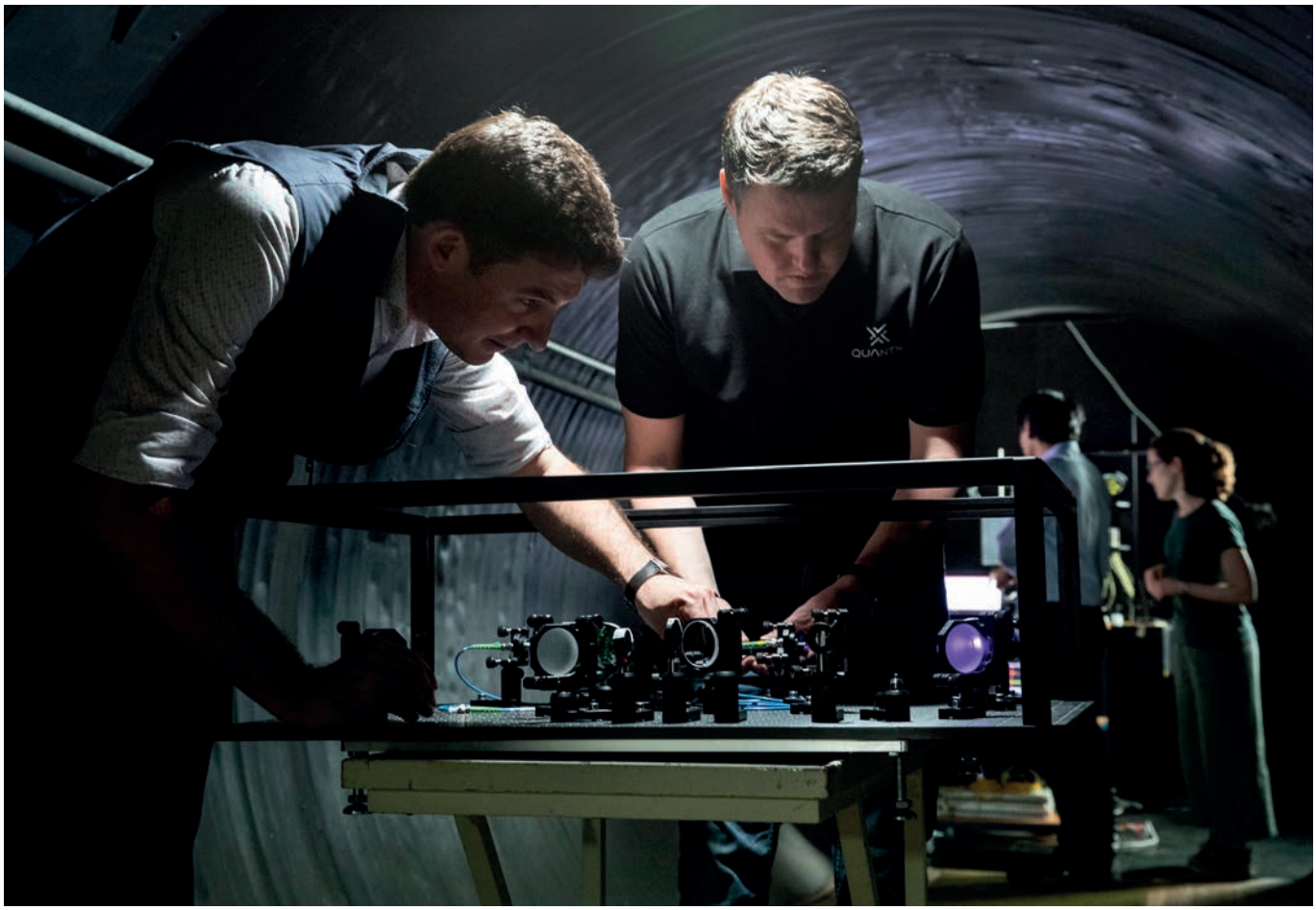

QUANTX

DEFENCE TRAILBLAZER – NURTURING INNOVATION

The Defence Trailblazer is sponsoring research into innovation and commercialisation that might have an effect across more than just the Defence sector.

GREGOR FERGUSON | SYDNEY

FUNDED by the Department of Education this research is designed to benefit all six of the Trailblazers set up to kick-start Australian research in key parts of the national economy.

It's a common criticism that Australia does great research and then is awful at commercialising it – but it's true. By every measure Australia does outstanding research in just about every field but, measured against other members of the Organisation for Economic Cooperation and Development (OECD), it fails to make much, if any, economic benefit rom this research excellence.

