constantly improve the supply chain management were commendable, the supply chains formed still operate in largely traditional hierarchical C2 structures and are of a predictive, optimised and linear form.¹⁴ The supply chains' *modus operandi* is still very much a one-way "push" concept and lacks an intelligent feedback loop.

With an adaptive and highly responsive network such as Sense-and-Respond, the supply chains in both peacetime and operations would be able to accept stochastic demand patterns, leverage on peer-to-peer and adaptive structures for the supply chains to be both efficient and effective. While this could entail fundamental shifts in processes and structures, the emphasis on **adaptability** and **flexibility** would bring the right *matériel* to the right place at the right time. Supply chain agencies would be networked and

empowered with the right means to allocate and deliver supply to meet demand dynamically.

Sense-and-Respond Model in the Private Sector

Driven by revolutions in technology, commercial companies are experiencing paradigm shifts in the way they compete and manage businesses. Traditional "make-and-sell" strategies fixated by annual budgeting cycles are fast being traded for drastically faster, real-time "Sense-and-Respond" strategies.¹⁵ Gone were the days of relying on forecasted data such as customer consumption patterns and aligning the company's production capacities and inventories to meet supply and demand. Companies are now depending **on real-time sensors to constantly discover what the customer wants, to the extent of anticipating unspecified needs.** That forms the "Sensing" part. With that, the company will then **dynamically allocate and shift their resources to fulfil those needs with customised services and products – with precise timing and delivery.** This completes the "Response" part.

"Make and Sell"	"Sense and Respond"
Driven by past consumption patterns and annual budget resource allocation	Driven by dynamic and real-time resource allocation
Design, build and sell	Sell, build, redesign
Plan	Act
Build to inventory	Build to customer
Build reliable, complex products and services	Create complex products and services while keeping stock levels at an optimal level

Figure 1. Comparison of "Make-and-Sell" against "Sense and Respond"¹⁶

Along with the proliferation of technologies, applications of “Sense-and-Respond” are increasingly widespread in the commercial sector. The main challenge facing “Sense-and-Respond” implementation is sensing the customer needs in real-time and in new ways. Many companies boost their understanding of their customers by linking them to their “virtual” value chain.

Fedex created huge value for their customers through linking them to their renowned COSMOS information system. Initially, the company used technology for internal tracking of packages and responded to customers through telephone enquiries. But after sensing the customers’ need for prompt responses, Fedex then issued software to their customers as a form of immediate FAQ. Today, customers can not only track their packages real-time using Fedex’s website, but also chat with an online operator to obtain instant solutions.¹⁷ This forms the “sensing” component. And if there is a need to redirect a certain package, Fedex can immediately redirect their local couriers to meet the customer’s request. This completes the “response” component.

The leverage on technology to implement Sense-and-Respond had also reaped improvements of time-to-market timings of 75%.¹⁸ Levi’s Strauss, a fashion retail company, recognised a market for custom-made jeans for women. To reach out to this market segment effectively, the company installed electronic kiosks at their retail outlets that allow customers to order custom-made Levi’s. The customer’s body profile is measured and

a suitable body style is selected from over a hundred different styles. The kiosks even offer suggestions proactively such as colours or patterns to customers to enhance their purchases. The order is then routed to their back-end production lines and executed. Through the mail, the customer receives her jeans within ten days. Those surveyed expressed extreme satisfaction with their purchases.¹⁹ Following Levi’s success, many fashion retail companies such as Nike and Adidas have also invested on improving their customer sensing and response strategies and infrastructure.

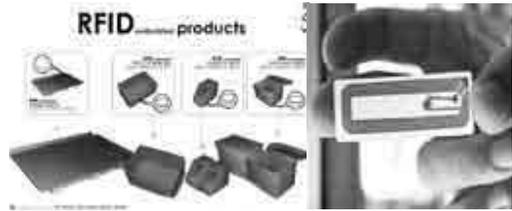
In moving towards Sense-and-Respond management, entire industries have transformed, companies have flattened their clumsy vertical integration structures to more responsive horizontal structures. The key leverage is on technology to monitor their customers and sense their needs incessantly, providing even beyond their recognised needs and developing new capabilities and speed to meet those needs within distinct market segments. That would constitute the company’s definitive edge against their competitors.²⁰ Indeed, with Sense-and-Respond “mass customisation” made possible, customers can receive personalised products from an array of solutions targeted at the common market.

Having seen how successful Sense-and-Respond had been in the commercial sector, is there similar applicability to military operations? Can it achieve the same success? In 2005, the USAR embarked on a trial to implement Sense-and-Respond CSS. The experiences of the USAR would be elaborated in the ensuing section.

Sense-and-Respond CSS in the US Army

During the 1991 Gulf War, the USAR applied Just-in-Case (JIC) CSS to build up large inventories in sustaining troops. In OIF, the USAR moved on to Just-in-Time (JIT) CSS which leverages on technology to track assets real-time, using forecasted demand to push supplies to frontline troops “at the right moment”. In that way, inventories would be kept lean. However, the USAR’s experiences in both Gulf Wars demonstrated that JIC and JIT were no longer sufficient to meet their operational demands. Thus, from 2002 to 2004 alone²¹ the USAR invested at least US\$70 million in Sense-and-Respond CSS – relying on sensors and networks to create a responsive supply chain that can adapt real-time.²² Much of the development efforts had been focused on Radio Frequency Identification (RFID) and Agent-based Modelling (ABM).²³ In RFID implementation, every single item as well as the transport medium (e.g. cargo pallets and containers) was tagged to provide in-transit visibility. By applying ABM, analysis and decision-support making tools were built into the CSS system to help Commanders make better decisions. Current operating structures, such as the Forward Operating and Support Locations for the US Air Force have also been put on trial to further develop operating concepts. Initial results yield a faster turn-around time and higher sustainability of aircrafts.²⁴

Sense-and-Respond CSS is defined as a network-centric concept that provides precise, agile CSS through prediction, anticipation and coordination in



In RFID implementation, every single item as well as the transport medium (e.g. cargo pallets and containers) was tagged to provide in-transit visibility.

operations. The concept is reliant on highly adaptive, self-synchronising, dynamic physical and functional processes, employing and enhancing cognitive decision support.²⁵ Sense-and-Respond CSS also has the ability to predict demand, possesses a cross-organisational capability to activate logistics resources and coordinates end-to-end and point-of-effect delivery of supplies. In other words, it is highly dynamic, situation-based and customer-oriented in its delivery. Within the supply chain, each agency is both a potential customer and service provider.²⁶ With Sense-and-Respond CSS, both predictive tools and responsive systems would be integrated in a single command and control framework to provide better support.²⁷

To illustrate the concept, consider the following scenario: Battalion X launching an attack requests for more ammunition through the command network. The system would process the best options for the higher echelon Commander to decide. It would first do a search of available supplies and find out exactly what is in stock and who has priority call on them. A neighbouring unit Battalion Y not in need of that ammunition during that crucial period of time could well end up providing the

ammunition supply to the requesting unit, using its organic transport assets. And before Battalion Y embarks on its next mission, the requirements would be “sensed” and “responded” through a replenishment mission by the higher echelon. Commanders may not own the CSS resources for prolonged periods of the operation. The resources are instead allocated responsively for crucial periods as the mission demands.

Sense-and-Respond CSS – The Case for the Singapore Army

To stay relevant for the future battlefield, the SAF has embarked on a major effort to transform itself into the 3rd Generation networked fighting force, or Integrated Knowledge Command and Control (IKC2) fighting force. The IKC2 concept is premised

upon the OODA loop, and allows Commanders to see first, see more, understand and decide better and faster, and act decisively to exploit battlefield opportunities.²⁸ In essence, IKC2 epitomises an operational framing anchored upon integrating sensor-to-shooter systems, developing new warfighting concepts and leveraging on technology to achieve self-synchronised actions.

With IKC2, the OODA cycles are expected to be faster with a resulting increase in the tempo of activities. This pull of faster action across hierarchies and space under a compressed time will accelerate the rate of operation. So, what does this mean for a CSS planner?

CSS operations must be integrated into the IKC2 framework. To sustain

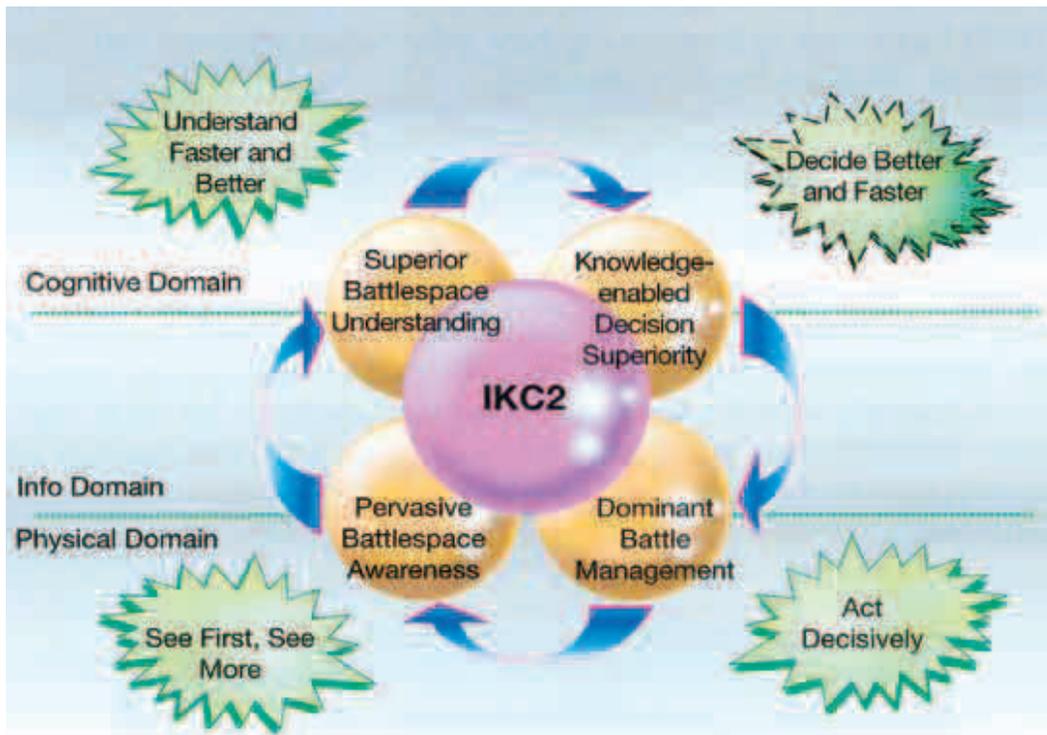


Figure 2. SAF's IKC2 Framework²⁹

operations, the CSS systems must match the speed of decision and action. If the CSS cannot keep up, then operations can possibly be halted with forces dispersed, and the **ability to mass effects and combat power would be lost**.³⁰ CSS responsiveness can be enhanced drastically through a common information network providing up-to-date operations and CSS situational awareness. This can allow the synthesis, synchronisation and expedited planning processes between warfighters and CSS agencies.

Indeed, the capability of Sense-and-Respond CSS would be an adaptive, demand-responsive support network of end-to-end logistics suppliers, instead of a hierarchical chain providing mass-customised services and products. The benefits of implementing sense-and-respond CSS are as follows:

Adaptability and Speed

In integrating CSS planning operations into the Operations-Intelligence cycles, the warfighters can receive up-to-date resource availability information for mission planning. In addition, CSS planners can be attuned to a common perspective of the battle space, obtain an early awareness of resource consumption and needs, and reconfigure proactively to support operations as necessary. With that, operations and CSS planning cycles can occur **almost concurrently instead of sequentially during battle**.³¹ This greatly shortens the OODA loop for operations (refer to Figure 3). Being piped into the Operations-Intelligence and Command decision cycles allow CSS-ians access to both tacit and explicit knowledge to achieve Commander’s intent. The CSS network is also configured to be event-driven and responds dynamically to

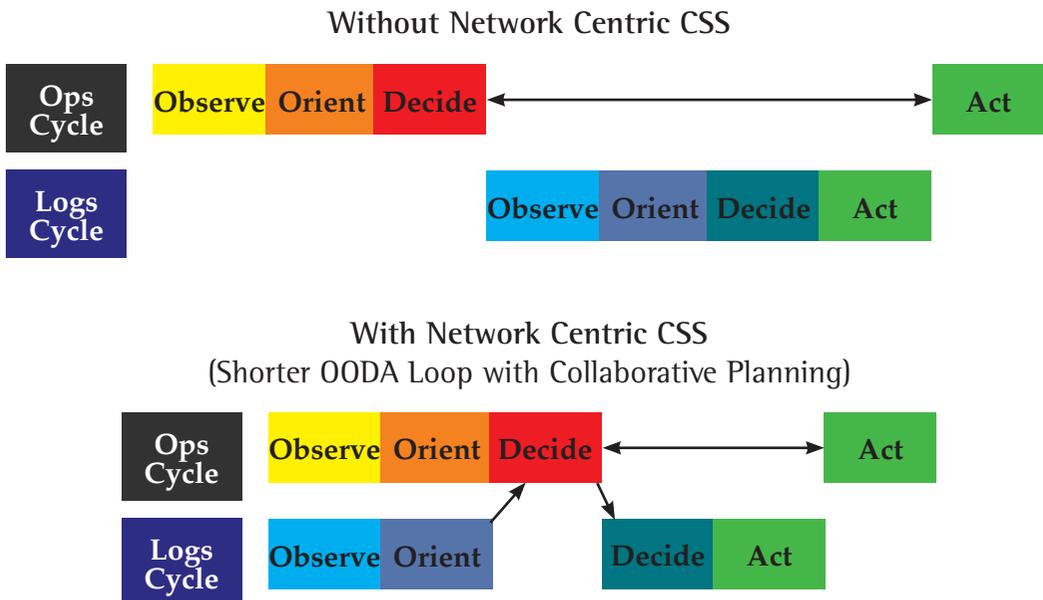


Figure 3. Shorter OODA Loop with collaborative CSS planning.

the Commander's intent. The necessary network, agents and cognitive decision support tools are also configured to be employed in real-time, limited data and communications – conditions reminiscent of actual war scenarios.³² With Sense-and-Respond CSS networks, greater speed and quality of combat operations can be gained through scalability and robustness in CSS operations.

