

E D I T O R I A L



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Into its sixth edition this year, DSTA Horizons is a testament to the persevering spirit of knowledge sharing in our defence community. I am very heartened to report that this edition drew a bumper crop of submissions, presenting the Editorial Board with a pleasant but difficult task in deciding on the final line-up of articles.

DSTA Horizons brings together a selection of DSTA's innovative solutions and applications in the various disciplines of defence science technology. The diverse range of topics in every edition is a reflection of the multi-faceted capabilities of our defence ecosystem.

To be at the forefront of defence technology, the Singapore Armed Forces (SAF) must continue in the pursuit of breakthroughs and innovation. More than half of this year's articles detail the exploration of alternative methods and solutions to support the SAF in its development and evolution. Many of these ideas, still in the initial stages of experimentation and research, have shown promising results.

Progressing from traditional mission planning and evaluation tools, an alternative method to facilitate decision making in today's fast-paced and dynamic battlefields is discussed in the article 'Rapid Simulation-based Evaluation of Operational Plans'. The authors recount their positive research findings and the plans to enhance the system further for local needs.

The maintenance of Third Generation Integrated Knowledge-based Command and Control systems in an increasingly complex networked environment is a growing challenge. The article, 'End-to-End Integrated Systems Management Tools', seeks to address this issue with the proposed implementation of an automated configuration management tool suite and database to boost productivity and competency development, as well as optimise resources.

Clear and objective cost estimation is crucial in the long-term budgeting and decision-making process of defence acquisition and development projects. The article 'Estimation Model for Integrated Logistics Support Cost and Annual Recurrent Expenditure in C3 Projects' provides a model for planners to carry out cost estimates as percentages of their capital investment cost.

Similarly, on the topic of cost management, the article entitled 'Performance-Based Logistics' proposes a potential weapon support strategy to reduce Operations and Support costs for the SAF. This method employs long-term contractor logistics support with payment tied to performance metrics, rather than to services and materials.

Safe separation distances between military explosive facilities and inhabited buildings are known as quantity distance (QD) criteria. QD criteria depend on the quantity and hazard division of

explosives. The article 'Risk Benchmarks for the Siting of Military Explosive Facilities' suggests complementing the QD approach with Quantitative Risk Assessment which considers the likelihood of an accident based on the type of activity, the number of people involved and the building structures.

Capability development in the various Services and platforms is essential as the SAF progresses in its transformation into a Third Generation fighting force. Two articles this year focus on the development of naval and land platforms. In 'Submarine Rescue Capability and its Challenges', the authors detail the acquisition of the submarine rescue service by the Republic of Singapore Navy (RSN) in 2007. This locally based solution ensures self-sufficiency and swift response to enhance the rescue capability of the RSN. In 'Fighting Vehicle Technology', the traditional design considerations of armoured fighting vehicles (AFV) – lethality, survivability and mobility – are discussed. The authors also highlight how human factors engineering and avionics play a significant role in the development of next-generation AFVs that have to operate on a networked battlefield.

Organisations too need to be continually transformed to remain efficient and responsive to rapid changes in the business environment. Two articles address the transformation on the Corporate IT (CIT) front. 'Driving Business Transformation through a Process-centric Approach' is an account of the enterprise-wide Business Transformation Initiative undertaken by the Ministry of Defence CIT community in 2008 to provide business owners with the expertise and support to improve business efficiency. The article elaborates on the key concepts and enablers that drive business transformation, as well as the key technology that capitalises on business process models for faster and more agile IT systems implementation.

Within DSTA, Business Analysis (BA) was identified as a core competency for the DSTA Enterprise IT Programme Centre (EIT PC) to better support the MINDEF CIT business beyond the provision of technical solutions and project delivery. The article 'Setting up a Business Analysis Centre of Excellence in EIT PC' details the build-up of BA competency in the EIT PC, the lessons learnt as well as the framework for setting up these BA initiatives.

In the domain of radar applications, authors of 'Ducting Phenomena and their Impact on a Pulse Doppler Radar' took an investigative approach to conduct a comparison study of the ducting phenomena between two locations, Singapore and Ajaccio, over a one-year period. The impact of the phenomenon on the detection sensitivity of a pulse doppler radar under tropical, humid conditions is contrasted with that of a dry, temperate environment, and illustrated by the research findings.

A guiding framework serves as a basis for the development, integration and harmonisation of complex system of systems. This edition features a theoretical piece on the Systems Engineering methodology adopted by DSTA in the development of Command, Control, Communications, Computers and Intelligence (C4I) systems. The article, 'Architecting C4I Systems', details the processes and the architecture principles behind the integration of all C4I systems.

This issue has been made possible only with the authors' contributions and dedication. I would like to extend my appreciation to all the authors for their submissions, as well as to the community which, with their encouraging feedback, has spurred us on to improve the publication with each edition. We hope DSTA Horizons continues to inspire a vibrant culture of learning and growth and to serve as a valuable channel for knowledge sharing with all members of the defence community.