

E D I T O R I A L



Pang Chung Khiang
Editor, DSTA Horizons
Director (DSTA College)

DSTA Horizons has gained recognition as a reputable technical journal with growing interest and encouraging feedback received over the past six years. It has also become an established journal for DSTA engineers to showcase and share the work that they have done. I am proud to present you with the seventh issue.

In the seventh issue, 12 articles were selected with the intention to include a wide spectrum of the audiences in our defence ecosystem. These topics cover engineering innovations, new initiatives and research, as well as introductory topics.

Six articles in this issue present leading-edge technological solutions and frameworks which were developed in response to challenges faced by the defence community. Some of these projects are still in the developmental stage, while others have been implemented and have become success stories today.

As the Singapore Armed Forces (SAF) transforms into a Third Generation fighting force, evaluating highly interconnected and interdependent systems becomes a necessity. 'Using Analytic Hierarchy Process (AHP) with Operations Analysis (OA) in Project Evaluation' illustrates the use of AHP with the OA methodology to meet the rigours of evaluating complex defence applications. The article also cites the successful adoption of AHP to various national non-defence related projects.

With increasing complex interactions between various systems, a more encompassing methodology is also required in the field of Guided Weapon and Armament (GWA). Safety can and has to be managed in the implementation of programmes. 'System Safety in GWA Applications' describes how the principles of System Safety have been implemented successfully to deliver safer systems to the SAF.

Planning for the future in an increasingly unpredictable environment requires more than traditional forecasting techniques. To better support analysts in anticipating emerging strategic issues, a cognitive-based system was developed at 'The Risk Assessment and Horizon Scanning Experimentation Centre'. The article traces the development of the system and also describes the challenges and the innovative solutions undertaken.

The pitfalls associated with relying on technology to solve problems in human performance have sparked interest in using a multi-disciplinary human-centred approach to design and evaluate complex socio-technical systems. The team demonstrated the efficacy of 'A Cognitive Systems Engineering Approach to Developing Command and Control Systems' through a cognitive system prototype for human controllers working in the airport traffic control tower.

To keep Generation Y soldiers who are technologically savvy engaged, a paradigm shift is required in the way SAF teaches and trainees learn. 'Enabling Army Learning Transformation

through Infocomm Technology' explains how social and rich media applications are employed for learning in the SAF. The article also illustrates how Content Distribution Network technology is deployed to overcome the challenge of delivering rich media content over a limited-bandwidth environment.

There are increasing demands within the defence ecosystem to be productive on the go, but achieving Enterprise Mobility for security-conscious organisations like DSTA is challenging. To achieve 'Secure Mobility for the Enterprise' and enable access to business applications on non-camera mobile devices, several key challenges are involved. The article explains how the solution needs to balance user expectations, security requirements and the capability of current technologies.

Two articles in this issue show how comparative analysis and technology adaptation can lead to fresh perspectives and new ideas. First, 'A Comparative Analysis of Radar and Sonar Principles' explores the similarities between the two extensively used sensor systems so as to exploit synergistic overlaps in their applications and technologies. Second, 'Effects of Degree of Saturation on Ground Shock' re-examines existing guidelines on ground shock loading. The article provides an insight into developing technologies for the mitigation of ground shock effects on underground structures in Singapore, which experiences high temperatures and abundant rainfall throughout the year.

The remaining four articles are introductory papers to various topics. We have endeavoured not to be extensive but to be holistic, by combining our knowledge gained from literature reviews and our experiences working with the Ministry of Defence and the SAF. It is our hope that this knowledge shared will be useful and applicable to others in the defence community.

Capability development has been identified as the key objective of defence technology investments. The team proposed 'A Capability Development Framework for Defence Technology Investments' and illustrated this framework through historical examples of early defence technological innovation, and contemporary examples from DSTA.

Armament, protection and speed are key considerations for surface warships. Submarines need to achieve these requirements and fulfil even more challenging demands for stealth, range and adaptability, while controlling their cost and size. 'Introduction to Submarine Design' presents four innovative solutions to meet these critical requirements.

The network-centric battlefield today has to cope with unreliable connectivity, limited bandwidth and latency issues due to the tactical operating environment. 'Designing Tactical Networks – Perspectives from a Practitioner' serves as a guide for the design and configuration of tactical networks – proposing best practices for implementation and highlighting potential challenges of adaptation for application.

Data centres house the most valuable assets of organisations and they require large investments. Organisations have to draw from industry best practices and customise the data centre strategy according to their own business requirements and constraints. 'Planning and Designing Data Centres' gives an overview of some of the design considerations and implementation approaches for data centres.

This issue is a testament to the diverse capabilities and expertise that reside within the defence community. I would like to express my sincere appreciation to all the authors for coming forward with their contributions. I am confident that with such dedication, DSTA Horizons will continue to be a valuable channel for knowledge sharing.