Flexibility of Operations

The new battlefield is inherently unpredictable. This translates to unpredictability in operations, where Commanders have to constantly adapt to fast changing ground conditions. Sustaining military operations under such conditions is most effective when the supply network is **highly flexible rather than highly optimised**. Sense-and-respond is the answer where high uncertainty is endemic in situations, as no number of contingency planning or abundance of supplies can ever meet demand. There is a limit to how big the logistics tail can be on the battlefield.³³ With Sense-and-Respond, CSS resources are pooled to achieve a broader base of control. CSS networks can then self-synchronise and cross-load through its enlarged pool of shared resources to achieve a greater variety of support options in terms of duration, intensity or responsiveness. This new *modus operandi* cuts across traditional boundaries of command and paradigmatically changes the employment of CSS assets. Commanders may no longer own CSS assets, but have the right to use them according to the priority of allocation by higher HQ. In this manner, units accorded higher priority would

be ensured sustainability of effort, in line with Commander's intent. Ultimately, Sense-and-Respond allows **Commanders to resource their actions in accordance to the desired end-states**.

Effectiveness and Optimisation

From the CSS-ian's perspective, continual monitoring of CSS assets fulfils the complete end-to-end supply chain picture. This enables him to move assets as required to achieve adaptable and precise support not just at localised points but also at the global supply chain. CSS can also be tailored in modular packages to fit different operating requirements, rather than by traditional service or organisational elements. There would be minimal wastage of resources, as optimised resource-matching to supply is made possible. With this, inventory costs would also be reduced. Both JIC and JIT advocate a central management of resources and global optimisation. And from our earlier discussion on commercial and military cases, such optimisation happens on a superficial and broad level, and is also handicapped by hierarchical structure and inability to cope with dynamic changes. Sense-and-Respond CSS allows for optimisation at both localised and global levels, yet equipping and empowering the CSS Commander on the ground to allocate and optimise as he deems fit, according to Commander's intent. The benefits have also outweighed significantly in comparison with JIC and JIT approaches.³⁴

While the benefits of Sense-and-Respond CSS in the private sector prove to be very promising, one must

remember that implementation must be based upon the context of the SAF and the Singapore Army. For one, the Singapore Army is not a profit-oriented organisation. Benefits must not be based primarily on optimisation but rather, from an effectiveness perspective. The risks facing the military organisation are not also just monetary, but can have far-reaching impacts on human lives and unfathomable influence on the nation's well-being as well. Furthermore, war does not occur on a seasonal cycle as in business demand cycles. In comparing the SAF with the USAR, we must also be mindful that the Singapore Army's mission and operating context are also different. The scale of deployment, projection of forces and size of forces are some of the differences.

However, there are still similar parallels and lessons on which we can build upon for implementation in the Singapore Army. When examined in detail, the principles have been found to be equally useful in making the Army's supply chain more robust and flexible. Therefore, the approach is to determine what is useful to us and build upon, while eliminating what is irrelevant to create capacity for change.

Implementing Sense and Respond CSS for the Singapore Army - What Needs to Be Done and the Challenges

In implementing Sense-and-Respond CSS for the Singapore Army, four key areas have been identified:

Connecting the Dots – Integration of CSS Requirements into the IKC2 Architecture

As evidenced in past and recent wars, CSS remains a growing integral part of operations. The best operations plan would not happen if the supply of *matériel*, transportation of personnel and maintenance of weaponry cannot respond with agility, speed and precision. As explained earlier, the basis to be able to do so is information sharing and acquisition. This applies to both the **warfighter and CSS-ian**. The CSS-ian needs the same access to the battle space situational awareness as the operations and intelligence planners, and it has to be across all levels. Only then, will CSS planners be able to ensure that our OODA loop can be executed with the necessary support and be faster than the adversary. Thus, the first step towards Sense-and-Respond CSS implementation is to integrate CSS planning into the IKC2 architecture. The CSS-ian would then be able to see more, understand and decide better and faster to support operations. The Singapore Army must make the investments to extend the necessary developments to connect CSS as part of the battlefield C4I requirements in operationalising IKC2. This would enhance the "Sense" capability of CSS.

The integration must not simply be pegged at the operational levels. The Army's end-to-end supply chain spans from our Defence partners such as Army Logistics Base, Singapore

Technologies and Defence Science and Technology Agency. These agencies too must be connected, albeit at the appropriate security levels to ensure a seamless supply chain. In addition, the newly implemented Army Enterprise System (AES for short, currently designed chiefly for peacetime operations) must also be amalgamated into the operations system. The AES cannot be viewed as a standalone or peacetime system, as issues such as data acceptance and integrity would result in truncation when we transit to operations. The AES must be integrated as part of daily operations that is not much different to operations.

Achieving Maximum Return-on-Investment

In implementing Sense-and-Respond CSS, one must be mindful of the benefits that can be derived from the investment. On one hand, “Sensing” is about determining what, how much, where and when to send supplies. Demand uncertainties vary for different commodities. Staple consumption items such as food and water would have low uncertainty; common-to-type such as small arms or fuel may have average uncertainty while battle and equipment casualties would have high variances. “Sensing” norms must thus be commodity-specific for different battle scenarios. On the other hand, “Response” is the execution of supply to meet demand. The supply chain design with regard to transport must therefore be cheap, small and easy to transport. In this light, more technologically advanced equipment may not be viable as unique requirements such as special

handling equipment would prove to be restrictive and perhaps a hindrance.

Having a clear idea of “what to Sense-and-Respond” would determine the extent of Sense-and-Respond CSS for total asset visibility. The rest of items may perhaps be best managed using the safety-stock option. This decision must be justified against the return-on-investment for Sense-and-Respond CSS. Therefore, the most feasible solution could well be a hybrid solution encompassing Sense-and-Respond CSS and a certain degree of mass-based approach.

Modernisation of *Matériel* Distribution and Delivery Platforms

In both OIF and OEF, it was concluded that there was an acute need for superior delivery distribution and delivery platforms to ensure speedy and responsive supplies to be sent to the right place at the right time. This was because the CSS systems could not cope with the surge in capacity requirements. By developing these platforms, the “Respond” element is enhanced.

The highly fluid and dynamic battlefield demands forces to manoeuvre across large spans of distances and in modular outfits. Often, the modular task forces consist of a variety of fire-and-manoeuve combat elements, making homogeneity of CSS limited. This translates to: a) a need to project modular CSS requirements from the rear to the front, without a linear step-up in tempo or geographical advance; b) a need for CSS to carry more parts and supplies to support the task forces more effectively.

By employing combat configured loads for specific forces and operations, together with intelligent *matériel* handling systems, handling and transportation times would be greatly reduced.³⁵ Thus, by implementing RFID to enhance TAV, one can know at the push of a button the exact locations of a specific asset or supply item. Redirection can be done in real-time.³⁶ There also needs to be initiatives to upgrade the mobility of CSS assets. Material delivery platforms must be extended to exploit the sea and air dimensions to speed up and develop greater flexibility in support options. These complementing transportation channels provide flexibility to project supplies forward when battlefield conditions may negate the primary or planned mode of resupply.

Restructuring CSS Structures and Processes

The most crucial and difficult step in implementing is restructuring the CSS structures and processes. Earlier on, we discussed the implementation of the “Sense” function through information technology and the “Respond” function through upgrading of material delivery platforms. The linkage between the “Sense” and “Respond” function is clearly the CSS structures and processes. And **People** is the key determinant in driving the structures and processes. It is the People that are the most intelligent and adaptive “sensing and respond” elements.

First and foremost, in implementing Sense-and-Respond CSS, traditional hierarchical structures and boundaries would need to be redefined. This includes the traditional command chain for organic CSS assets. To ensure adaptability, flexibility and responsiveness of support, CSS assets

may now be centralised at the higher command levels. Thus instead of owning CSS assets, tactical Commanders may now own the right to employ CSS assets for a specified mission, period of time or priority. In addition, to ensure responsiveness of support, CSS assets would now need to be **deployed forward**. This departs from the traditional passive method of support from the rear.

For example, the new Forward Maintenance Support Concept sees a collapsing of the four-level maintenance support (Operator, Direct Support (AMC/FMC), Direct Support (MMC) and Depot levels) to a two-level maintenance support (Operator and Direct Support). In order to execute the new Forward Maintenance Support Concept, maintenance assets such as the former Light-Aid Team (LAT) and Workshop Platoons are “hubbed” at the Divisional level and decentralised to the warfighting units as required by mission. While Commanders now may feel the loss of their once-organic assets, they can be assured of continual support as the CSS unit now has a greater base of assets to provide continual support even for demand surges. More importantly, the support is more responsive as it is deployed forward, thereby reducing the equipment downtime and increasing operational availability.

The transformation in structures is not limited to the maintenance structures but also includes the other elements of Division Support Commands (DISCOM). The traditional-type organised CSS battalions are now being transformed into task-organised Forward CSS Battalions (FCSSB). The FCSSB Commander is the subject-matter expert on the ground who takes charge of all CSS

requirements for a manoeuvre Brigade Commander, spanning from medical to maintenance issues. By positioning himself forward with the Brigade, the FCSSB Commander is able to keep touch with changing ground conditions and provide proactive and adaptive solutions to support operations. Similarly, the CSS Commanders and units would be able to do so for their corresponding tactical levels as well. The devolvement of command would also commensurate with the control element, allowing self-synchronisation at the lower levels where similar CSS units can be routed to support the units. The end result culminates into effective and adaptive CSS support capable of responding to fast changing operations scenarios.

Along with redefining operating boundaries and structures, processes need to be changed in tandem. Operating processes, tactics, doctrine and procedures would need to be changed to ensure seamless flow of information and supplies. This must fall in line with the command and control



The CSS personnel operating the systems at all levels must also be technically competent to handle the information systems.

structures. The use of the information systems must also be enforced as a form of system discipline, so that data integrity and accuracy are not compromised. The CSS personnel operating the systems at all levels must also be technically competent to handle the information systems, which leads to training as a cardinal requirement.

To transform successfully, the focus must be on **People**. Commanders and men alike must be involved in the capability concepts development. They must be engaged to provide and experiment ideas during exercises or as part of communication sessions. Innovation must be encouraged and all “peacetime work” must be skewed towards operational scope. Commanders must set priorities to streamline workload and objectives to a manageable level. With the conscript nature of the SAF leading to a high turnover, changes must take place fast and the deliverables must be managed at an “observable” state. There must be “quick-wins” to encourage people during the journey. The leadership must demonstrate commitment and leadership by example, so that the specialists and men down the line would own a part of the process, instead of being mere observers.

Therefore, it must be very evident to the Officer and WOSE corps, both warfighters and CSS alike, why and what we are changing to generate mutual understanding and commitment. Therein lies the importance of a communication plan. CSS-ians have demonstrated a huge capability to adapt and we must leverage on this strength. By gearing all towards a common goal of success, we will be able to achieve a total greater than the sum of individual parts.

Conclusion

Supply chains predicated on mass-based or JIT approaches are no longer valid in today's businesses or military operations. To deal with demand that are highly uncertain in nature, logistics or CSS must first be able to sense and then respond in a dynamic, adaptive and responsive manner. The window of opportunity to do so is now, where both businesses and military forces today can leverage on emerging technologies. In adopting the best practices and business models applied by the commercial and a modern military force like the USAR, Sense-and-Respond has emerged to be the best answer. Companies such as Microsoft, Fedex and Levi's Strauss & Co. have experienced huge market edge over their competitors by being able to sense out customer demands and deliver responsive service. The recent OIF and OEF have demonstrated that "Sense-and-Respond" is a feasible fit to meet the respective operational demands.

