



Engineering solutions for a
secure and sustainable future

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FRAZER-NASH
CONSULTANCY
— A KBR COMPANY —

We believe in creating a secure and sustainable future.

Frazer-Nash is a technology and engineering consultancy. We work in some of the most sensitive, critical and highly regulated sectors including nuclear energy, aerospace, transportation and defence.

Our customers trust us to provide impartial advice addressing their most complex challenges and to deliver integrated solutions that meet their needs.

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Our Values

Frazer-Nash is a leading systems, engineering and technology company. A KBR Company, we help organisations deliver innovative engineering and technology solutions to make lives safe, secure, sustainable, and affordable.

With over 1,500 employees, we work from a network of fifteen UK locations. Our people apply their expertise to develop, enhance and protect our clients' critical assets, systems and processes.

We value our people

Our people are the heart of everything we do. We are dedicated to creating diverse and inclusive work environments in which every member of our team of teams feels safe, supported, respected, trusted and valued, and where each person is given opportunities to grow and reach their full potential.

We are people of integrity

We are people of character, who value honesty, trust, courage, fairness, prudence and tenacity. We believe that doing what's right for the planet, the communities where we live and work, and our people is good for our business. We will not sacrifice our integrity.

We are a team of teams

We have a will to succeed, individually and as a company, but we value the achievements of our team of teams over our individual accomplishments. Our collective focus powers our operational excellence, fuels our passion for delivering for our customers, and makes us a better, stronger, more effective and efficient company. We are ONE KBR.

We deliver

We are our clients' trusted partner. We are uncompromising in our commitment to deliver innovative, high-quality, technology-led solutions for them, and exceptional, sustainable value for all our stakeholders, underpinned by strong commercial and operational discipline.

We empower

We empower all our people with a shared purpose, the right tools and the supportive culture they need to be proactive, to be adaptive to change and to succeed. We trust them to be independent decision-makers who aren't afraid to meet any challenge head-on and who proudly own their work.

Frazer-Nash Consultancy and NATO

Frazer-Nash collaborates with NATO in multiple fora, to address NATO's high-priority technology challenges:

- Multi-national research tasks under the NATO Science & Technology Organisation's Technical Panels
- NATO Industry symposiums hosted by the Conference of NATO Armaments Directors
- Chaired the NATO Architecture Framework Working Group.



Space

We implement solutions and deliver research and advisory services for **Space Domain Awareness** and space related **Intelligence, Surveillance and Reconnaissance**. In addition to our commercial offerings, our staff hold UK Government advisory roles, including to the House of Commons Defence Select Committee.

Case Study - Space Domain Awareness:

Iron Stallion® is a fully automated web-based tool for Space Traffic Management. It shows the Pattern of Life of individual satellites by using real-time data from multiple sources and astrodynamics algorithms. Frazer-Nash is **supporting UK Space Command** in the use of Iron Stallion® by the Joint Task Force – Space Defence Commercial Operations Cell. Our staff work alongside uniformed personnel and colleagues from our parent company, KBR.

Case Study - Data Fusion for Space ISR:

Applying our expertise in data fusion, image processing and machine learning, we investigated new ways of fusing data from satellite-based sensors.



Autonomy

We develop **integrated** and **assured** autonomous solutions for defence and security applications across the full range of Technology Readiness Levels.

Case Study - Medical Evacuation:

The customer wanted to understand how humans could team with current and emerging robotics and autonomous systems for Medical Evacuation (Medevac). Working as part of a multi-industry team, Frazer-Nash developed a range of potential concepts covering the end-to-end Medevac process and produced **technology roadmaps** highlighting key areas for future development.



Case Study - Counter Fast Inshore Attack Craft:

We demonstrated, in field conditions, the rapid training and deployment of machine learning models for object tracking on a UAV platforms ('AI at the edge'). We went from **concept to trial in 9 months**, helping the customer explore the concepts, characterise performance and better understand the problem space in a real-world setting.



