

FOREWORD

Internationally, 1972 will be remembered as the year when then US President Richard Nixon made his historic trip to China. The same year, he also signed the Anti-Ballistic Missile (ABM) treaty with the Soviet Union to limit their respective numbers of nuclear missiles. These were watershed events that were to have significant repercussions on global geopolitics in later years.

Regionally, the Vietnam War was still raging. Peace talks between the Americans and the North Vietnamese were faltering.

At home, it was the first year when Singapore took full responsibility for its own defence. The British military withdrawal from all its bases “East of Suez”, announced in 1968, came into effect in December 1971.

Strategically, the withdrawal created a security vacuum in Singapore, which the fledgling Singapore Armed Forces (SAF) struggled to fill.

Economically, it was a blow as British military expenditure had accounted for some 20 per cent of Singapore’s GDP. Intensive efforts were made by the Singapore Government to attract foreign investments and create employment to fill the economic vacuum, and ensure our economic survival.

In the shadow of these strategic shifts in global geopolitics, coupled with the bleak security and economic backdrop at home, laboured Dr Goh Keng Swee, then Minister for Defence and architect of modern Singapore.

It was in 1972 that he spawned yet another of his innovative, nation-building ideas – to establish a local defence science research and development (R&D) capability.

Singapore’s small size and limited resources, Dr Goh believed, made her vulnerable. The only viable defence strategy was to leverage on science and technology as a force-multiplier.

Though most of what the SAF needed in its early years were available in the open market, Dr Goh saw that there would be certain sensitive and critical-edge technologies that would never be for sale.

Such were the higher strategic considerations that prompted Dr Goh to establish a local R&D capability; to create indigenous know-how in defence science and technology.

It was a bold move, and given Singapore’s practice of importing technologies and systems from abroad then – completely against the grain.

Thus was born what we now call the DSO National Laboratories – or “DSO” in short. Our staff strength of 3 at birth has grown more than 300-fold in 3 decades to 1,000 strong today. It is now Singapore’s premier and most established R&D laboratory.

Over the last few months, we have interviewed the pioneers of DSO and sought the perspectives of those in the Ministry of Defence (MINDEF) and the SAF who had influenced DSO’s development over the years. Their thoughts and words have been collected and preserved in this book.

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Warfare is the most unstructured field in human affairs. It is natural and inevitable that it draws on the most advanced technologies available to the protagonists... But, because of higher strategic considerations, states often invest in science and technology for reasons that are not economic or academic, even though, in the long term, there might be economic benefits.”

BG (NS) George Yeo,
Singapore’s Minister for Trade and Industry,
at the 1st German-Asian Young Leaders’ Forum Dinner, 11th May 2002

It is the story of how the seeds sown by Dr Goh in 1972 have matured into a national treasure. DSO is a trove of technological knowledge and know-how, dedicated to creating the *technology edge* for Singapore’s security.

As someone who has been in DSO for more than twenty years, I have learnt much from the insights and perspectives of our interviewees. We are deeply indebted to them for providing us invaluable information that has filled a vacuum about DSO’s early heritage.

In a sense, this book is more than the story of a national institution. It reflects the rich diversity of perspectives on defence science and technology in the Singapore landscape. In each excerpt lie gems of wisdom, management and science, polished by the rich and diverse experiences of our interviewees. They give us a rare, personal view of an entirely home-grown, Singaporean-built organisation.

The *raison d’être* of DSO is to create technological surprises to sharpen the cutting edge of our national security. It is thus inevitable that many of our accomplishments and capabilities cannot be spoken out loud. Herein lies the paradox of defence R&D – the more critical our achievements, the more covert they must remain!

Some of the things we did more than twenty years ago still cannot be revealed. Over the years, however, we have begun to adopt a more open profile. In line with this, we take the opportunity to share with you, a selection of our R&D capabilities in this book, to provide you a glimpse of the journey we took to build up each of them over the years. These complement the various interviews which focus more on the genesis and evolution of DSO and our relationship with our stakeholders.

Even then, words can never fully paint the emotional tapestry of each capability journey, such as the disappointment of failure, the anxiety of flight testings, the joy of discovery, the jubilation of success, the power of shared vision, and the teamwork and trust engendered through shared experiences.

In collecting and collating materials for this book, we are constantly inspired by the strength of the DSO spirit and the strong emotional bonds,

forged through our three decades of history, which link each and every member of the DSO team, past and present.

Given the constraints of space and security, our main regret is that we are unable to include everything that we have collected in this one book. Despite that, we hope that this collection helps to unravel some of our mystery to give you a sense of DSO’s distinctiveness and capabilities. We also hope that it contributes in a modest way to the history of Singapore.

This book is a tribute to our founder Dr Goh Keng Swee and to the many unsung and unassuming DSO heroes. These men and women have created many significant capabilities over the last thirty years of DSO’s history. These capabilities have contributed to the professionalism and respect that the SAF enjoys today.

DSO staff and management, past, present and in the future, can take pride in DSO’s achievements over the last three decades. We hope that this collection will inspire current and future generations of DSO staff to have even bolder R&D dreams to further sharpen the *technology edge* that our predecessors have created.

We are indebted to Melanie Chew and Bernard Tan for agreeing to be the co-authors of this book. For them to have fathomed the intriguing world of defence science and to have successfully navigated the jungle of technical jargon and MINDEF/SAF acronyms to bring you this book is no mean feat in itself. We are also very grateful to the DSO Book Editorial Committee for the endless hours they have spent in the making of this book. Last but not least, we would also like to thank the many people who have contributed materials to make this book possible.

With this book, we have taken another step to demystify DSO. If what you discover in this book delights you as much as would the discovery of a pearl upon opening up an oyster, it will have served its purpose well. Have an enjoyable read!

Quek Tong Boon
Chief Executive Officer
DSO National Laboratories
August 2002