However, "Sense-and-Respond" CSS must not be viewed as a panacea to all ills facing the Singapore Army. In that aspect, consideration was put on how "Sense-and-Respond" can be implemented in the Singapore Army. The key areas of implementation are: Integration of CSS Requirements into the IKC2 Architecture, Achieving Maximum Return-on-Investment, Modernisation of Delivery Platforms and Restructuring of CSS Command and Control Systems. First, CSS must be an integral part of the Operations-Intelligence planning. This would ensure that the "Sense" function is embedded to shape planning rather than an afterthought. Secondly, the return-on-investment remains a key consideration in determining the extent of Sense-and-Respond implementation for the entire suite of CSS operations. The focus of implementation would

continue to be where benefits outweigh the investment outlay. Thirdly, current asset tracking and delivery platforms must be modernised to improve projection and mobility requirements. Otherwise, the "Respond" function cannot effectively meet future battlefield requirements. Last but not least, the CSS Command and Control structures and operations must evolve in line with "Sense-and-Respond" *modus operandi*. The traditional hierarchical and "stove-piped" operations must be revolutionised to allow self-synchronisation, cross-loading and sharing of CSS resources.

The 3rd Generation SAF must be supported by a highly responsive and effective Combat Service Support system. The ideas proposed here are not applicable solely to the Army, but to the greater SAF as well. Commanders must be cognisant that the best operational plan can only materialise with an adaptive, responsive and intelligent system. Similarly, the best hardware and software can only realise its full potential if there is commitment from the **People. The CSS-ian is the most intelligent, adaptive and responsive "Sense-and-Respond" weapon for the Army.** The de-layering and forward battlefield deployment of CSS assets marks just the start of the shape of things to come. There is much more to do in terms of communication and training. Focus therefore must be channelled towards engendering greater trust and *esprit de corps* amongst the CSS-ians and with the warfighters. Only with that, can the true potential of "Sense-and-Respond" CSS be fulfilled. 

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The Environment: An Important and Increasingly Urgent Military Concern

by MAJ Ng Pak Shun



Sic utere tuo ut alienum non laedas¹
Latin Maxim

Change (IPCC) for their efforts in educating the world about man-made climate change.²

Introduction

Many important news items of the past few years have revolved around reports on the environment. The Stern Review on the Economics of Climate Change captured the attention of world leaders in 2006 with its call for urgent global responses to the economic threats of global warming. In 2007, the Nobel Peace Prize was awarded to former US Vice President Al Gore and the Intergovernmental Panel on Climate

At first glance, the military seems to be exempt from any influence on the environment in its traditional role to preserve national security. However, under international laws of war, the military is actually bound in its operations to limitations that encompass “environmental considerations”.³ Furthermore, armed forces will also be called upon increasingly to defend national sovereignty in areas where security, economics and environment

concerns intertwine. Therefore, to be an effective “instrument of policy” or “political instrument”, a military organisation cannot treat the environment as a policy issue outside its purview. Instead, the military must seek to understand the impact of environmental security on its operational and training activities. It must then respond through its plans and priorities in appropriate ways that acknowledge its huge role in environmental protection and conservation.

Security and the Environment

Security is a word that appears often in military circles, but it is actually a term that has gone through many definitional revisions in the past few decades. Whereas past concerns of security involve mainly military threats, present definitions of security have been expanded to justify the use of force against threats to a nation’s society, economy, environment, etc.⁴ In this context, the term “environmental security” can then be understood as security against environmental threats to a nation’s survival. These threats to national survival can cause abrupt physical changes in the world (increased frequency of severe floods, droughts and extreme weather events; extended ranges and seasons for mosquitoes and other disease carriers) and negative socio-economic changes in human society (decline in agricultural productivity due to altered weather, losses from extreme weather events).⁵

Some scholars have criticised the attempt to incorporate the environment as a key issue in national security and sovereignty. They argue that

environmental issues typically straddle across national boundaries and that they do not typically pose immediate threats to a nation’s survival.⁶ Nevertheless, the environment and other non-military threats should be factored in changing definitions of security, not only because they can cause wars (think of water and oil conflicts), but also because the securitisation of such threats can raise effectively national awareness of their tremendous potential to determine the well-being of a state.⁷

Military and the Environment – A Two Way Relationship

Moving from a political-theory discussion of environmental security to the military realm, how exactly does the environment interact with the armed forces, such that military planners should treat environmental security not as a peripheral concern, but rather as a key condition for mission success?

A military can be affected by environmental threats in two ways. First, and perhaps most evidently, a reduction in environmental resources often triggers violence and armed conflicts among and within nations. Competition for natural resources is a key cause of conflict especially in Third World countries, as resource possession is as important as technological or service know-how is for economic survival in the developed nations. Therefore, valuable natural resources, such as oil, diamond and timber, have led and will continue to lead countries to wars, as long as they remain scarce in supply. A key case in point is the Iraq-Kuwait conflict over oil reserves in the early 1990s.⁸ In fact, approximately one

out of four wars and armed conflicts in 2001 were driven by resource struggles.⁹ The military will thus almost always be called to exercise its power in order to secure scarce environmental resources.



Competition for natural resources is a key cause of conflict especially in Third World countries.

Second, adverse environmental changes could affect the military by creating sustained poor health and economic conditions to critical levels beyond state control, or by generating more natural disasters, and consequently more humanitarian crises. Leaving the dispute with regard to the causal relations of climate change and natural disasters aside, natural disasters in themselves affect more than six times the people affected by armed conflicts between 1990 and 1999.¹⁰ These affected individuals pose security challenges for a nation in terms of manpower and resource costs in humanitarian assistance and disaster relief efforts. If a country does not have the economic and social programmes to help the affected populations, they would in fact challenge the legitimacy of the ruling government, leading to internal unrest

and instability. Even if a country were not hit by earthquakes or hurricanes, it may experience persistent droughts, disease and economic stagnation that reach “tipping points beyond which state failure becomes more likely”.¹¹ The military will again have to be called to address these internal security problems due to worsening environmental conditions and increased incidence of natural calamities.

While the military would be called to exercise its powers externally and internally to resolve conflicts caused by the environment, the environment does not affect the military alone. In fact, the interactions between the environment and the military go both ways, as military operational and training activities also have huge potential to affect the environment across the physical air-sea-land continuum.

In the air, ozone-depleting materials or aircraft activities are main contributors of climate change. Substances such as chlorofluorocarbons (CFC) remove ozone in the atmosphere and allow UV radiation to reach the earth, leading to detrimental effects on nature. Aircraft activities also contribute to ozone depletion by emitting noxious pollutants. In addition, aircraft leave behind contrails, or artificial clouds in the atmosphere, which could lead to a significant rise in regional temperatures.¹² In such contexts, a military could technically abstain from contributing to ozone depletion through judicious use of materials. However, an air force needs to fly its aircraft for training and for war, creating unavoidable air pollution.

In the sea, pollution is generally produced by vessels that leak oil and other harmful substances, or ships that dump their waste and sewage. In addition, offshore oil and gas platforms had been targeted by the US military before in the Iran-Iraq conflicts. If the US military attack had caused serious spillage of oil and other toxic substances, the environmental effects would have been extremely significant in terms of marine life sustainability.¹³ Therefore, a navy would definitely contribute to marine pollution, while the amount of pollutants it produces would be subject to daily operational requirements in peacetime as well as target assignments in wartime.

On the ground, a military usually occupies substantive amount of land for training, and a war is typically won through ground campaigns. Therefore, military campaigns can cause significant harm to the ground environment, especially when much flora and fauna could be destroyed as a result of aerial bombardments and ground fires during times of conflict. For example, in order to improve visibility in jungles for ground troops, the US military launched the infamous “Herbicide War” during the Vietnam War and defoliated huge amount of Vietnamese forests, leaving behind significant environmental damage to the battlefield.¹⁴ Even in peacetime, military activities could have negative impact on the environment as natural habitats give way to military training areas, especially if environmental standards are not adhered to during its construction and daily use.¹⁵

Last, but certainly not least, nuclear weapons remain a clear and present threat to the global environment. With

environmentally adverse consequences in its use and testing, nuclear weapons leave evident imprints of the military on the entire world, not only in terms of the environment, but also in terms of global survivability.¹⁶



With environmentally adverse consequences in its use and testing, nuclear weapons leave evident imprints of the military on the entire world.

International Laws Related to the Environment and the Wartime Military

Since the military alters the health of the environment with its operational use of natural resources, its actions should be pegged to some codes of environmental protection that are subscribed by the entire international system. Indeed, such codes of environmental protection governing military conflicts do exist in three broad categories. Environment-specific treaty laws, such as the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD), are drafted to protect the environment during hostilities. The Fourth Hague Convention is one of many general treaty laws that also contain provisions to preserve the environment through

broad protection of civilians and their property, which placed restrictions on the methods and means of warfare.¹⁷

Environmental concerns in military operations have also been recognised in customary international laws, specifically under the ambit of the international laws of armed conflict. Initially in the early 1900s, the treaties of war were established to avoid collateral damage in the strict sense of human casualties only. Therefore, laws were established to forbid the use of chemical and biological warfare against humans. Cultural and historical objects are also protected by international law from acts of war since 1899 to preserve human heritage. However, even though the underlying principles of military necessity and proportionality concerned mainly human life in accounting for collateral damage, these laws had an inherent “environmental protection character” that facilitated their easy application in preserving the environment during times of war. For example, laws protecting cultural and historical objects also conserve natural resources by avoiding any rebuilding efforts. Laws protecting human life also indirectly benefit the environment by banning contamination of food and water sources, minimising infrastructure damage, as well as limiting proliferation of environmentally devastating methods of warfare.¹⁸

Over time, among other non-military interpretations of acceptable behaviour, “the prohibition of means and methods of warfare causing wide-spread, long-term and severe environmental damage” has become “jus cogen”.¹⁹ ²⁰ Therefore,

military commanders should factor unintended harm to the environment in their calculation of collateral damage. In fact, such concern for the environment is no longer an option, especially as rapid media cycles and strict demand for information transparency today require the military to show deliberate minimisation of any kind of collateral damage – human casualties as well as environmental damage.

Peacetime Military Environmental Policies and Limitations

Beyond strict adherence to international laws of armed conflict and the associated “environmental protection character” provisions within during wartime, a military should also adjust its planning processes accordingly to address environmental concerns in its peacetime operations and training activities. Therefore, the military should consider the environment together with politics and economics as essential considerations in peacetime and wartime planning and decision-making.

In peacetime specifically, the military should seek to preserve natural resources in its daily operations for future wartime requirements. Environmental risks should be included as part and parcel of peacetime decision-making processes, not only because the military should protect the environment, but also because such assessments could affect its long-term operational effectiveness and efficiency. Resource constraints have always influenced the military’s force transformation efforts, and in this regard the energy infrastructure of

an armed forces is a critical ingredient for mission success. For example, due to limited government finances, the British Navy changed its force structure in the first half of the 20th century to derive greater manpower savings by diversifying its energy sources to include both coal and oil.²¹ Nearly a century later, the problem of resource constraints has not disappeared; in fact, it has worsened significantly with the potential inevitability of depleting oil supply in the next few decades. As advances in military technology will continue to be powered by increasing consumption and dependence on oil, the military of today needs to improve its energy efficiency and develop alternative energy sources in peacetime, so as to ensure that its force structure remains operationally sustainable throughout the peace-to-war continuum.