Drone image by Corporal Nathan Tanuku, UK MOD © Crown copyright 2023.
Peregrine Rotary Wing UAV image by Lt Cdr Fraser Simon, UK MOD © Crown copyright 2024.
Aircraft carrier image by LPhot Finn Stainer- Hutchins, UK MOD © Crown copyright 2024.

Artificial Intelligence

With expertise in AI, cloud computing, data and software engineering, we deliver cutting-edge **research and build AI solutions** for our clients, helping them make data-driven decisions and stay ahead in a rapidly evolving technological landscape.

Case Study - Automated Technology Horizon Scanning:

To address the increasing amount of research published each year, we applied AI to the task of technology horizon scanning. We delivered a cloud-based tool that supports users in the identification of new and emergent research, themes, trends, and topics based on scientific literature.

Case Study - Digital Customer Friend:

We acted as a 'digital customer friend' for developing a multi-national system that brought together information sources and AI agents. We helped the client to better understand, document and prioritise their requirements, acting as an interface between the end-user, developers, and sponsors.

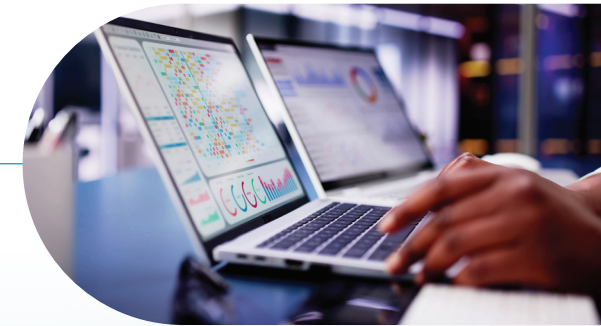
Case Study - AI and Autonomy for Intelligence, Surveillance and Reconnaissance:

Frazer-Nash is working with the customer as part of a joint government-industry team, delivering a multi-year, multi-million-pound research programme applying AI and Autonomy to the Intelligence, Surveillance and Reconnaissance Enterprise.

Case Study - AI Safety, Critical System Design and Assurance:

With the potential benefits of AI, our defence customers want to understand how to make it safe, assured and ethical. Given our track-record in engineering integrated systems for some of the most sensitive industries, we were able to **apply this experience to AI**. Examples of our work in this area include:

- Developing a Generic Safety Argument Structure for the assurance of autonomous systems that use machine learning
- Identification of safety and security related challenges presented by machine learning on autonomous platforms
- Developing good practise for autonomous component integration
- Develop a framework to assist legal advisors understand the technical aspects of autonomous and artificial intelligence-based systems



Sustainability

In defence, we look at sustainability from all angles. From developing methods to dispose of ammunition, to designing more sustainable materials and energy systems for demanding defence applications. Outside of defence, our work is wide-ranging and analogous to defence needs. From **reducing our clients' exposure to climate related risks, defining decarbonisation strategies, to engineering consultancy on sustainable energy projects.** Our hands-on, cross-sector, multidisciplinary approach truly distinguishes us when addressing this highly complex domain.

Case Study - Ammunition Disposal:

We investigated how NATO nations can improve disposal of Weapons, Ordnance, Munitions and Explosives to move towards Net Zero targets and comply with regulations. We generated a roadmap to Net Zero 2050 and **identified science-backed actions** to make disposal activities more sustainable.



Spent ammunition image by SAC Phil Major, RAF, UK MOD © Crown copyright



Case Study - Sustainable Materials:

Sustainability of materials has a range of dimensions – it is not simply about environmental concerns. We developed a materials management plan, including risk assessment and mitigations, for the **full life cycle** of a large strategic military platform. This involved identifying materials which would be difficult to source due to a range of practical and political variables including geopolitical risk, rate of production, lack of substitutes, infrastructure availability and industry stability.