PROGRAM GENESIS

So, when the federal Department of Education set up its $370 million Trailblazer Universities Program in 2022, it deliberately set it up so that the six lead universities would also become leaders in research commercialisation.

The Trailblazer Universities Program addressed feedback to an earlier public consultation on university research commercialisation. This highlighted the importance of strengthening capability at the institutional level as well as emphasising key barriers to collaboration and commercialisation, and proposed solutions such as more effective IP arrangements and greater incentives for academics and institutions to translate and commercialise research.

One result of this consultation was Australia's Economic Accelerator (AEA); another was the National Industry PhD Program, which sought to match PhD students and

graduates with industrial partners needing specialist researchers. And a third was the Trailblazer program.

One of the six Trailblazers is, of course, the Defence Trailblazer for Concept to Sovereign Capability, or DTB, which combines researchers from the University of Adelaide and UNSW and, now, more than 100 industry partners. In 2024 the DTB funded an embedded team of six researchers from the University of Adelaide and UNSW, led by Adelaide's Professor Ralf Zurbruegg, tasked with completing a real-time evaluation of commercialisation outcomes, rather than a retrospective study on what worked and what didn't at the end of the program.

The other members of the team are Dr Tracey Dodd, Dr George Mihaylov and Dr Chanvi Singh of the University of Adelaide, and Associate Professor Daniel Prior and Dr Gamithri Karunasena of UNSW Sydney.

DEFENCE TRAILBLAZER

The DTB is unique in sponsoring this research. One of the aims of the study is to develop an evaluation framework for the DTB, with potential to extend that framework to the other five Trailblazers: the space industry iLAuNCH Trailblazer at the University of Southern Queensland, the REACH recycling and clean energy commercialisation hub which is led by Deakin University, the Resources Technology and Critical Minerals Trailblazer led by Curtin University, the Food and Beverage Trailblazer led by the University of Queensland, and the Trailblazer for Recycling and Clean Energy led by UNSW.

The research team is applying a Program Logic methodology to develop actionable recommendations in real time for DTB enhancement and sustainability. They aim to assess the effectiveness of the DTB in fostering University-Industry collaborations; evaluate the DTB initiative's impact on cultural reform within the universities; and analyse the DTB's influence on Intellectual Property (IP) and commercialisation outcomes.

The DTB has six separate industry programs, depending on the technology concerned and the specific needs of the industry partner. For example, it is enabling research by the Toll Group on the use of mixed-reality simulations for ADF and civilian training; with Adelaide startup QuantX on the commercialisation of quantum clock and sensing technologies; and with Sydney-based Uncrewed Surface Vessel (USV) manufacturer Ocius Technology on scaling-up the production of renewably powered USVs.

The only problem is that, having received $50 million each in 2022 (with another $45 million for access to use CSIRO's test and prototyping equipment), the Trailblazers are all due to 'retire' by 2027 – the Trailblazer program itself is currently scheduled to shut down in 2026. The Executive Director of the Defence Trailblazer, Dr Sanjay Mazumdar, has been working on a stakeholder engagement plan for the 'post-Trailblazer' environment, of which more below.

The bottom line according to Associate Professor Daniel Prior of UNSW, is that the research's preliminary findings show that Defence Trailblazer has been successful in bringing industry and university representatives together, while also contributing hundreds of millions of dollars in indirect value to the Australian economy.

"Research reveals that DTB has been most effective in facilitating direct connections between defence industry and university researchers, creating pathways that bypass traditional bureaucratic barriers," Prior said.

"IT'S A COMMON CRITICISM THAT AUSTRALIA DOES GREAT RESEARCH AND THEN IS AWFUL AT COMMERCIALISING IT – BUT IT'S TRUE"

According to the researchers, industry partners consistently value DTB's role in providing access to specialised academic expertise and university research capabilities that are often difficult to access through conventional channels.

BRIDGING THE GAP

The DTB functions most effectively as a 'bridge' and broker between the academic and industry sectors, rather than as a system transformer. This has important implications for the design of Australia's future defence innovation ecosystem.

"Our project aims to evaluate the effectiveness of the Defence Trailblazer as an agent for change," Prior adds. "The team's research has led to the development of an evaluation framework that allows us to plot context, resources, actions, outcomes achieved so far and to understand the likely impacts in the longer term."