Many militaries have started to include considerations for the environment as part of their planning processes. In fact, as the military has always been the leader in R&D, as long as it is interested in environmentally-friendly products and practices, it would naturally spur technical innovation and lower product price for commercial use. In the US, total energy efficiency of military operations increased by approximately 17% between 1990 and 1999 as a result of the US military's environmental emphasis. Private investors were allowed to upgrade military facilities using private capital and then share in the savings from reduced energy bills, thereby accelerating adoption of environmentally-friendly practices. The US Navy developed a new technology that reduces the power to propel a ship,

and this technology is now used by ships worldwide.²² In Australia, solar technology in communications and C2 systems has been implemented in military installations. The Australian military is also involved in R&D to reduce halon emissions and use revenue from such reductions for ozone protection, including technology cooperation with developing countries.²³

Besides technological developments, policy changes are also afoot in world militaries to use their abundant manpower and sophisticated equipment for the betterment of the environment. For example, the Indian military has put in substantive efforts in areas of environmental protection such as forestation, use of renewable energy sources, anti-pollution measures, population control, and environmental education at the command, division and battalion levels.²⁴ The Chinese senior military leadership has disclosed that Chinese servicemen reclaimed "about 133,000 hectares of waste land and planted 4 million trees around barracks... planted 1,470 hectares of trees and grass" in 2003 and emphasised the need for army units to improve the quality of the environment in China.²⁵ In Europe, German surveillance aircraft have been deployed beyond their traditional roles to discover and monitor oil spills, while Swedish army assets have been used to support local agencies in response to environmental emergencies.²⁶

Regardless of the tremendous potential of the military to protect and conserve the environment, the armed forces must always be prepared and ready to achieve its fundamental objective of defending national

sovereignty. Therefore, the military will have inherent limitations in fulfilling all worthy environmental goals in peacetime. First, as military assets are finite in nature, emphases in peacetime environmental protection will necessarily divert resources from military-specific security missions to civilian-related environmental missions. Second, indiscriminate military involvement in environmental protection efforts would also compromise mission readiness of an armed forces in the entire peace-to-war continuum – the classic “mission creep” possibility. Third, the peacetime military might be held publicly accountable for the success or failure of environmental efforts when its role is clearly in national defence.²⁷ Therefore, the military should be aware of the role it plays in impacting and protecting the environment, but not to the extent where it compromises its existential aims. However, in war, the balance between strategic victory and military success lies not only in destroying a certain number of targets or claiming a certain number of enemy combatant casualties; but also in demonstrating strict avoidance of collateral damage. How a military treats the environment in the battlefield will increasingly influence its ability to win the strategic battle against the scrutiny of the international media.

The SAF and Environmental Efforts

The mission of the SAF is clearly stated: “to enhance Singapore’s peace and security through deterrence and diplomacy, and should these fail, to secure a swift and decisive victory over the aggressor”. Environmental concerns do not seem to be addressed explicitly

in the SAF’s mission statement, at least for now. Nevertheless, as a responsible custodian of a large area of land mass in Singapore, the SAF has actually been actively involved in environmental protection efforts in Singapore.

For example, the Air Force has been using simulators to conduct a significant proportion of its fighter and helicopter pilot training. The use of simulator for training not only addresses the problem of limited training airspace above Singapore, it also reduces air pollution and fuel consumption significantly.²⁸ For the Navy, divers from the Naval Diving Unit have been volunteering in the annual “Save our Sea” project with other civilian divers to clear underwater debris and waste off Pulau Hantu. In fact, the SAF’s contribution in marine clean-up started back in 1990 under the “Save our Corals” project.²⁹ In Pulau Tekong, the training ground for recruits and other Army units, the SAF has often been an active player in local environmental conservation efforts. For example, the SAF has been roped in to assist an inter-ministry effort to safeguard the mangrove swamps off the shores of Tekong. In addition, upon request from the National Parks Board (NParks), the SAF has safeguarded various small streams from being converted to drains and prohibited training access to areas with various rare plants. The SAF has also provided NParks access to all Army training lands for a nation-wide survey of Singapore green areas, as well as permitted NParks and other members of the public to visit Pulau Tekong and specific areas on the Singapore mainland quarterly for nature studies.³⁰ All these efforts show

the SAF's commitment as a partner with the Singapore government and local NGOs on environmental issues.



Our divers from the Naval Diving Unit have been volunteering in the annual "Save our Sea" project.

Such commitment from the SAF is important at the national level, because environmental sustainability and economic growth have been and will continue to be key drivers of Singapore's socio-economic development. As a small island, Singapore could also be affected physically by the effects of climate change due to its low-lying land-mass and high population density.³¹ Therefore, the Singapore government has recently unveiled the National Climate Change Strategy in Feb 08 to signal its commitment in tackling environmental challenges through initiatives to use less carbon-intensive fuels and improve energy efficiency in all sectors of the economy.³² As a significant user of energy and land-mass, the SAF plays an important part in supporting these environmentally-friendly efforts in its peacetime activities.

Conclusion

As the world continues to face challenges in preserving the global environment for the next generations, the military must begin to shoulder

the heavy responsibilities of environmental protection in times of peace and war. After understanding the two-way relationships between the environment and military activities, armed forces must start to account for the key condition of environmental security in their operational planning and execution. Although the military cannot and should not morph into an environment champion and neglect its duties of national defence, it must seek ways to protect national sovereignty in a way that also concurrently reduces its environmental footprint in peacetime. The SAF has done well in this regard, but more can be done to incorporate environmental concerns in its mission to secure peace and security for Singapore. 🇸🇬

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Imaging and Reflectance Spectroscopy for the Evaluation of Effective Camouflage in the SWIR

by MAJ Ho Chee Leong

Abstract

The emergence of SWIR (short-wave infrared) sensors and ongoing development of multi-spectral imagers that operate across four wavebands (visible, near infrared (NIR), SWIR and medium-wave infrared (MWIR)) pose new challenges for current camouflage, concealment and deception technologies. For one, they render ineffective conventional camouflage material that worked well in the visible part of the spectrum. The aim of this study is to propose means to provide effective camouflage across the visible and SWIR spectra. A system was developed for combined imagery and spectral reflectance measurements for the visible and the SWIR regions. The system utilises an InGaAs focal plane array with a response range from 400 to 1700 nm. Experiments were conducted to study the reflectance of materials (e.g. foliage and current camouflage materials) across the two spectra. From these experiments, the desired properties for camouflage materials were established. It is then proposed that a layer of nanomesh be used to complement current camouflage material in order to maintain the reflectance contrast between various dyes in the SWIR. The modified camouflage material

would be reinforced with fibres tuned to absorb radiation of wavelengths around 1.4 μm . This would mimic the SWIR reflectance behaviour exhibited by water contained in foliage. The proposed material will enhance the survivability of future warriors by providing effective camouflage across the visible and SWIR spectra.

Introduction

In recent years, sensors operating in the SWIR region have emerged. The main motivation of having a sensor operating in this part of the spectrum is that it allows our soldiers to see eye-safe targeting lasers which have a typical wavelength of 1.55 μm . Also, having SWIR sensors provides an option for covert signalling beyond the range of increasingly proliferated Night Vision Devices (NVD) technology. Covert signalling or targeting devices operating in parts of the NIR (NIR band is from 0.7-1.1 μm) region can now be seen by anyone with current or older generations of NVD. The advantage of being able to operate at night can be regained if there exists covert signalling means in the SWIR. Another great advantage of having SWIR cameras is that they can be used from within vehicle windscreens because glass offers 90% transmittance

from 0.3 to 2 μm . IR sensors currently employed have to be used outside the vehicle thus exposing observers to possible enemy fire.

Current Camouflage Ineffective in SWIR

The Defense Advanced Research Projects Agency (DARPA) embarked on a programme named the Multi-spectral Adaptive Networked Tactical Imaging System (MANTIS). The programme aims to develop a helmet-mounted camera that captures images in the four wavebands (visible, NIR, SWIR and MWIR) and provides soldiers with a fused image on their helmets' visors.¹ Advanced NVG (ANVG) is another programme that aims to extend the spectral response of current NVD into the SWIR. One reason for having these multi-spectral sensors is their ability to defeat conventional camouflage material. Current technologies in Counter-Camouflage, Concealment, and Deception (Counter-CC&D) do not consider the behaviour of materials in the SWIR region. As a result, materials that effectively provide camouflage and concealment in the visible spectrum may not do so in the SWIR spectrum. This effect is best illustrated by comparing the two images in Figure 1.

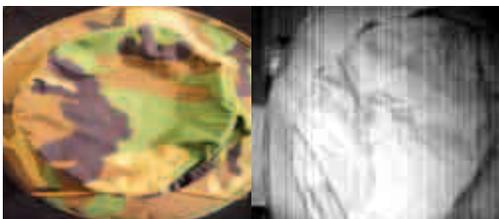


Figure 1. Image of camouflage hat taken using a Silicon CCD camera (left) and a SWIR camera in the 1.2 – 1.7 μm spectral region (right)

The visible patterns that were meant to camouflage soldiers operating in a woodlands environment “disappear” in the SWIR image. This is because the dyes

of the fabric have different reflectivity of light in the visible spectrum. By reflecting different amounts of visible light, camouflage patterns are presented to the human eye and any cameras operating in the visible spectrum. However, that is not the case in the SWIR region. All of the dyes used in this particular hat have similar reflectance in the SWIR. Hence the camouflage patterns are not apparent when presented to a camera sensing in the SWIR region and the hat appears not camouflaged.

The US Marines and recently the US Army have adopted digital or pixelated camouflage design for their new uniforms, namely the MARPAT and ARPAT. A SWIR image taken of the Marine MARPAT hat, shown in Figure 2, exhibits a similar result when compared to the visible image. The patterns disappear, though to a lesser extent, compared to the previous version of woodlands camouflage.

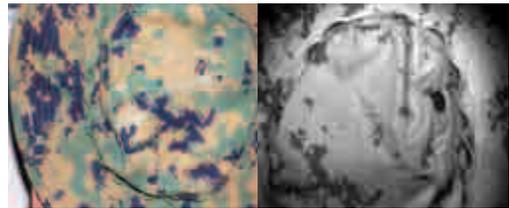


Figure 2. Image of MARPAT hat taken using a Silicon CCD camera (left) and a SWIR camera in the 1.2 – 1.7 μm spectral region (right)



Figure 3. SWIR (0.9 – 1.7 μm) image of soldier against woodlands vegetation background²

Figure 3 shows a soldier standing in front of woodlands vegetation. The background consists mainly of leaves

of high water content. Water absorbs radiation in the SWIR, specifically IR wavelengths at 1.4 and 2.5 μm , thus the vegetation appears dark in the picture. In contrast, the camouflage battle dress worn by the soldier reflects SWIR uniformly. Our soldiers donning these battle dresses will thus be ineffectively camouflaged in the SWIR region.

Camouflage Defeat Using Multi-Spectral Imaging

No one sensor works best under all conditions. Sensor fusion is the way to mitigate the environmental effects of operating in a particular waveband. Multi-spectral sensor systems capture images in various wavebands. The images are processed using software to produce a fused image. For example, the quality of an image captured in the visible and SWIR spectral may be severely degraded by presence of fog. The image will be significantly enhanced with information from the MWIR or LWIR spectral because sensors in these two wavebands are less affected by fog.

SWIR sensors complement traditional IR cameras and enhance the probability of detecting targets hidden behind foliage. There is a strong absorption of IR radiation by water at 1.4 μm . IR radiation at this wavelength is absorbed because it matches the harmonic frequencies of OH-bond vibrations.³ Foliage contains a high percentage of water. Hence, foliage materials can be distinguished from non-foliage materials by comparing an image taken in the visible spectral with one taken in the SWIR spectral.⁴ The AlphaTM NIR⁵ camera is well-suited for use as a multi-spectral imager because it operates in the visible, NIR and the SWIR spectra. A full spectrum scene, consisting of a leaf placed on a MARPAT sample, is imaged

at two different wavelengths, in a simple experiment to illustrate how multi-spectral imaging can be used to distinguish man-made objects from foliage.

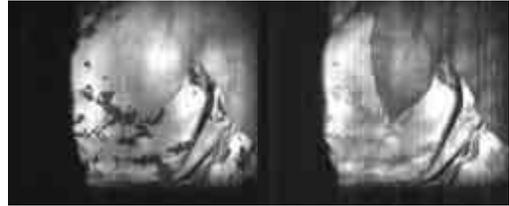


Figure 4. Images of a scene, with a leaf placed onto a MARPAT hat, taken using a SWIR camera under illumination of 0.7 μm (left) and 1.4 μm (right)

The left image in Figure 4 was taken under the illumination of 0.7 μm from the monochromator. A second image was captured under the illumination of 1.4 μm SWIR. The reflectance intensity for the two images were subtracted from one another. The resulting image, which is created by the contrast in reflectance between the two images, is shown in Figure 5.

The leaf can be clearly distinguished from the MARPAT hat because of its significantly lower reflectance in the SWIR spectrum due to strong water absorption in the region of 1.4 μm . This is a useful counter-camouflage technique to detect military targets concealed by foliage in the back or foreground.

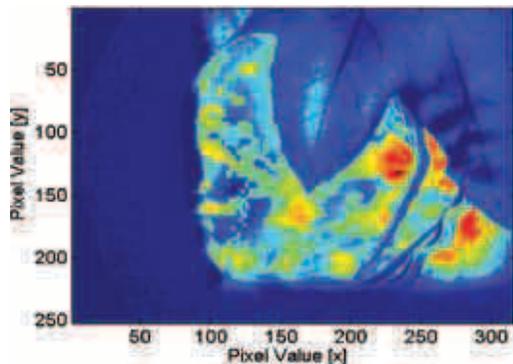


Figure 5. Image showing reflectance contrast between foliage and non-foliage objects by comparing visible and SWIR images.

