



A NEW HOPE

Arnab Basu considers ways in which ARIA will benefit the UK – and what makes it distinctive

Britain needs to be “match-fit for a more competitive world” said Boris Johnson following publication of the Integrated Review of Security, Defence Development and Foreign Policy in March. The country had to be willing to change its approach and adapt to “a new world emerging around us”. The Prime Minister’s comments reflected wider perceptions of a more perilous landscape at home and abroad. In the February edition of *Intersec* Jules Werner of QinetiQ outlined the increasing complexity of the security and defence threats to the UK and the democratic world. And amid the turmoil, it makes sense the Government should see science

and technology – and new ways of facilitating it – as one of the key solutions to evolving threats ranging from security and terrorism to climate change and pandemics. In addition, Britain, particularly, faces new economic challenges and opportunities from its recent departure from the EU. Science and tech may well be a game-changer in the global dog fight of 21st Century economic competition as well as a source of cooperation.

A new Bill to create the Advanced Research and Invention Agency (ARIA) was introduced to Parliament in March. A potentially pivotal step in establishing the UK as a front runner in scientific and technological innovation, the plans were afoot for some time. In 2019 in its briefings



ARIA unlocks new ways to tackle a range of security issues while invigorating UK industry

for the Queen's Speech, the Government declared a new approach for long-term funding to support visionary high-risk, high pay-off scientific, engineering and technology ideas to complement the country's existing world-class research system. Then, in the July 2020 R&D Roadmap, it put its money where its mouth was, pledging £800 million to develop an independent body focusing on high-level research. ARIA was born.

The new agency will fund, commission and conduct research in core sectors including defence and security. It will identify and support transformational areas of research, empowering some of the world's most exceptional scientists and researchers. ARIA is expected to be fully operational by 2022. But what makes it distinct from research agencies that are currently active and how might it operate?

Existing infrastructure already supports basic and applied research in the sciences and technology. Innovate UK, for example, a non-departmental public body, has invested £2.5 billion since 2007 to aid business and research collaborations, accelerate innovation and drive business investment into R&D. However, existing agencies' speed and responsiveness is often compromised by bureaucratic and other institutional constraints. Such constraints can

restrict the ability of agencies to quickly and responsively invest in creation of cutting-edge military, commercial and civil products. What sets ARIA apart from pre-existing agencies is its flexibility and, arguably, tolerance of failure as an essential part of technological discovery. It will be equipped with unprecedented powers to develop ambitious research at previously unseen speeds. Matching this, is an innovative funding approach – including seed grants and prize incentives – and the ability to start and stop projects based on success.

“To rise to the challenges of the 21st century we need to equip our R&D community with a new scientific engine – one that embraces the idea that truly great successes come from taking great leaps into the unknown,” said Science and Innovation Minister Amanda Solloway prior to the Bill's introduction.

ARIA IS PIVOTAL IN ESTABLISHING THE UK AS A FRONT RUNNER IN SCIENTIFIC INNOVATION

ARIA is broadly but explicitly modelled on the US DARPA project, which has driven military capabilities and security innovations since the Cold War. This was originally founded by Eisenhower in the Fifties as the Advanced Research Projects Agency (ARPA) after the Soviet launch of Sputnik. The technological sophistication of the launch in 1957 took the West by surprise. Following this momentous event, ARPA orchestrated competing American missile and space projects, allowing the US to catch up and get ahead in the space race. Though the US agency was created specifically to enable research with potential military applications, many of ARPA/DARPA's projects have also had great influence in the civilian sphere. For example, DARPA could be described as the father of Silicon Valley for its work provided the basis for the modern internet. For over 60 years since its foundation, DARPA has worked with innovators and manufacturers inside and outside government. Fruits include ground-breaking military advances – precision weapons, research on antiballistic missiles, nuclear test detection, radar, high-energy beams, computer science and advanced materials. Projects on 'stealth' compounds have rendered US F-22 fighters and B-2 bombers 'invisible' to enemy radar. New battlefield sensors, blue-green lasers and non-acoustic submarine detection are also among its achievements.

