

# EDITORIAL



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Now into its ninth issue, DSTA Horizons which started as a channel for knowledge sharing within the defence community has also served us well as a repository of our stock of intellectual capital and accumulated knowledge. We are heartened that this technical journal has been accepted into the Institution of Engineering and Technology's Inspec<sup>1</sup> database, an information resource for scientists and engineers.

In this issue of DSTA Horizons, we feature a selection of 13 articles chosen for their breadth and depth in their respective disciplines. With the Singapore Armed Forces' (SAF) spectrum of missions broadening and growing in complexity, their requirements for technological solutions in recent years have also changed significantly. The articles are thus a reflection of the level of insights and innovations that DSTA develops today to support the Ministry of Defence (MINDEF) and the SAF.

Six of these articles best exemplify the sharing of insights. Through case studies on Enterprise Architecture, 'Business Architecting – The Journey Towards Process Excellence' examines the Business Architecting approach and its utility in managing the intricacies of business processes in MINDEF and the SAF; while 'Development of Enterprise GIS for Defence' looks at geospatial information and illustrates how this vital information can be managed and shared among many users through a coherent enterprise

Geographical Information System. 'Lessons Learnt from Managing Acquisition of Pre-Owned Naval Platforms' tackles some of the common issues in managing pre-owned military platforms, offers insights into the challenges and attempts to 'tune' the robust acquisition framework practised in DSTA. 'Managing Shock Requirements of Shipboard Equipment' takes a closer look at shock specifications, requirements and management, as well as key considerations for shock design and common international standards on shock specifications and qualifications.

'Assessment of ARINC 653 and Its Potential Applicability in RSAF Context' presents the Avionic Application Software Standard Interface, evaluates the characteristics of the specification and how they can possibly be adopted in the Republic of Singapore Air Force (RSAF) to ease the testing effort arising from software changes; while 'Interoperable Open Architecture for Land Platforms' raises considerations and challenges in examining a potential shift to a more scalable, flexible and open architecture for the next-generation land vehicles.

Anchored on innovations, the other articles discuss new methods and techniques our engineers developed in the course of delivering capabilities. By proactively developing new modelling and simulation tools for analytical studies as well as frameworks and methodologies to enable systematic

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<sup>1</sup> The Institution of Engineering and Technology, one of the world's leading professional societies for the engineering and technology community with more than 150,000 members in 127 countries, runs the Inspec database which contains over 14 million bibliographic and indexed records to articles, conference proceedings, books, reports, dissertations, and scientific videos in the fields of electrical engineering and electronics, computers and control, information technology, physics, and mechanical and production engineering.

study of complex System-of-Systems (SoS) architecture, DSTA's competency spectrum has also widened.

In particular, 'Framework for Managing System-of-Systems Illities' is a pioneering body of work done by Systems Architects from 2012 to 2013. Using a comprehensive framework, it conceptualises the 'relationship' and 'hierarchy' of key SoS illities and suggests how they can be measured. This significantly aids decision makers and analysts in developing insights into the myriad of SoS quality attributes. Another article 'Optimising Complex Networked Systems Availability' looks at how the new Optimised Decisions in Networks tool equips DSTA, MINDEF and the SAF with the ability to simulate networked system elements and optimise resource allocation. These two efforts exemplify how our Systems Engineering Analysts and Systems Architects push the envelope, develop and integrate useful tools for advanced studies in complex SoS design and resource optimisation.

Separately, 'On-Site Radar Performance Verification Testing' sets out to determine the methodology to derive the number of trials required for verifying a specific radar performance parameter during on-site radar testing. The systematic and rigorous approach outlined promotes dialogue between operators and radar programme managers in establishing the sensible number of sorties for on-site radar performance acceptance testing.

Additionally, 'Tradespace Exploration for Military Simulations' presents new methods to enhance the use of

simulation to evaluate systems and operations, achieved by leveraging an advanced level of automation and customisation, and encapsulated in a software simulation tool; while in 'Modelling the Debris Throw from a Reinforced Concrete Ammunition Storage Magazine', DSTA engineers discuss a predictive model that outlines the stages involved in the event of an explosion resulting in debris throw, thereby enhancing our understanding of the phenomenon.

Finally, 'Enhancing Network Resiliency – Innovative Exploitation of FabricPath Switching Technology' explores how a team of DSTA engineers improved resiliency of enterprise networks through creative lateral thinking and innovative adoption of existing technology developed for data centres; and 'Human Computer Cooperation in Environmental Scanning' shares how the collaborative power of humans and machines can be harnessed to make sense of copious amounts of data. By leveraging state-of-the-art software and algorithms to retrieve information from the web and deliver interactive visualisations, analysts can now conduct environmental scanning and analysis more effectively and efficiently.

We hope that our readers will be enriched by the insights and innovative engineering work shared by the authors in this issue of DSTA Horizons. We would like to thank all the authors and the reviewers for their dedication and effort. We welcome participation from all who are inspired to further enrich our community with ideas, insights and contributions. Thank you.