Dr Chanvi Singh, a Research Fellow at the University of Adelaide, points out that the University has a 150-year history, highlighting some of the challenges that any short-term funding program would face in attempting significant cultural change. The team will deliver its final report in June 2026, she says, but she points to some other initial findings.

DEFENCE

MAIN: Adelaide startup QuantX is part of the DTB, on the commercialisation of quantum clock and sensing technologies

RIGHT: Sydney-based Ocius Technology is working on scaling-up the production of renewably powered USVs

Academic incentive systems remain misaligned with industry collaboration goals, she says: the academic calendar and focus simply don't match industry's calendar and focus, resulting in career risks for university researchers who prioritise defence industry engagement over traditional academic KPIs.

"These systematic issues require sustained attention to achieve the cultural transformation necessary for long-term defence innovation success," she says.

However, understanding these impediments has helped the DTB make strong progress in technology development and commercialisation. Not only are multiple defence-relevant technologies now advancing along the Technical Readiness Level (TRL) scale, but many of the industry partners are also returning to work on additional projects. That signals genuine value creation and suggests that sustainable collaboration patterns are emerging, she says.

LOOMING PRECIPICE

It's indicative of the timescales involved in technology development that the four-year life of the Trailblazer program isn't quite enough to complete commercialisation of all DTB's technology development programs, and this fact has shaped the research by Professor Zurbruegg's team. However, several technology trials are under way with industry partners which means that DTB activities won't end until 2027.

Importantly, says Dr Singh, another of the findings is that both program staff and external participants expressed a strong desire for the DTB to continue beyond the current funding cycle, recognising the critical role such facilitation plays in Australia's defence innovation ecosystem.

"THESE SYSTEMATIC ISSUES REQUIRE SUSTAINED ATTENTION TO ACHIEVE THE CULTURAL TRANSFORMATION NECESSARY FOR LONG-TERM DEFENCE INNOVATION SUCCESS"

The creation of a robust and sustainable defence industry sector that can be a pillar of the wider national economy is now part of defence industry policy. Similarly, most of the AUKUS Pillar II and Defence's own technology priorities – hypersonics, quantum technology, directed energy, information warfare, trusted autonomy, electronic warfare, and advanced cyber capabilities – are generating interest in Australia's defence innovation ecosystem.

The challenge, post-June next year, will be to transition successful elements of the DTB into sustainable institutional practices that can maintain research momentum in these areas while addressing the deeper structural barriers to university-defence industry collaboration.

Dr Sanjay Mazumdar says that the heads of each of the Trailblazers are looking at Concept 2.0 when the Trailblazer program ends. Obviously, he is hoping for a simple continuation of funding, given the Trailblazer program has received some very positive feedback in the current Department of Industry, Science and Resources' (DISR) strategic examination of Australian R&D which is being chaired by Robyn Denholm, the Chair of Tesla.

TOLL GROUP

Preliminary findings from the strategic examination include lots of positive messaging about the Trailblazer program generally; and lots of support for a simple continuation of this program by the Department of Education.

Meanwhile Dr Mazumdar has also been developing a stakeholder engagement strategy for the final quarter of this year and the first quarter of next, leading up to the 2026-27 budget in May which could be an opportunity for the government to approve continuation funding for the Trailblazers, but may also result in zero funding.

DELIVERING THE PROMISE

The fact that the Trailblazer program is a co-contribution scheme where the universities and industry partners also put their own money at risk is important, he says: of 100 defence industry participants, he points out, some 90 per cent of them are SMEs, but they still put cash on the table and they're still coming back for more projects. That's proof, Mazumdar says, that the DTB is delivering on its promise.

The DTB has a lot of support from CASG and Defence's leadership. Mazumdar's core message to Defence, ASCA and CASG is that the DTB is aligning technologies and products with the needs of Defence and so de-risking much capability development, which gives Australia's defence innovation ecosystem a much better chance than before of delivering useable capability, and quickly.

That de-risking also hasn't gone unnoticed in the private and Venture Capital (VC) communities, Mazumdar points out: a process that makes companies more attuned to their market, in this case defence, and which makes the companies more defence-ready is valuable to them and, by extension, to the entire industry ecosystem.

The bottom line, he says, is that there is nothing like the Defence Trailblazer in the defence innovation ecosystem; continued funding and creating a commercialisation framework that makes that ecosystem work more effectively and efficiently, is long overdue. ■

ABOVE: Toll Group is working on the use of mixed-reality simulations for ADF and civilian training