Reflectance Tuning to Achieve Optical Contrast

A material must possess two desired properties to provide effective camouflage in the visible as well as the SWIR spectrum. First, the camouflage pattern must persist in the SWIR spectrum. This is achievable only if the contrast in reflectance, between each of the four dyes or paints, is consistent with their reflectance difference in the visible spectrum. Secondly, average reflectance of the material should be closely matched to that of the background across both spectral regions.

The contrast in reflectance between different colour dyes of the fabric can be maintained in both the visible and SWIR spectrum by having layers of wearable nanomesh with different mesh spacing interlaced with conventional camouflage material.

A theory of mesh optical properties was presented in a study on solar sails.⁶ The mesh spectral fraction transmission, absorption and reflectance are derived for a typical mesh, as shown schematically in Figure 6.

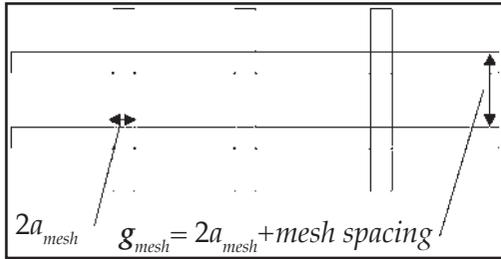


Figure 6. Perforated mesh of rectangular wire

Key parameters are defined as follows:

- width of the mesh = $2a_{mesh}$
- mesh parameter,
 $g_{mesh} = 2a_{mesh} + \text{mesh spacing}$
- thickness of the mesh = t_{mesh}

- cross-sectional circumference of mesh, $u_{mesh} = 8a_{mesh}$
- conductivity of the material, σ_{mesh}

The mesh spectral fraction transmission, $T_{\lambda, mesh}$, absorption, $A_{\lambda, mesh}$ and reflectance, $R_{\lambda, mesh}$, are derived under the following set of conditions.

- light wavelength, $\lambda \gg 2g_{mesh} > 16a_{mesh}$
- $a_{mesh} > \delta$ (skin depth)
- $t_{mesh} < g_{mesh}$

$$T_{\lambda, mesh} \cong \frac{4g_{mesh}^2}{\lambda^2} \left\{ \ln \left[\sin \left(\frac{\pi a_{mesh}}{g_{mesh}} \right) \right] \right\}^2$$

$$A_{\lambda, mesh} \cong \frac{2g_{mesh} R_{\lambda, mesh}}{u_{mesh}} \left(\frac{c}{\sigma_{mesh} \lambda} \right)^{1/2}$$

From this, one can show that in the case of visible light incident on a mesh made up of aluminum mesh, the reflectance of a mesh would be primarily a function of the mesh spacing.

$\delta = 3 \text{ nm}$ (skin depth for visible light)

For $\lambda \approx 0.5 \times 10^{-6} \text{ m}$, $\sigma_{mesh} \sim 3 \times 10^{17} \text{ s}^{-1}$,
 $c = 3 \times 10^8 \text{ ms}^{-1}$,

$$\left(\frac{c}{\sigma_{mesh} \lambda} \right)^{1/2} \approx 0.045$$

And if $a_{mesh} = 10 \text{ nm}$ and mesh spacing = 50 nm ,

$g_{mesh} = 70 \text{ nm}$ and $u_{mesh} = 8a_{mesh} = 80 \text{ nm}$.

$$\text{then, } A_{\lambda, mesh} \cong \frac{2g_{mesh} R_{\lambda, mesh}}{u_{mesh}} \left(\frac{c}{\sigma_{mesh} \lambda} \right)^{1/2}$$

$$\cong \frac{2(70)R_{\lambda, mesh}}{80} (0.045) \cong 0.079 R_{\lambda, mesh}$$

Since $R_{\lambda, mesh} \gg A_{\lambda, mesh}$, $T_{\lambda, mesh} \approx 1 - R_{\lambda, mesh}$

$$\therefore R_{\lambda, mesh} \approx 1 - \frac{4g_{mesh}^2}{\lambda^2} \left\{ \ln \left[\sin \left(\frac{\pi a_{mesh}}{g_{mesh}} \right) \right] \right\}^2$$

In other words, the reflectance of a mesh can be tuned by varying the mesh spacing or the fill factor (fraction of the mesh filled). To illustrate this, the reflectance of SWIR ($\lambda=1200\text{nm}$) off a mesh made up of 5 nm wire is computed for a range of fill factor, using the expression derived above. Figure 7 shows the reflectance as a function of fill factor.

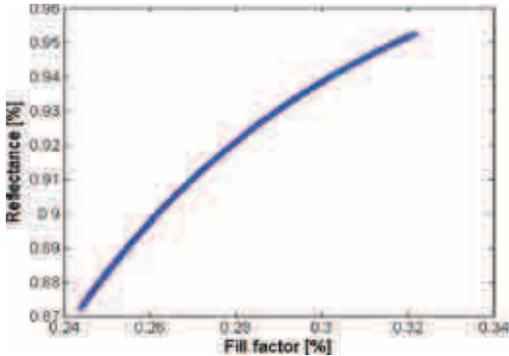


Figure 7. Reflectance as a function of Fill Factor for a 5 nm wire

The results above suggest that a viable method to maintain contrast between colour dyes is interlacing meshes of different spacing with the camouflage material with each dye.

Figure 8 shows the reflectance as a function of wavelength for 5 nm wire with 95, 70 and 50 nm mesh spacing. The average reflectance across the SWIR region is about 86.6% for the mesh with 95 nm spacing. This mesh can be interlaced with the black camouflage textile.

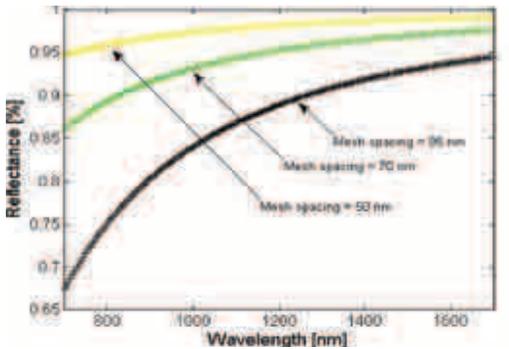


Figure 8. Reflectance as a function of wavelength for 5 nm wire with 95, 70 and 50 nm mesh spacing

When the spacing is decreased to 70 nm, the average reflectance across the SWIR region increases to about 94.3%. This mesh can be interlaced with the green camouflage textile. An average of about 8% difference in reflectance can be maintained between the green and black dye across the SWIR spectrum.

When the spacing is further decreased to 50 nm, the average reflectance across the SWIR region increases to 97.8%. This mesh can be interlaced with the khaki camouflage textile. This will maintain an average of about 4% difference in reflectance between the green and the khaki camouflage material across the SWIR spectrum.

Wavelength Tunable Fibre

The green colour in camouflage material is used to replicate positive objects such as foliage in the environment. A mesh with the correct spacing could be chosen so that the modified camouflage material has comparable average reflectance with foliage across the SWIR spectrum. However, to further mimic the environment and avoid detection by multi-spectral imagers, the modified textile will have to exhibit the characteristic decrease in reflectance associated with water.

This could be achieved by “reinforcing” the new camouflage material with wavelength tunable fibres. One such wavelength tunable fibres has been produced by the group of Yoel Fink, an Associate Professor of Materials Science & Engineering at Massachusetts Institute of Technology (MIT).⁷ Fink and his team of researchers from various departments in MIT have produced fibres that have demonstrated the

ability to be tuned to absorb radiation around a desired wavelength. This new wavelength tunable fibre is a candidate material for smart uniforms in the future. When integrated in uniforms, the fibre serves as the detector material for lasers used in free-space communication. It could potentially also be used to reinforce the green dye in the new camouflage material, to mimic the behaviour of foliage.

The optoelectronic fibre is made of a semiconductor (As-Se-Te-Sn) core contacted by metallic (Sn) electrodes and surrounded by a cylindrical-shell resonant optical cavity. When the wavelength of the incident radiation matches the resonance wavelength of the cavity, the reflectance of the fibre is reduced because the light reaches the semiconductor core. The photons incident on the semiconductor core, which acts like a photodetector, generate a photocurrent in the metallic electrodes that run along the length of the fibre. This photocurrent can be detected when the electrodes are connected to an external circuit. Figure 9 shows a scanning electron microscope image of the fibre. Figure 9a is a micrograph of the cross-section of the fibre. The bright part of the fibre is the semiconductor core with four Sn electrodes attached. Figure 9b shows the resonant cavity structure. It consists of eight pairs of As_2Se_3/PEI multi-layers,

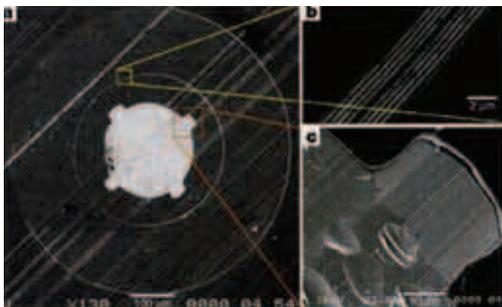


Figure 9. Scanning electron microscope image of the metal-insulator-semiconductor optoelectronic fibre.⁷ Figure 9a is a micrograph of the cross-section of the fibre. Figure 9b shows the resonant cavity structure. Figure 9c shows the intimate contact between the semiconductor core and the Sn electrodes.

with a resonant cavity in the middle. Figure 9c shows the intimate contact between the semiconductor core and the Sn electrodes.

Figure 10 shows the reflectance and the generated photocurrent for such fibres with resonant wavelengths of 1.26, 1.29 and 1.33 μm respectively.

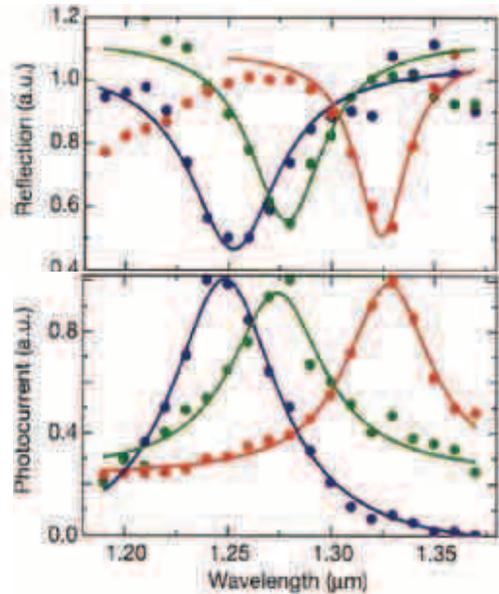


Figure 10. Reflectance measurements and photocurrents generated by fibres with resonant wavelengths of 1.26, 1.29 and 1.33 μm .⁷

The reduction in reflectance is observed over a range of wavelengths around the resonant wavelength, because the cavity resonance varies slightly with the angle of incidence of light. Therefore, the fibre originally manufactured to detect laser at specific wavelength can also be made to mimic the absorption of water if the fibre was tuned to absorb at a central wavelength of 1.4 μm .

Reflectance Measurement of Optoelectronic Fibre

This reflectance reduction around a resonant wavelength was verified in an experiment using fibres with cavity

resonance designed for the visible part of the spectrum. Figure 11 shows a photograph of a sample tunable semiconductor fibre obtained from MIT.



Figure 11. Optoelectronic fibre produced by MIT

They appear red because they have been tuned to absorb light around $0.55 \mu\text{m}$. The reflectance of the fibre in the visible and NIR spectrum is measured using a system designed to simultaneously study the reflectance characteristics and spatially image materials in the visible and SWIR spectra.

Essentially the system, as shown in Figure 12, consists of a broad band light source coupled to a monochromator to direct light at a variable wavelength onto the sample material. The reflected light from the sample material is captured using a camera that has a detection range in the visible as well as the SWIR spectrum, up to $1.7 \mu\text{m}$. The image or video captured can be displayed on the host computer via a digital image acquisition board and subsequently processed, using an image processing software and MATLAB, to determine the reflectance of the sample material as a function of wavelength.

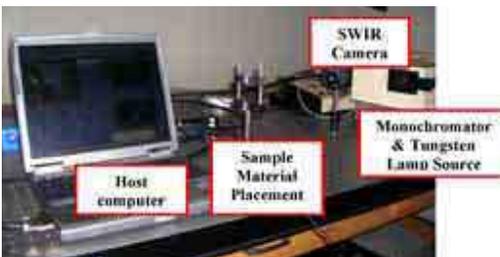


Figure 12. Optical bench with experimental apparatus

Figure 13 shows significant reduction of reflectance around the designed wavelength. The reason for the dip over a wider range of wavelengths is the wide range of angles from which light is incident on the fibre in our optical system.