Case Study - Naval Electrical Power:

Frazer-Nash have worked with US and UK Defence clients and broader industry to develop future naval electrical power and propulsion systems. This included **high-fidelity modelling** of energy storage options and designing power system architectures that will support future naval technology such as Direct Energy Weapons and Electromagnetic Launch Systems.



Formation of ships image by Lt Ian Miller, UK MOD © Crown copyright 2024.

Quantum Technology

On behalf of our clients, we conduct horizon scanning, feasibility studies and research on quantum technologies. We help our clients navigate through the hype – presenting the critical insights that matter most to them, based on their needs and in terms they understand. In response to the growing interest in this area, we are expanding our capacity to conduct applied research 'in-house'.

Case Study - Implications of Novel Computing Technologies:

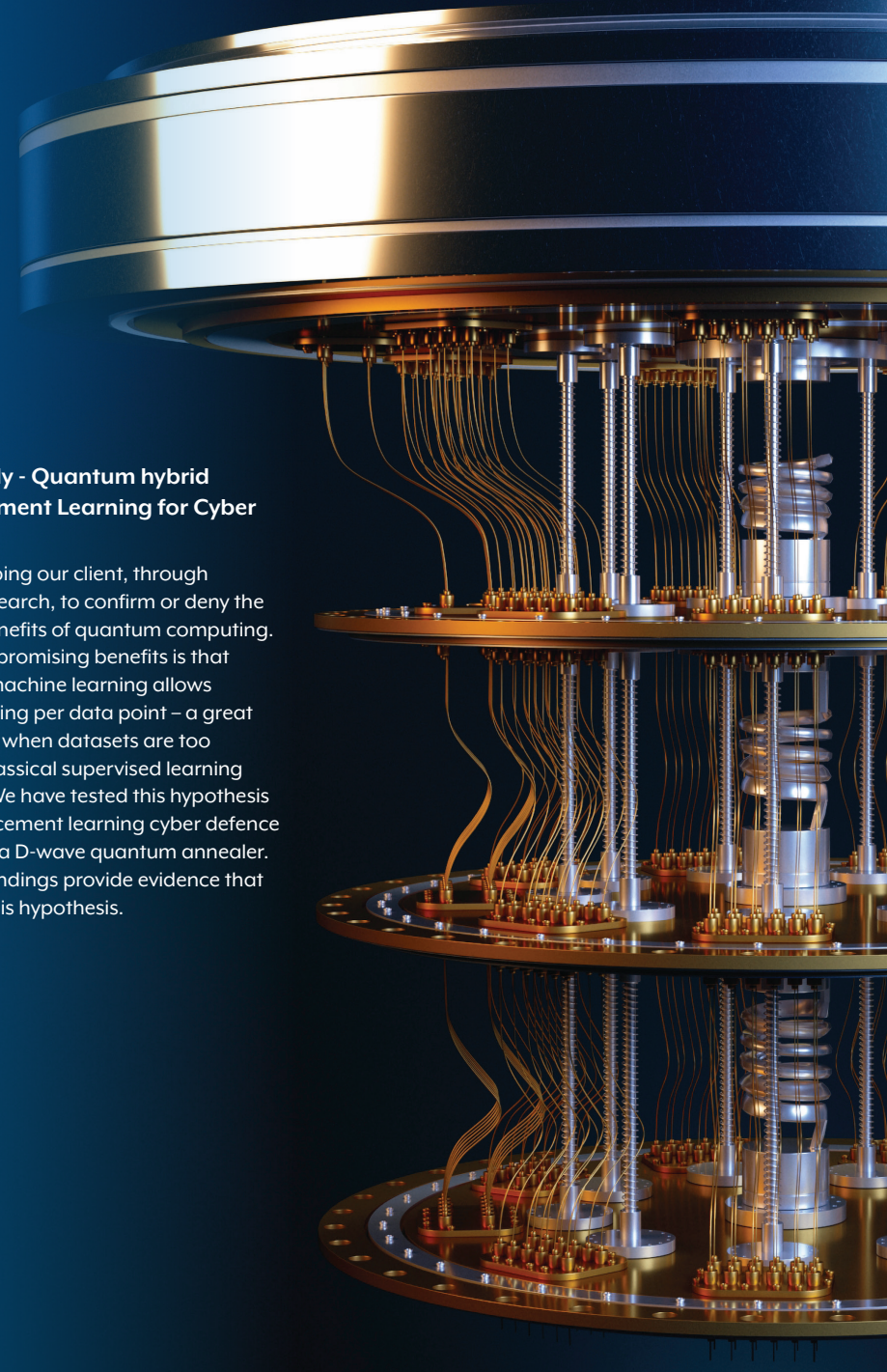
We led on work supporting UK Defence to understand the implications, opportunities and threats arising from novel computing technologies – including quantum, neuromorphic and biological computing – in the 2030-2040 timeframe. We delivered a three-year research plan to prioritise and **guide the client's research investment**. In related work, we co-authored a quarterly **newsletter** for the UK Ministry of Defence, highlighting the latest research and its relevance to UK Defence and Security.