Importantly, DARPA comprises experts at the top of their fields in both academia and industry, who are looking to push the limits of their discipline. They generally serve the agency for only three to five years, fuelling a unique urgency to achieve success in less time. ARIA is expected to emulate key features of the US model including significant autonomy for its project managers and the tolerance for failure in pursuit of transformational defence. Crucially, ARIA will not be subject to Public Contract Regulations or the Freedom of Information Act. This will drastically reduce time spent processing FOI requests and protect Britain's competitive advantage, while allowing the agency to run an extremely lean and agile operating mode. Recognising high-risk research requires patience. The ARIA Bill confers the

necessary long-term security, with a 10-year grace period before ARIA's potential dissolution can be triggered.

Ramping up national security has been a key component of the UK Government's agenda in recent times in response to organised crime and evolving terrorism. It recently announced some £340 million towards further enhancing the UK's nuclear detection capability over the next five years. In November 2020, the PM declared the largest military investment in 30 years. ARIA therefore seems the next logical step as the UK bolsters its defence prowess.

But leanness alone will not guarantee success. If it is to closely resemble DARPA, the agency must also foster dynamic relationships between various players and businesses within the security and defence sectors, developing and exploiting the results of their research.

British-based Kromek has worked with DARPA for many years and so appreciates first-hand the value of such an agency. The company's high-performance security screening and nuclear radiation detection equipment is deployed in 25 countries including the US. The nuclear detection products it develops and supplies have been integrated by DARPA for use by the US Department of Defense. One of Kromek's radiation detection solutions currently protects critical infrastructure in New York, and the company is collaborating with DARPA on a system to detect viruses, including SARS-CoV-2, in open spaces.

Naturally, Kromek welcomes introduction of the ARIA Bill and believes freeing the agency from administrative constraints such as FOI requests will enable concentration of resources into streamlining transformation projects, bolstering Britain's competitive advantage.

Paul Howell MP for Sedgefield told Parliament: "Innovation-led funding that accepts a higher risk can be the key that opens scientific advances quicker. It also provides better opportunities for such companies to develop production and supply chains in the UK."

ARIA is not the first agency to model itself on DARPA. Germany's Federal Agency for Disruptive

Innovation known as SPRIN-D was created in 2019 to discover highly innovative research projects, support their development and help them break into the market. SPRIN-D has a budget of approximately \$1 billion to 2029 and is designed to allow innovative entrepreneurs to advance ideas with as much flexibility as possible. Similarly, Japan's Moonshot R&D programme collaborates across various governmental departments and with academia and industry to develop scientific solutions for a plethora of needs such as sustainable care systems for major diseases and sustainable global food supply.

With ARIA support and funding, stories like Kromek's could become commonplace in the UK, generating job opportunities and addressing the specific needs of the UK's security and research and development landscape. An agency actively looking to collaborate with industry leaders regionally would also fulfil the Government's levelling up agenda and help stop the brain drain, Paul Howell said.

However, despite ARIA's flexibility, it will still have administrative and legal obligations. ARIA will be required to proactively share information on its activities. It will also be subject to the usual National Audit Office oversight of public bodies and Parliament will scrutinise its annual report. Furthermore, the Business Secretary will have power to intervene in the interests of national security, including directing the agency to cease collaboration with hostile actors or end a particular programme.

By greenlighting ARIA, the UK Government has made a clear move to align itself with other world nations that currently deploy DARPA-inspired agencies like Germany and Japan. The initiative will open the door to partnerships with multiple government department customers, unlocking new ways to tackle a range of security and societal problems while invigorating UK industry. Most of all, it will cement the United Kingdom as a scientific and technological powerhouse in the wake of Brexit and the COVID-19 pandemic ●

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Kromek's bio-threat detector developed under a DARPA project



Picture credit: Kromek Group plc