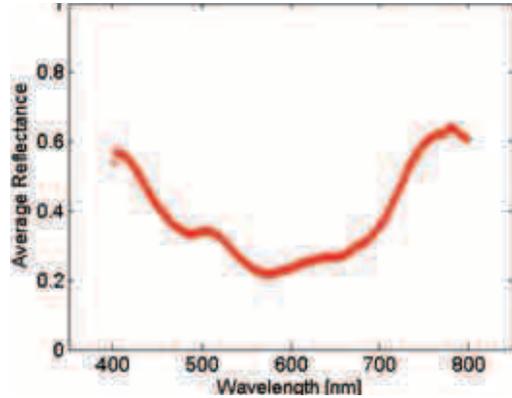


Figure 13. Reflectance measurement of the optoelectronic fibre from Figure 11

Hence the recommendation is to reinforce the new camouflage material with fibres tuned to absorb radiation around $1.4 \mu\text{m}$ region. That way, green fabric will exhibit similar reflectance as foliage across the visible and SWIR spectrum. The successful imitation of the characteristic absorption of radiation by water will deny multi-spectral imagers the ability to defeat the new camouflage material.

Conclusions

In the evolution of weapons, the invention of a sharper sword has always brought about the invention of a stronger shield.⁸ To defeat multi-spectral sensors or even image intensifiers with extended spectral response in the SWIR, effective camouflage that works in both the visible and SWIR spectrum is required. The aim of this study is to propose means to provide effective camouflage in both the spectral regions.

A material must possess two desired properties for it to provide effective camouflage in the visible as well as the SWIR spectrum. Firstly, the contrast in reflectance between each of the dyes would have to be maintained throughout the entire spectrum of interest, in order for the camouflage pattern to persist. Secondly, the average reflectance of the material should be closely matched to that of the background, in both spectral regions.

Initial studies and experimental results show that nanomeshes are suitable as complements to current camouflage materials because reflectance of meshes varies with parameters such as the mesh spacing. Thus, the overall reflectance of camouflage materials can be tuned and the contrast between different dyes can be maintained by having meshes with different reflectance interlaced with conventional camouflage textile.

To further mimic the environment and deny detection by multi-spectral sensors, it is recommended that the meshes and fabric be reinforced by wavelength tunable fibres. These fibres tuned to absorb in the region of $1.4\ \mu\text{m}$ replicate the strong water absorption, a characteristic behaviour of foliage in the SWIR.

In conclusion, it is proposed that the conventional fabric be reinforced with nanomeshes and wavelength tunable fibres, in order to defeat multi-spectral imagers by providing more effective camouflage in the visible and SWIR spectra. 

Endnotes

- ¹ Jeffery Paul, "MANTIS Program Update", Soldier Technology U.S. 2007 Conference, Jun 07.
- ² Austin Richards, "Military and Homeland Security Applications for Shortwave Infrared Imaging", Presentation to Naval Postgraduate School Physics Colloquium on 19 Jan 07.
- ³ Stephen A. Drury, *Image Interpretation in Geology*, (Oxford: Routledge, 2001).
- ⁴ Devon C. Nugent, "Analysis of Foveon Multi-spectral Images for Counter-Camouflage, Concealment and Deception Application", Thesis for Naval Postgraduate School, 2005.
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- ⁸ Trevor Nevitt Dupuy, *The Evolution of Weapons and Warfare*, (Cambridge, MA: Da Capo Press, 1990).

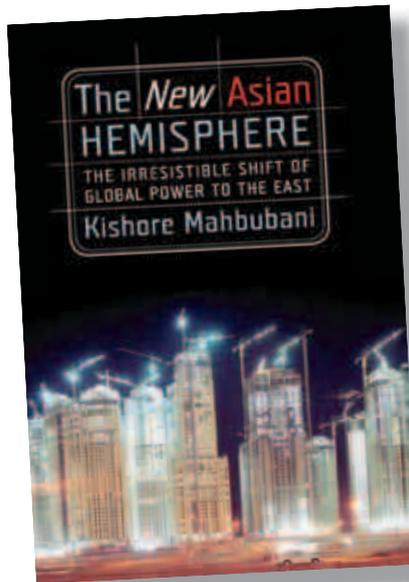


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BOOK REVIEW

The New Asian Hemisphere: Pragmatic Singaporean, Pragmatic Future World Order

by CPT Phua Chao Rong, Charles



Kishore Mahbubani,

The New Asian Hemisphere: The Irresistible Shift of Global Power to the East,
(New York: Public Affairs, 2008)

In the 21st century of seeming uncertainty, Professor Kishore Mahbubani, Dean of the Lee Kuan Yew School of Public Policy wrote a treatise on the inevitable shift of global power to Asia. *New Asian Hemisphere* is a successful yet ambitious attempt to tackle many thorny issues impeding our world's progress. Since the end of the Cold War, the Western world has feared the rise of China and India, the rapid proliferation of nuclear weapons and its

possible usage by rogue states such as Iran and North Korea. The advent of the 9/11 attacks and the US government's retaliation seems to realise Huntington's *Clash of Civilisations* thesis. The world, as a whole, laments the stalled climate change talks, crippled international legal and economic institutions/agreements. As the world becomes more wealthy in the material sense, it also becomes more susceptible to abnormal cultural (cultural imperialism), environmental

(climate changes), financial (more sudden market failures and crashes) and security (nuclear proliferation and failed states) threats.

The fundamental goal of politics – to organise in order to lead a happy life¹ – can no longer be satisfactorily answered, and we are not progressing the way we should be. As early as 1966, Martin Wight lamented “Why is there no international theory?” and attributed the poverty of progress to the international system’s anarchical nature.² Three decades later, Marysia Zalewski³ elucidated the vicious cycle of theoretical debates as a hindrance towards a good life. Without a coherent set of international theory, it is understandable why there is no coherent practical master-plan for world peace, order and progress. *New Asian Hemisphere* seeks to offer insights on global leadership based on the observations of a renown “student of history and philosophy”.⁴ Pragmatism is seen as the key thrust.

A Discourse on Pragmatism

This is a strong discourse on pragmatism to remind the US, the alleged home-ground of the Western school of pragmatism founded by William James, James Dewey et. al., to accept the inevitable rise of China and India and be pragmatic in their engagements with them. During and after the Cold War, the US seem to have forgotten its pragmatic roots and delved deeper into the abyss of ideology. The end of Cold War ushered in the contentious “End of History” but it did not make the world more peaceful

nor make the US more prosperous. Besides, the recent rise of the material West driven more by Western interests than Western values⁵, intellectual smugness⁶ and gradual reduction in their inter-“civilisational” learning is in stark contrast to philosophical West’s remarkable contributions to humanity from simple ideals of equality of man and individual dignity to modern science and technology.⁷ Therein, “the US is both a large part of the solution and a large part of the problem in our efforts to restructure the world order”.⁸ Without undermining the US’s present leadership role, *New Asian Hemisphere* seeks to remind the US that their current global leadership should not be taken for granted since leadership and power can be eroded pretty quickly after repeated instances of double standards (inconsistencies in international justice, free trade, global warning and nuclear non-proliferation)⁹ and signs of incompetence (to better engage Iran for world peace).¹⁰ This is especially so when the rising Asian powers increasingly show signs of competence and behaviours of equanimity.

Hence, this book presents an open conclusion for US policymakers – if the US can shed the ideological facade and re-adopt their tradition of pragmatism (William James et. al.)¹¹, learn and blend the worthy virtues of the East, US may well share more power gracefully with the East.¹² Or in Sun Tzu’s words, only by “knowing your enemy and knowing thyself” can the US better engage the inevitable rise of Asia. This is sincere advice from a seasoned America watcher.

A Singaporean Pragmatic Discourse

With this book, the typical balance of power strategy for small survivalist states is once again witnessed with a twist towards shaping global perception and opinion through prolific writing.

Besides, *New Asian Hemisphere* is deeply Singaporean in its seeming continuation of the Asian values debate; a debate that distinguishes Asian/Confucian (Singapore) values from “Western” values, assuming the term “Western” can be satisfactorily defined in the first place. A decade after the Asian Financial Crisis, Kishore marshals new compelling evidence to suggest that Asia has emerged stronger. Continual growth of Asia, which is fuelled by sound fundamental Asian values (“the belief in thrift, hard work, filial piety and loyalty in the extended family, and, most of all, the respect for scholarship and learning”).¹³ Key Asian countries have pragmatically adapted facets of the Seven Pillars of Western wisdom in their developmental process such as free-market economics, science and technology, meritocracy, pragmatism, culture of peace, rule of law and education¹⁴; perhaps this hybridisation may signal the rise of New Asian values of the *New Asian Hemisphere*. This said, there are reasons to believe meritocracy, pragmatism, culture of peace and education are by no means foreign to the ancient Sinic (Confucian) civilisation and the aforementioned Asian values. Furthermore, there are traditionally inherited ills of Asian societies such as

corruption, nepotism and cronyism that are still prevalent and deserve greater mention in the book. What is clear is that the “Western” wisdom and principles of democracy, rule of law and social justice¹⁵ have been pragmatically albeit creatively adapted to effectuate our successful Singapore story.

Therefore, with *Can Asians think?* recognising the differing Eastern (Asian) and Western values and being both a celebration of key Western virtues (of meritocracy) and a cautionary alarm to Westerners to transform their ways of thinking, in view of the rise of Asian economies that may surpass the US by year 2050¹⁶, and *Age of Innocence* reminding the US of their vital importance in the world and how self-confidence and trust with other global players needs to be re-built, especially after her disastrous post 9/11 pre-emptive strikes on Iraq¹⁷, *New Asian Hemisphere* can be considered Kishore’s latest pragmatic reality check on global trends, the current gaps of American global leadership and latest Singaporean discourse on Asian values. Given Kishore’s dynamic personality and profound intellect, this will definitely not be his last discourse.

Gems of Wisdom for Our SAF Officers

To our SAF Officers, *New Asian Hemisphere* reminds us of the fundamentals behind Singapore’s success and prosperity – her institutions and practices of science and technology, meritocracy, pragmatism, rule of law

and education. These produced the necessary human and social capital for Singapore to weather through the challenging global politico-economy. Defence and diplomacy remain key twin strategies in such complex uncertainty. This is where “principles, partnerships and pragmatism”¹⁸ remain as relevant to small states like Singapore as it was to historical empires such as India and China; the current American hegemon is not immune to these.

Kishore’s words of wisdom, “the motivation and capacity to learn and implement best practices from other societies/[armed forces]”¹⁹ are the most applicable advice to our SAF officers. Indeed, official defence exchanges have already been initiated by our top management and participated by officers in official capacity. But as the success story of China and India goes, it is the “mass” learning and proliferation of “foreign knowledge” that explains their phenomenal development. Likewise, it will be the initiative of each individual thinking soldier of our Learning Army (3rd Generation SAF) to learn the latest military and civilian best practices and propose, to our leadership, experimentation of the more relevant ideas. In this way, the goods and values of East-West theories and practices can be aptly blended.

Immediate products will vary from better strategic ways of handling terrorism and transforming the SAF to tactically training the ideal 3rd Generation warrior-leader-thinker SAF soldiers.

While we do not have the “civilisational” heritage to rely on to spark off any Renaissance, in the long run with more inter-“civilisational” learning, we can refine our very own Singapore way of governance, diplomacy, development and warfare. That is only possible with people – good people with inquisitive minds and indomitable learning spirits; we like to call them – the Singaporeans of the New Asian Hemisphere. 

Endnotes

- ¹ In his *Nicomachean Ethics*, Aristotle describes the happy life intended for man by nature as one lived in accordance with virtue, while in the *Politics* he describes the role that politics and the political community must play in bringing about the virtuous life in the citizenry. The *Politics* also provides analysis of the kinds of political community that existed in his time and shows where and how these cities fall short of the ideal community of virtuous citizens. Source: <http://www.iep.utm.edu/a/aris-pol.htm> accessed on 14 Apr 08.
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- ⁴ The Foreign Policy Association Medal was awarded to Kishore Mahbubani in New York in June 2004 with the following opening words in the citation: “A gifted diplomat, a student of history and philosophy, a provocative writer and an intuitive thinker”. Source: <http://www.mahbubani.net/biography.html> accessed on 02 April 2008.
- ⁵ Kishore Mahbubani, *The New Asian Hemisphere: The Irresistible Shift of Global Power to the East*, (New York: Public Affairs, 2008), pp33, 102.
- ⁶ *Ibid.*, p49.
- ⁷ *Ibid.*, p102.
- ⁸ *Ibid.*, p8.
- ⁹ *Ibid.*, pp176-204.
- ¹⁰ *Ibid.*, pp204-216.

¹¹ Ibid., pp278-9.

¹² Ibid., Cover.

¹³ Key tenets of Asian values are delineated by then Senior Minister Lee Kuan Yew. Fareed Zakaria, "Culture is Destiny; A Conversation with Lee Kuan Yew", *Foreign Affairs*, (March/April 1994). Source: <http://www.fareedzakaria.com/articles/other/culture.html> accessed on 2 Apr 08.