Case Study - Quantum Technology Roadmaps:

Outside of defence, we have helped clients understand the sector-specific value of quantum technologies – including sensing and timing, communications, and computing. **Our technology roadmaps** are based on the latest developments across academia and industry. The roadmaps include high-level technology summaries for non-specialists, alignment to organisation's strategy, and assessment of potential client-specific applications, barriers and intervention points.

Case Study - Quantum hybrid Reinforcement Learning for Cyber Defence:

We are helping our client, through applied research, to confirm or deny the claimed benefits of quantum computing. One of the promising benefits is that quantum machine learning allows faster learning per data point – a great advantage when datasets are too small for classical supervised learning methods. We have tested this hypothesis in a reinforcement learning cyber defence context on a D-wave quantum annealer. Our early findings provide evidence that supports this hypothesis.



Hypersonics

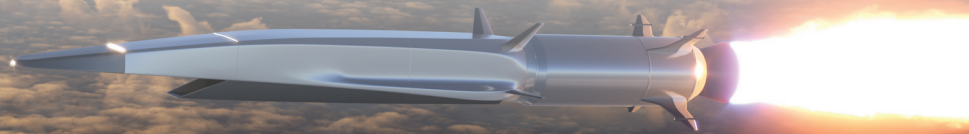
With expertise in a broad number of engineering and supporting disciplines such as advanced computational modelling and simulation, we help our customers understand hypersonic technology and what it means for them.

Case Study - Hypersonic Weapons Concept and Design:

We are working as part of a pan-industry team to **develop and assess concepts for hypersonic weapons**. Frazer-Nash is leading on the Maritime Strike theme which includes considering the integration of hypersonic weapons with existing Vertical Launch Systems. The work will outline designs and corresponding operating envelopes/performance characteristics for future hypersonic weapons including glide vehicles and cruise missiles.

Case Study - Hypersonic Synthetic Test and Evaluation Road-Mapping:

Frazer-Nash, working as part of a multi-supplier team, **assessed the UK's ability** to test and evaluate hypersonic technologies in synthetic environments. We established the requirements for hypersonic technology synthetic test and evaluation, mapped them to existing capabilities, identified gaps and developed costed technology roadmaps to address those gaps.



Modelling and Simulation

Modelling and Simulation (M&S) is a cross-cutting area that is a crucial part of our capability for solving our customers' problems. We offer solutions that allow our clients to address complex and uncertain challenges with precision and confidence.

Case Study - M&S for Autonomous Platform Software Development:

We built a simulation to support the development of software for a new military autonomous platform. The software-in-the-loop simulator enabled the testing of software components without risk to the platform.

Case Study - M&S for AI Research:

We built a simulation environment based on Virtual Battlespace 4 to demonstrate AI algorithms for the tasking of Intelligence, Surveillance and Reconnaissance (ISR) collection assets. The simulation modelled a military scenario and autonomous platforms. This was part of a wider research programme applying AI to ISR.



