

EDITORIAL



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Today, the technological landscape is transforming at breakneck speed. It presents many challenges to those who wish to maintain the status quo but also ample opportunities for creative minds to innovate and change. It is amid this rapidly changing environment that DSTA has evolved continually to provide leading-edge solutions for the Ministry of Defence and the Singapore Armed Forces (SAF). The twelfth edition of DSTA Horizons thus features 12 articles that have been carefully curated to present our work in developing new competencies and improving on existing solutions across multiple disciplines to do things more effectively, efficiently and creatively.

‘Design and Validating the Optimised Manning Concept for Littoral Mission Vessel’ explores DSTA’s adoption of a two-phase approach comprising cognitive analysis as well as modelling and simulation to design and validate the optimised manning concept for a new fleet of Littoral Mission Vessels. This breakthrough methodology of designing for support generated important insights for DSTA and offers an innovative solution to overcoming the SAF’s perennial manpower constraints. In **‘A Multi-Perspective Hazard Identification Approach for Complex System-of-Systems’**, the use of multiple perspectives and analysis techniques is proposed to identify emergent hazards in System-of-Systems (SoS). With its application validated in a networked air defence system, this approach provides a more structured and broad framework for the identification of emergent SoS hazards and represents DSTA’s leading efforts in ensuring that the SoS delivered to the SAF is safe to operate.

DSTA is always striving to enhance its operations by spearheading transformative initiatives to exploit the non-obvious potential of technologies. **‘Transforming Facilities Management with Information Technology’** describes DSTA’s move to augment the governance and efficiency of Facilities Management (FM) with the incorporation of IT. It also examines how the organisation is tapping Internet-of-Things and big data technologies to change the way FM operations are conducted for the SAF. **‘Leveraging Education Technologies – DSTA Academy Learning Management System’** outlines the way DSTA Academy is harnessing education technologies and collaborative tools such as the Learning Management System to facilitate engaging and effective knowledge transfer. As a result, course participants benefit from a more meaningful and interactive learning experience, while course managers are able to better manage their lessons. **‘Smart IT Development: Faster, Better, Cheaper’** aims to address the expectations and challenges that arise from the delivery of IT with the implementation of the Smart IT Development initiative. The initiative introduces three key enablers for faster, simpler and more agile system delivery to keep up with business changes. The trend of utilising smart technologies and approaches continues in **‘Common Operating Environment – The Journey of Smart IT Interoperability for Enterprise’**. The article traces DSTA’s journey in managing and shaping the Common Operating Environment through automation, smart optimisation and a service-centric operations model.

‘A Robust Email System – Architecting a Highly Available and Secure Email System’ illustrates the key considerations of designing a robust enterprise email system that ensures smooth and continuous business operations by achieving high availability, as well as designing for sustainment and security. **‘Enhancing Maritime Security through Data Analytics’** delves into the development and key concepts of the National Maritime Security System. Employing data analytics, the sensemaking system leverages and integrates disparate data from various agencies to detect and identify potential maritime threats more effectively. Using a past helicopter upgrade programme as a case study, **‘Radio Frequency Mapping: An Adaptive Approach to Mitigate SATCOM-Radar Warning Receiver Electromagnetic Interference’** touches on the efforts of a DSTA team in overcoming interference issues associated with radar warning receivers and satellite communications, while **‘Finding Balance in Protective Design’** details how adopting a radically different perspective and approach to protective infrastructure design may be key to creating buildings that meet both peacetime and wartime needs.

‘Analysis of Weapon Danger Area on Fire Support for Flanking Troops’ introduces the concept of Weapon Danger Areas, along with their corresponding applications and characteristics related to the provision of fire support for flanking troops. In doing so, the article provides deeper insights into achieving realistic, effective and safe live-firing

training. **‘Towards Cost-Effective Reliability Verification in Defence Acquisition’** looks at the reasons behind the high cost of system reliability verification, taking into account the motives and issues faced by both defence customers and contractors. It goes a step further by offering a solution to manage the high cost by implementing an alternative reliability verification approach for defence acquisitions.

Through these articles, we hope that readers will be able to learn more about the various fields of defence technology that DSTA is involved in and thus gain a better understanding of the organisation’s contributions to the defence and security of Singapore. We would also like to express our appreciation to the authors for their hard work and dedication. Moving forward, it is our wish that DSTA Horizons will continue to enrich our readers through the sharing of various domain knowledge and engineering innovations. Thank you.