



C4I Asia Conference 2008 Keynote Address

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Good afternoon, Distinguished Guests, Ladies and Gentlemen.

Welcome to C4I Asia Conference 2008 and for all who are visiting, let me extend a warm welcome to Singapore. It is a great privilege to have in our audience the Chiefs of Defence of Malaysia and New Zealand, and many other prominent personalities from leading military organisations and defence industries who are joining the conference his afternoon.

Let me also thank our distinguished speakers Maj Gen Michael Moore, Chief of Development from the Swedish Armed Forces; Mr John Grimes, Asst Secretary of Defense for Networks and Information Integration and Chief Information Officer of the US Department of Defense; Dr Thomas Killion, Deputy Asst of the Army for Research and Technology and Chief Scientist in the Department of Army, US; Dr Roger Lough, Chief Defence Scientist from the Defence Science and Technology Organisation of Australia; Dr Sivathanu Pillai, Distinguished Scientist and Chief Controller for Research and Development from the Ministry of Defence India; RADM Ophir Shoham, Commander of the Israeli Defence Force C4I Technology Division; and Prof Lui Pao Chuen, Chief Defence Scientist in the Ministry of Defence Singapore. We look forward to hearing their insights and perspectives on this year's conference theme of "Agile C4I".

In a new and complex security environment, modern military forces have to be adept and effective in a wider spectrum of operations, ranging from high intensity operations to safeguard national security and sovereignty, through to missions such as counter-terrorism, humanitarian assistance and disaster relief, maritime security, peace support operations and even containment of infectious diseases. In all of these areas, we expect that advances in C4I technology will have a profound impact on the shape and structure of military forces, as well as the doctrine and tactics in the concept of operations.

So it is that many armed forces around the world have in recent years been developing their concepts for force transformation based on the promise and potential of communications and information technology. Known variously as Network Centric Warfare in the US, Network-Enabled Capability in the UK, Network-Enabled Defence in Sweden, and Integrated Knowledge-based Command and Control or IKC2 here in Singapore, while the names may be different, the concepts share a common goal. That goal is to harness the power of networks and C4I to enable our armed forces to become more agile, flexible, integrated and capable in the conduct of operations across

this wide spectrum from troubled peace to high intensity conflict. Fundamentally, C4I enhances military operations in three aspects:

The first is in effective command and control and decision-making. With digital communications and networks, the transfer and promulgation of information across the battlespace can be achieved more precisely, more cogently and more speedily. Greater flexibility can be derived in the command and control arrangements, affording more options and agility for forces to be configured for their missions. The shorter time needed to pass and process information also enables a higher rate and faster tempo of operations. And greater situation awareness and an enhanced capacity to fuse and process data helps to improve the quality of decision making.

Secondly, information networks help to create a knowledge-based environment for commanders to have a better sense of the battlespace and to enhance his or her decision-making capability. Some of the basic questions concerning location and status of own and enemy forces can be answered and organised more quickly, comprehensively and coherently. Command and staff time and energy can then be focused on other vital tasks. Easy access to knowledge repositories can help to create a stronger learning environment for force protection and combat effectiveness.

And thirdly, the power of networks can be harnessed to enable a systems approach to operations. Cross domain connectivities and "virtual closeness" enable the dispersal of forces so that they are less vulnerable. At the same time, previously separate entities and platforms can now be better synergised to inter-operate as an integrated system of systems to bring about the full weight of force, fire or information to bear on a target or objective. These targets can be acquired and engaged via multiple means, attacked at multiple points simultaneously and in a multitude of ways.

Let me take a few minutes to update you on how these ideas and application of IKC2 in Singapore have progressed since this was articulated at the first C4I Asia Conference in 2002. Efforts in transforming to a 3rd Generation SAF are well underway. We started the journey first by creating capacity for change and allowing space for new developmental ideas and operational concepts to be mooted and tested. A Centre for Military Experimentation, and the soon-to-be-established Innovation Hub, are facilities for us to try out and prove the potential of advanced concepts and cutting-edge technology. Precision weapons, unmanned systems and urban fighting capabilities were identified as the key growth areas for the future, with IKC2 as the key enabler.

Our vision is for the SAF to grow as one networked, integrated, cohesive and synergistic armed force. Having steadily built up the foundational pillars in the Army, Navy and Air Force through the first 2 generations of the SAF, spanning 4 decades, the next step is to focus our efforts beyond simply modernising platforms and capabilities along Service lines, but towards stronger substantive cooperation and mutual interdependence across the Joint Staff and Services.

