

# EDITORIAL



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It is undeniable that the increasing rate of change in technology has compounded the evolving complex security challenges faced by the Ministry of Defence and the Singapore Armed Forces. This development in recent years created what I would call a ‘problem-rich’ environment for DSTA engineers. This unique circumstance however also presented opportunities for us to develop innovative and impactful technology enabled capabilities. Today, artificial intelligence and data analytics play an increasingly important role in uncovering insights to aid in processes and decision-making. Hence it is timely that the thirteenth edition of DSTA Horizons features 10 articles that share how new ideas and tools are applied – some tapping big data – to improve existing systems and create new capabilities, as well as DSTA’s contributions towards and beyond the nation’s defence.

‘**Enterprise Data Analytics**’ highlights DSTA’s initiative to create an environment to support projects that leverage data analytics capabilities by putting in place three key enablers – data, technology and people – via the Enterprise Data Analytics Platform. ‘**Smart Diagnostic Tool for Complex System-of-Systems**’ details the innovative development of a tool with centralised monitoring, root cause analysis, impact analysis and self-learning fault prediction to

maximise the Republic of Singapore Air Force’s Island Air Defence capabilities. It discusses the background for the need, methodologies used, and its potential adaptability for future System-of-Systems.

‘**A Systems Engineering Approach for Solving the Train Signal Interference Problem**’ captures how DSTA’s experienced engineers apply the systems approach to determine the root cause of the signal interference that troubled our train operator in late 2016. The multi-disciplinary team led by DSTA, comprising diverse subject matter experts from several organisations, was able to solve the puzzle of emergency breaks in trains in an automated and driverless rapid transit line system in Singapore.

‘**Application of Data Visualisation in the Study of Ammunition Performance**’ outlines how data visualisation can be a useful tool to allow better understanding of projectiles’ performance as they age. It also touches on factors affecting projectile performance and shares the applicable lessons learnt. ‘**Application of Hybrid Generator System in a Smart Grid**’ examines how the introduction of a smart Energy Storage System can potentially unlock the reserve capacity of diesel generators and lead to a more reliable military microgrid.

Beyond big data, DSTA continues to demonstrate engineering expertise in various domains. Through **‘Planning and Development of Redeployable Widespan Tension Fabric Structure Simulator Building’**, the article offers insights into DSTA’s innovation journey in delivering a non-conventional building solution through the adoption of a Tension Fabric Structure for the Republic of Singapore Navy’s simulator building. Closer to home, **‘DSTA Integrated Complex’** explains how user-centricity guided the design and development of the complex, and also illustrates the usage of technology and innovation as a key enabler to provide optimised building performance and sustainability.

**‘Architecting the NS Portal for Excellent User Experience’** describes the approach and considerations taken for the revamp of the NS Portal with a focus on enhanced user experience and ease of integration with new technologies. Learning points for subsequent user experience-related projects are also identified in the article.

**‘Approach to Deliver a Safe Type 218SG Submarine’** sheds light on the adoption of a system safety approach for the engineering management of the Type 218SG submarine project to provide maximum assurance of its safety. It

discusses the background of the submarine’s design, the various approaches taken during the design, testing and delivery phase as well as the safety assurance structure in place during the Operations and Support phase for a safe and capable Type 218SG submarine. Focusing on the roles and capabilities of radar, **‘Evolution of Radar Technologies and Capabilities in the SAF – Past, Present and Future’** delves deeper into the evolution of radars driven by the unique demands and challenges that Singapore faces. The article also looks at how evolving radar technology trends will affect the next generation of radar development.

We hope readers find this volume of DSTA Horizons interesting and informative. The compilation of articles reflects the passion of authors and reviewers inspired to share deep insights into their endeavours. We would like to thank all of them for their contribution and dedication, and to encourage many more to come forth to continue this culture of learning and sharing in the community and beyond.