Diverse Expertise

We blend our diverse range of technical expertise and technical management competencies to solve our clients' challenges. We are proud of our defence portfolio which continues to evolve as our client's grapple with the latest evolutions in technology. The following examples illustrate the breadth of our expertise.



Case Study - Novel Materials:

At Frazer-Nash we have hands-on experience with the development and **assurance of novel materials** for defence and wider applications from flight-deck coatings on aircraft carriers to additive manufacturing of heat exchangers for a next generation fusion reactor.



Case Study - Defence Research Framework Serapis Lot 6:

On behalf of our customer, we handle a contracting framework for defence research. We built a supply chain of large, medium and small companies, traditional and non-traditional defence suppliers. We deliver an end-to-end service – including managing the supply chain, competitive bidding and project delivery – making access to cutting edge research accessible and flexible for our client. **We set out to be different** from previous frameworks which are often criticised for the 'prime' keeping most of the work for themselves. On Serapis Lot 6, 68% of work is delivered by the supply chain.

Case Study - Space Solar:

Space Based Solar Power harvests solar energy in space and beams it back to Earth. Its potential to overcome the intermittency of ground-based renewable energy makes it an important technology for attaining a sustainable future. Frazer-Nash is on the forefront of its development. Delivering **techno-economic feasibility studies** for the UK Government and European Space Agency. Our work in this area includes how to safeguard Space Based Solar Power from potential adversaries.

617 Sqn F35-B Lightning Jets image by ASI Amber Mayall RAF, UK MOD © Crown copyright 2024.



Case Study - Digital Skills Pathways:

We were contracted to develop a learning pathways solution to enable the client to **upskill their workforce with digital skills**. We worked with the customer to design a solution that met their needs, implemented it and supported its roll-out and transition to Business-as-Usual. Individuals are now reaching 'independent practitioner' level in less time and freeing up experienced staff to focus on operational priorities.

Case Study - Techno-Economic Assessment for Investment Decision Support:

Combining engineering expertise with economic and financial modelling we support our customers' large **investment decisions**. We have supported multiple Infrastructure Investment Decisions and Technology Option evaluations.

Case Study - War Gaming:

Building on our military domain understanding, and Modelling and Simulation, Frazer-Nash is growing our War Gaming discipline. Our staff have considerable experience in this area and related disciplines including: military exercise design and execution; development of a pre-deployment training war game; designing, developing and deploying war gaming toolsets, adaptation of existing models and simulations for war games.

Case Study - Project Office Management:

Our defence customers want us to deliver integrated solutions, often using a range of suppliers. Project Office Management is the discipline of establishing and operating large, multi-disciplinary project teams. Our customers are seeking our support to run their Project Management Offices and are experimenting with delivery models – from industry working side-by-side with civil servants to handing over greater autonomy to us with the client providing oversight.

About Frazer-Nash Consultancy

Frazer-Nash consists of approximately 1,500 engineering, management and technology experts – including a significant number of former military personnel and reservists.

With an 80+ year track-record in defence, we have established ourselves as a trusted 'prime' to the UK Ministry of Defence. In addition to defence, we operate in some of the most sensitive industries like nuclear energy and rail.

Rooted in traditional engineering disciplines, our expertise has broadened significantly. Today we are proud to be a **technology and integrated solutions provider** - for challenges large and small. Our multi-disciplinary and cross-cutting industry know-how sets us apart, allowing us to engineer superior solutions.

Our customers trust us because our focus is not product sales. We prioritize delivering impartial advice and solutions tailored to your specific needs.

90+
Established technical groups

1,500+
Staff

£168m
Turnover in 2023

24
Publications in 2023

4
Patents filed in 2023

10%
Overseas work in 2023

Delivering from

15
UK offices

4
Australian offices

Accreditations



Get in touch

To find out more, or to see how we can help, please reach out.

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