Last year, the vision of One SAF was articulated, with three key thrusts identified to guide the development towards the next generation SAF. Conveniently, using the acronym O-N-E, the first thrust - with O - is to Operationalize through spiral development the first baseline for the 3rd Generation SAF. This first thrust covers capability development, operational concept formulation and organisational restructuring. From concept demonstration to capability development, we carved out more clearly a community of defence technologists and operational planners across different domains in the Joint Staff and Services to form a Capability Development Hub, that would focus all force development programmes in an integrated and synchronised way towards realising the first milestone spiral of the 3rd Generation SAF. In a couple of years, a system of systems that would

have a meaningful integrated slice of C4ISR, precision fires and unmanned capabilities would be operationalised to add to the current operational baseline. A high level C4ISR Steering Committee helps to harness the collective energies of the Joint Staff and Services, the SAF C4 community, our Defence Science and Technology Agency (DSTA) and Defence Science Organisation (DSO), as well as our defence industry collaborators. It is supported by a team of operators and engineers who map out and system-architect the desired integration and agility requirements of the 3rd Generation SAF, develop the network architecture, and establish the governance and protocols for the entire capability.

In tandem with this, new operating processes and procedures are being established and validated in order that the full potential of a network-enabled capability can be exploited. In every area and functional competency, existing work flows and business rules are being challenged to see if a more efficient and effective system and structure can be derived. With C4 as the enabler, new more matrixed structures have been constructed at the Joint and Services levels, hubbing across functional lines to forge a stronger integrated and networked orientation. At the SAF level, the previously more linear functional departments have now morphed into multi-disciplinary hubs responsible collectively for the dual outcomes of Operations and Capability Development. Correspondingly, in the Army, Air Force and Navy headquarters, hubbing arrangements are also being formed, presenting a clearer alignment of resources to the desired mission outcomes for each of the Services. More importantly, the organisational restructuring has created communities of practice beyond Service colours and functional lines so that knowledge created can be shared more extensively in the interests of stronger interoperability and integration. Some examples of this effort are in the Island Defence headquarters which bring together assets and entities across the SAF and home front agencies; in air-land integration for combined arms and targeting operations, in networked air defence that employs a system of systems approach to Singapore's air defences; and in the Changi C2 Centre that will house the Singapore Maritime Security Centre, an Information Fusion Centre and a Multinational Operations and Exercises Centre that helps promote interoperability and enhance regional capacity in meeting common security challenges and contingencies.

It would be an understatement to say that dealing with these hardware and system changes is a massive effort. But an equally important and challenging aspect of the transformation is in the software and heartware aspects of change - the second and third thrusts of N and E: Nurturing our People so that they keep up with the new systems and technologies; and Engaging their hearts and minds towards the changes and challenges ahead. At the core of the transformation is the quality of our people. We therefore need to train and educate our people well and develop the potential in each individual and team, preparing them not just for the present but more importantly for future needs and challenges. Soldiers, airmen and sailors themselves need to be agile, in order to level up to the new competencies and skill-sets required to maximise the full value of C4I technology. In this regard, C4I technology and application courses have been incorporated at various stages of the servicemen's career so that they can be continually updated on the latest technology trends, and their relevant context and application to military operations.

To truly achieve organisational transformation will however require new mindsets and attitudes towards the new operating environment. Otherwise the new technologies would simply be automating what used to be more manual and linear processes. A new generation capability must clearly come about with the associated new generation thinking. How do we encourage an innovative and collaborative mindset, how do we develop our people to think critically and act in an integrated way, how do we foster the necessary open learning culture? These will take time. A new discipline will need to be found that allows networks and hubs to operate seamlessly within a

military hierarchy that must still be in place in order that decisions and actions are taken in an organised and coherent way. New attitudes about leadership, and the values in command and control will need to evolve alongside traditional ones.

In conclusion, C4I is a critically important force enabler and multiplier for military forces. In the SAF, IKC2 has been moved to the centre of our 3rd generation transformation efforts. It is not something that can be left to system engineers and C4 specialists to deal with on their own. The commander needs to take personal and professional interest because C4I is at the heart of military operations. But C4I is obviously not an end in itself. It is the means by which mission success can be achieved with greater force effectiveness, higher economy of effort, and wider flexibility in choosing and configuring forces at the right time and place for the best effect. The key is in building that agility, so that our armed forces can be ready and responsive to the fast evolving nature of threats in an uncertain security environment.

I wish all of you a good conference.