¹⁴ Mahbubani, *New Asian Hemisphere*, pp52-99.

¹⁵ Ibid., p236.

¹⁶ Quote from interview article with Kishore Mahbubani. Suzy Hansen, "Can Asians Think?"

¹⁷ Mahbubani, *New Asian Hemisphere*, p237.

¹⁸ Ibid., p235.

¹⁹ Ibid., p240.



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FEATURED AUTHOR

Kishore Mahbubani

Listed as one of the top 100 intellectuals in the world by *Foreign Policy* and *Prospect* magazines in Sep 05, Professor Kishore Mahbubani is an outstanding and outspoken analyst on the global geo-political arena. He has given many speeches and contributed countless articles to established magazines and institutions. His depth of knowledge and understanding on international relations sheds light on the world we live in and provides uncommon wisdom, breaking free from the Western grip on “conventional” wisdom. This ability to share new knowledge was slowly nurtured from his acceptance of the prestigious President’s Scholarship in 1967 to his chairing of the United Nations Security Council – the apogee of his 33-year career in the Singapore Foreign Service.

Mahbubani was born to two Pakistani migrants in Singapore in 1948. His Hindu parents had fled their hometown of Sindh after religious conflicts erupted from the partition of the Muslim-majority Pakistan in 1947. From his impoverished background, he went on to study at the University of Singapore (now known as the National University of Singapore) on the President’s Scholarship, graduating with a 1st Class honours degree in philosophy.



Later in 1976, he obtained a Master’s degree in philosophy and was awarded an honorary doctorate in 1995, both from Dalhousie University in Canada. In the Singapore Foreign Service, Mahbubani served as Ambassador to Cambodia (from 1973 to 1974 during the war), Malaysia and Washington D.C. He held the post of Permanent Secretary in the Foreign Ministry from 1993 to 1998. Thereafter, he was appointed Singapore’s Ambassador to the United Nations and served as President of the Security Council in Jan

01 and May 02. In recognition of his contributions, he was conferred the Public Administration Medal (Gold) by the Singapore Government in 1998. In addition, he was awarded the Foreign Policy Association Medal in New York in Jun 04, with the following opening words in his citation: “A gifted diplomat, a student of history and philosophy, a provocative writer and an intuitive thinker”.

After leaving the Foreign Service in 2004, Mahbubani took up the appointment of the inaugural Dean of the Lee Kuan Yew School of Public Policy (LKYSPP) at NUS on 16 Aug 04. He is also a Faculty Associate for the LKYSPP’s Centre on Asia and Globalisation, and continues to serve in Boards and Councils of several well-known institutions, such as the International Institute for Strategic Studies, the Asia Society’s International Council and the Yale President’s Council on International Activities.

His first book, *Can Asians Think?* (1998), raised many eyebrows when it was first published. This compact volume consists of several essays published in renowned journals such as *Foreign Affairs*, *The National Interest*, *Survival*, etc. and transcripts of speeches and lectures he gave at forums and ceremonies. His pieces, covering Asian Values, the Asia-Pacific, Southeast Asia and other points of interest, offer refreshing alternative points of view which have been lacking in the West-dominated intellectual discussions.

The lead essay, from which the book takes its name after, challenges Asians to question their position in this world.

In attempting to answer the question “Can Asians Think?”, Mahbubani puts forth the thesis, No, the anti-thesis, Yes, and the synthesis of the two, Maybe. He makes a cogent case for each of the three, dispensing freely with convincing examples and backing them up with explanations. For example, in answering no, he pointed out the stagnation of the Asian community from the 16th to 19th century, the period of Western colonisation. A relatively small nation like Portugal was able to carve out colonies of Macau, Goa and Malacca from larger civilisations. This colonisation had affected the psyche of the Asians too, as they thought of themselves inferior in comparison to their masters.¹ Even today, the author notes, some countries are still struggling to break free of this mentality. Conversely, Asians can be deemed to be able to think, as proven by the economic miracles during the Cold War. South Korea, Taiwan, Hong Kong and Singapore are all impressive examples of the perspicacious and forward-looking Asians.² As for the Maybe response, Mahbubani raises the example of the Asian financial crisis and its after-effects, the prospects of a civil war or cross-border war breaking out in Asia (as compared to the West) and the lack of social mobility in several Asian societies.³ All these point towards an Asian community which is not sufficiently ready to stand at the same level with the West. Hence, Mahbubani hopes that the essay will constantly remind Asians that there is still quite a lot of road ahead, and that they need to overcome the mammoth challenges of the past and present to catch up.

His other pieces in this book also stir much controversy. In a separate

essay titled “The West and the Rest”, he challenges the Western nations’ priority of exporting democracy without due regard to the recipient nation’s social and economic problems. Besides believing that a country had to have economic stability and development before being able to transit to a democracy, he also emphasises “good government” as the crucial ingredient in determining whether a Third World Society would progress.⁴ His last article, “The Ten Commandments for Developing Countries in the Nineties”, presents the author’s unconventional take on development. It was done in response to the West dishing out commonly-thought “correct” advice to Third World minds when in practice they did not work. The brevity of the “commandments” makes the message forceful and persuasive, and adds some humour at the same time. The book, *Can Asians Think?*, was commended by Samuel P. Huntington, author of *The Clash of Civilisations*, as “a collection of absolutely first-rate essays, elegantly written and intellectually provocative”. With the wealth of knowledge captured inside the pages, *Can Asians Think?* will certainly whip up a delightful dish of food for thought to the reader.

Mahbubani’s second publication, *Beyond the Age of Innocence: Rebuilding Trust between America and the World* (2005), details more about the relationship between America and the world. The book came about as a result of his conversations and meetings with people around the world throughout his career as a diplomat in the Singapore Foreign Service. In writing this book, he wanted to alert his American friends of the

preventable tragedy – the rest of the world is turning against America.⁵

He writes objectively about the pros and cons of American hegemony, first beginning with the former. America had accumulated large amounts of goodwill from the role it played – the bringer of hope. It ushered in the period of decolonisation after World War II and provided a new lease of life to millions subjugated by their European masters, thus ending the Age of Empires. It also supported the idea of social mobility with its concept of the “American dream”, a society based on meritocracy. However, the author states that the large reservoirs of goodwill started drying up and changing into hatred and anger without the Americans knowing. He argues that this occurrence came about from America’s bizarre behaviour as an ordinary state after the Cold War.⁶ The withdrawal, disengagement and isolation of superpower America from regions like Afghanistan, Pakistan, Thailand, Indonesia and Rwanda brought about much confusion and displeasure.⁷ The failure of the US to show benign or moral leadership when the world expected it had started to turn the tide against America.

On the whole, *Beyond the Age of Innocence* strives to explain to an American audience why their perception of how they are viewed by the world has become so out of sync with how the rest of the world sees America. John Lewis Gaddis, Robert A. Lovett Professor of History in Yale University, praises this book in which “Kishore Mahbubani establishes himself as the best interpreter of the world to

Americans – and of Americans to the world”. With personal reminiscences on the good and bad impact of American power on the world, forceful arguments and absorbing content, Mahbubani brings out the essence of his career as a diplomat in this wonderful book.

Mahbubani has indeed been brought to the fore of intellectual discourse on world affairs with his exquisite mind. His multifarious articles and essays provide a different window from which people can view the world. His style of writing is engaging as it challenges the reader to ponder upon the big questions. His ability to challenge the norms and bring across new perspectives is nothing less than extraordinary. Despite his many criticisms aimed at the West, he is still its adherent at heart and feels the West has played a tremendous part in bringing

progress and prosperity to many parts of the world. Nevertheless, he postulates the emergence of an invigorated Asia as the defining moment of the next few centuries. This phenomenon is captured aptly in his latest book, *The New Asian Hemisphere: The Irresistible Shift of Global Power to the East*, which is reviewed in the preceding article. *POINTER* is indeed honoured to do a write-up on this distinguished Singaporean, Kishore Mahbubani. 

Endnotes

- ¹ Kishore Mahbubani, *Can Asians Think?*, (Singapore, Malaysia: Times Editions Pte Ltd, 1998), p21.
- ² *Ibid.*, p22.
- ³ *Ibid.*, pp27-30.
- ⁴ *Ibid.*, pp47-48.
- ⁵ Kishore Mahbubani, *Beyond the Age of Innocence: Rebuilding Trust between America and the World*, (US: Perseus Books Group, 2005), pix.
- ⁶ *Ibid.*, p27.
- ⁷ *Ibid.*, pp29, 42, 49.

PERSONALITY PROFILE

World War I – Against the Odds **Brigadier General Bernard Freyberg**

To commemorate the 90th anniversary of Armistice Day, which ended active operations for World War One, *POINTER* is proud to present a four-part series under the theme of “Against the Odds”. Under this series of Personality Profiles, we will feature four remarkable commanders who overcame great adversity to achieve victory. For this issue, the focus is on Brigadier General Bernard Freyberg.

Introduction

New Zealander Bernard Freyberg was a soldier’s soldier, a commander who led his men from the front, a hazardous but necessary element of effective leadership in the trench warfare prevalent in World War One (WWI). He had little military training or experience before volunteering for service but soon became well-known for “conspicuous gallantry”.¹ This quality stood out best in desperate situations of which he saw many. Freyberg was in the thick of action at Gallipoli, the Somme, Passchendaele and Ballieul, amongst the bloodiest battles of the War. Courage under fire won him two Distinguished Service Orders (DSOs) and the Victoria Cross (VC), widespread fame but most importantly the heartfelt respect and admiration of his men. As the youngest British general (temporary Brigadier) of WWI, he spent just as much time recovering from serious injury as he did



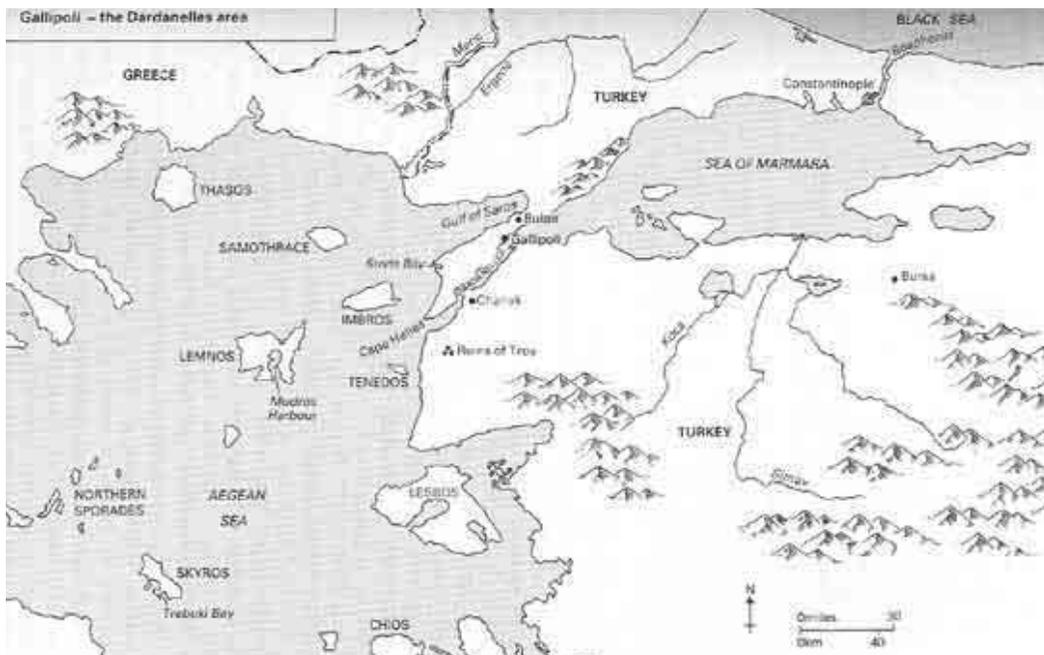
on the frontline but rarely failed to make his presence felt in a tough situation.

Background

Bernard Freyberg was a dentist, New Zealand’s swimming champion and a volunteer Second Lieutenant in a Territorial (Home Guard) unit from Wellington. He left New Zealand in search of adventure in Mar 1914, joining the Royal Naval Division (RND) as a Lieutenant after a brief stint fighting in the Mexican Civil War. The twenty-five-year-old saw his first major WWI operation at Gallipoli in 1915 where he displayed remarkable personal bravery, a trait that would colour his entire war career.

Gallipoli

Britain and France planned to knock the Turks out of WWI by capturing the narrow waters between the Mediterranean and Black Seas. This



Source: Paul Freyberg, Bernard Freyberg, VC: Soldier of Two Nations

Map 1

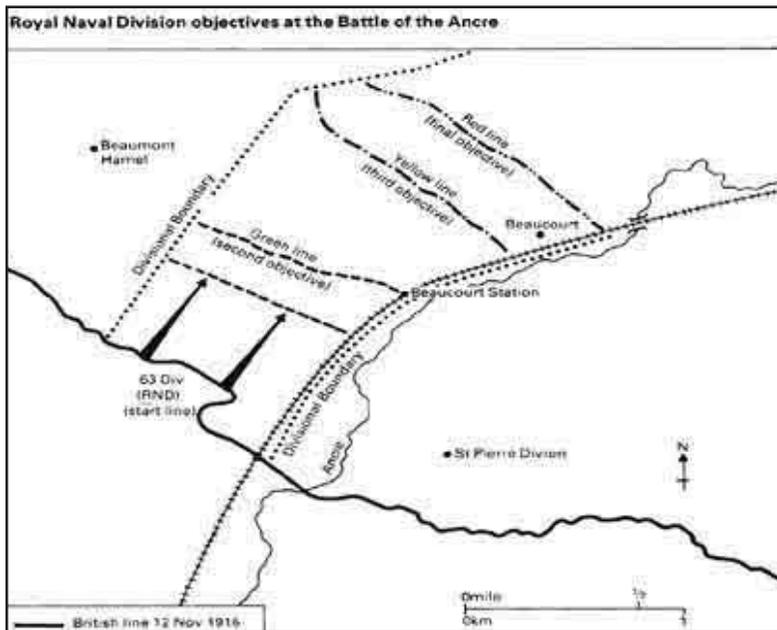
would give them direct access to the Turkish capital, Constantinople.² The RND and a large naval squadron were tasked with creating a convincing feint at Bulair, well to the north of the main invasion force (See Map 1 above). Freyberg's platoon was to infiltrate onshore and light flares to create the impression of a mass landing. Instead of risking his men who were not trained for such tasks, the New Zealander volunteered to undertake the mission alone on the strength of his swimming prowess. Swimming for an hour and fifteen minutes in icy temperatures in the dark, Freyberg went ashore and lit flares at widely dispersed locations. Though suffering from cramps, he made it back to his ship unscathed. The few Turkish defenders present sent word to Gallipoli, and their German commander, General Liman von Sanders was taken in by the diversion. Troops were drawn away from the main attack at Cape Helles and Arni Burnu (later renamed

Anzac Cove). The New Zealander won a Distinguished Service Order and the lasting admiration of his men for his daring deed.³

Unfortunately, poor planning and leadership slowed movement inland at the main landing sites. Failure to exploit the temporary Turkish dislocation gave the defenders time to bring up reinforcements and the whole operation became a battle of attrition, the kind the attackers could not win. The RND was redeployed to support this main effort and Freyberg was badly injured twice before the entire operation was called off.

The Battle of the Somme (1916)⁴

Freyberg spent several months in England recovering from complications to his wounds and rejoined his unit on the Western Front in France in 1916. The British and French initially planned to launch a combined offensive in the



Source: Paul Freyberg, Bernard Freyberg, VC: Soldier of Two Nations

Map 2

vicinity of the River Somme but the Germans pre-empted this by launching a major attack against Verdun. The Russians were also facing major setbacks on the Eastern Front at this time. The planned Somme Offensive therefore became an unsupported British attempt to draw German attention and resources away from these vulnerable theatres.

This was not going to be easy as the German defences consisted of several layers of wire obstacles, concrete bunkers and trenches heavily supported by artillery and machine-guns. German infantry also typically counter-attacked immediately and in strength to regain lost positions. British troops therefore had to carry material for fortifying defences as they charged across the battlefield, greatly slowing them down. In the last and most successful phase of the battle (Ancre, 13-15 Nov 1916), the RND was ordered to take a succession of four lines which were supported by

strong points on high ground on either side along a 1,200 yard front (see Map 2 above). Two waves were to leapfrog each other and take successive targets.⁵

Freyberg, by then a Lieutenant-Colonel, was in command of the lead Hood Battalion. Losing half his officers and men in the successful first assault, the New Zealander dug in and waited for the Drake Battalion to push through. However, this follow-on force was decimated while crossing no man's land. Without their commander, three officers and seventy men, they could not have continued the attack. Freyberg rallied both units, leading them forward to capture the Drake Battalion's objective with a fraction of the numbers envisaged. At 0645hrs, word from division HQ informed him that their left flank was uncovered by the failure of the adjacent division's attack. He was nonetheless ordered to hold his gains until nightfall when reinforcements would arrive.⁶

With too few men and an open flank, Freyberg's men sheltered in a series of artillery shell-holes instead of digging a continuous trench. German sniping made movement between them very hazardous. British 9.2-inch artillery fell short and hit their positions all day. With no communication possible with the rear, the shelling could not be lifted. As a result, Freyberg was wounded twice.

Various components of fresh units arrived at Freyberg's position after dark and the mixed force attacked Beaucourt village the next morning. The New Zealander led his men on a frontal charge to distract the Germans from the main flank assault. To his surprise the enemy surrendered en masse even though both sides were equal in numbers.

This forced the Germans to shell Freyberg's position furiously, wounding him very seriously in the neck. Although sensing death, he refused attempts to evacuate him as he was the only commander present who "knew the scheme".⁷ He made sure that runners went forward to notify his fellow commanders of a vital change in plans before stumbling back to the aid-station on a man's shoulder. Struggling to stay conscious, Freyberg informed his superior that the mixed units needed to be taken out of the line at once before he collapsed for six weeks. His condition was so bad that stretcher-bearers put him in a tent housing those not expected to live. The Official History of the Ancre battle credited Freyberg's "cool and capable leadership" for creating the initial penetration and repeatedly rallying dispersed and depleted units to renew attacks to keep it open. For his actions, he "was fitly rewarded with the Victoria Cross".⁸

The London Territorials

Soon after recovering from his near-fatal wounds, Freyberg was given command of 173 Brigade (London Territorials) of the 58 Division, becoming the youngest general in the British Army – he was twenty-eight years old. His reputation preceded his arrival and the effect on his new men was almost immediate.

*...we were very proud of our commander, a VC and the youngest Brigadier in the British Army – a handsome young man full of quiet confidence, and indeed giving us confidence too.*⁹

This was important as the brigade was constantly belittled as a sentry force. It had only been recently deployed from London to France and most of its original officers had just been rotated back to England. Freyberg knew that his first task was to instil a sense of dignity. The brigade's first action was a tough one. The general British offensive against the Hindenburg Line had failed except for the sector taken by the Australian Corps, which had endured direct fire from both flanks and artillery bombardment for nine days. 173 Brigade was ordered to relieve it and the lead battalion took 150 casualties just moving into the line. Nonetheless they held their position until they were relieved a week later. Despite heavy casualties, his unit was transformed. They had survived an ordeal that would have tested tough veterans.¹⁰

Passchendaele¹¹

Freyberg's brigade returned to assault the Hindenburg Line after nine days of rest. The New Zealander protested against the two-phased plan

envisaged as it gave the Germans ample time to reinforce an obvious weak point. The London Territorials achieved their objective but were eventually repulsed by a counter-attack. Their heavy losses seemed in vain and morale was shaken.

The brigade was relocated to Arras where it trained for an even more difficult attack at Passchendaele, an area covered with knee to waist-high mud which sucked soldiers in like ants. The Germans shelled the brigade as it assembled for attack and Freyberg was again badly injured. Yet he put on a brave face and stayed with his men to steady them, though he could only direct operations from his HQ. Nonetheless, he refused relief until the attack was pressed home. The casualty clearing station quickly evacuated him to London – shrapnel from the 5.9 inch shell had injured him in five places, including a wound through the lung and a hole the size of a fist in his thigh. The latter became septic and threatened Freyberg with amputation and death.¹² Two months later, he recovered and returned to France in early 1918, just in time to face Germany's greatest offensive since the beginning of WWI.

Bailleul

Russia succumbed to war deprivations and revolution in late 1917, just when the US joined the war on Britain and France's side. Germany quickly redeployed its eastern armies to knock the latter powers out before America could fully mobilise. The entire

Western Front threatened to collapse as German stormtroopers effected deep penetrations at several points.

Freyberg was given command of the veteran 88 Infantry Brigade. Upon being relieved after a fortnight in the trenches the unit was immediately sent to Bailleul to cover the retreat of two divisions pulling out of a salient. Expecting to be heavily outnumbered, Freyberg collected stragglers who had lost contact with their parent units and organised them into reserve companies. In confused fighting, the mixed rearguard managed to pull out and escape German encirclement, just after the divisions they were covering withdrew past their position.

While withdrawing further to the Ravelsburg Ridge, someone discovered that two injured men were left behind in haste. Brigadier Freyberg took one of them on his back and ran slowly uphill to the fresh fall-back positions despite being utterly exhausted by the time. At a briefing held later, the officers were so tired that they fell asleep at the table. Freyberg had to wake and pull each one by the hair in turn to make sure they understood their particular orders! He followed the battalion commanders to their HQs and found "colonels giving orders to snoring company commanders". All along the line the British were similarly burnt out. Fortunately, they outlasted the Germans, some of whom came forward and surrendered to the 88 Brigade.¹³ The tenacity of the British and French defences turned the tide of WWI for the last time.

Freyberg's divisional commander heaped high praise on him and the 88 Brigade for these decisive series of operations:

This Brigade... showed a gallantry and tenacity well worthy of its reputation.

Among the most notable of its exploits, were the covering of the retreat from Nieppe...the steadiness shown...when the retirement to Mont-de Lille-Crucifix Corner Line took place, and efficient assistance rendered to the hard-pressed left of the Division on the Haegerdone Line.

General Freyberg exhibited to the full those qualities of personal gallantry, energy and driving power for which he is well known throughout the army and his handling of his Brigade was beyond all praise.¹⁴

Freyberg continued to exhibit personal bravery in the closing operations of WWI, capturing the Dendre bridges in a lightning cavalry charge one minute before the Armistice came into effect at 1100hrs on the 11th of Nov. He would go on to command multinational Allied units in World War Two and become the Governor-General of New Zealand in 1946.

Conclusion

The British Army did not develop tactics to overcome the supremacy of defensive fire-power until the very last months of WWI. In the interim, they depended much on the gallantry of individual units and commanders who created opportunities on the toughest battlefields out of sheer tenacity. Bernard Freyberg exemplified the special kind of leader who could inspire his men to endure the unendurable. "He never talked down to them and didn't expect

them to talk up to him...They were proud of him and more than proud to call themselves 'Freyberg's men'."¹⁵ The New Zealander understood that the conditions prevailing required him to show, not tell his men, what true courage was. It is hard to imagine a more demanding calling. Bernard Freyberg might have fought in a time and place no longer familiar to us, but the qualities he exhibited will always be welcome and essential in a tight spot. 🇺🇲

Endnotes

- ¹ Commodore Backhouse, Character Reference for Commander Bernard Freyberg. Freyberg Papers as quoted in Paul Freyberg, *Bernard Freyberg, VC: Soldier of Two Nations* (London: Hodder and Stoughton, 1991), p76.
- ² Gallipoli, a key point along the narrow straits became the accepted name for this theatre of operations. See <http://www.firstworldwar.com/battles/gf.htm>, web version accessed 21 Oct 08 for succinct descriptions of various battles fought here.
- ³ Freyberg, *Bernard Freyberg*, pp54-74. One of the men in his platoon wrote in his diary "Only a superman could have survived so long in that icy-cold sea."
- ⁴ See <http://www.firstworldwar.com/battles/somme.htm>, web version accessed 21 Oct 08 for a brief account.
- ⁵ Wilfrid Miles, *History of the Great War Based on Official Documents: Military Operations – France and Belgium 1916 2nd July 1916 to the End of the Battle of the Somme*, (London: Imperial War Museum, 1992), p486.
- ⁶ *Ibid.*, p487.
- ⁷ Freyberg, *Bernard Freyberg*, pp91-2.
- ⁸ Miles, *History of the Great War: France and Belgium 1916*, pp488-506. The London Gazette also featured Freyberg's achievement on 15 December 1916. See Freyberg, *Bernard Freyberg*, pp95-6.
- ⁹ Charles Howard to Freyberg, 16 September 1960. Freyberg Papers as quoted in Freyberg, *Bernard Freyberg*, pp103-4.
- ¹⁰ Freyberg, *Bernard Freyberg*, p107.
- ¹¹ For a general description of this series of battles (also known as Third Ypres), see <http://www.firstworldwar.com/battles/ypres3.htm>, web version accessed 21 Oct 08.
- ¹² Freyberg, *Bernard Freyberg*, pp107-14.
- ¹³ *Ibid.*, pp122-9.
- ¹⁴ Memorandum by General Nicholson, GOC 34 Division. Freyberg Papers as quoted in Freyberg, *Bernard Freyberg*, p114.
- ¹⁵ Chief Petty Officer Tobin. Freyberg Papers as quoted in Freyberg, *Bernard Freyberg*, p96.

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