

RED
SCIENTIFIC

- **Independence**
- **Expertise**
- **Quality**
- **Compliance**

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RED Scientific Ltd is a limited company registered in England and Wales. Registered number: 2462121. VAT registration number: GB563 873605 Registered office: 1 Oriol Court, Omega Park, Alton, Hampshire, GU34 2YT



‘The science behind improved decision making’.

RED Scientific Limited (*RED*) is a long-established, privately owned, independent consultancy. We provide technical, managerial, and scientific support to a wide range of customers, including industry, defence, and central government. Our Quality Management System is accredited to ISO 9001: 2015.

RED are now looking to deliver to wider industry the excellence that has served our existing customers for over three decades.

RED is a broad-based consultancy supporting our customers’ domain and technical specialist requirements. *RED’s* current capabilities include:

- *Engineering Services:*
 - Safety and Environmental Management & Consultancy
 - Integrated Product/ Logistics Support & Analysis
 - Equipment maintenance database services
- *Data Science & Digital:*
 - Mathematical Modelling and Digital Twins
 - Systems Engineering & Software
 - Algorithm Development
 - Software Tool Development
 - Autonomous Systems/Machine Learning
 - Wargame Development
- *Contingent Labour*
 - Supply of a broad range of highly skilled personnel across a broad range of domains and capabilities

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Engineering Services



RED Scientific has a truly independent *Safety and Environmental Management team*, to provide first class safety and regulatory expertise, engendering a high degree of confidence to our

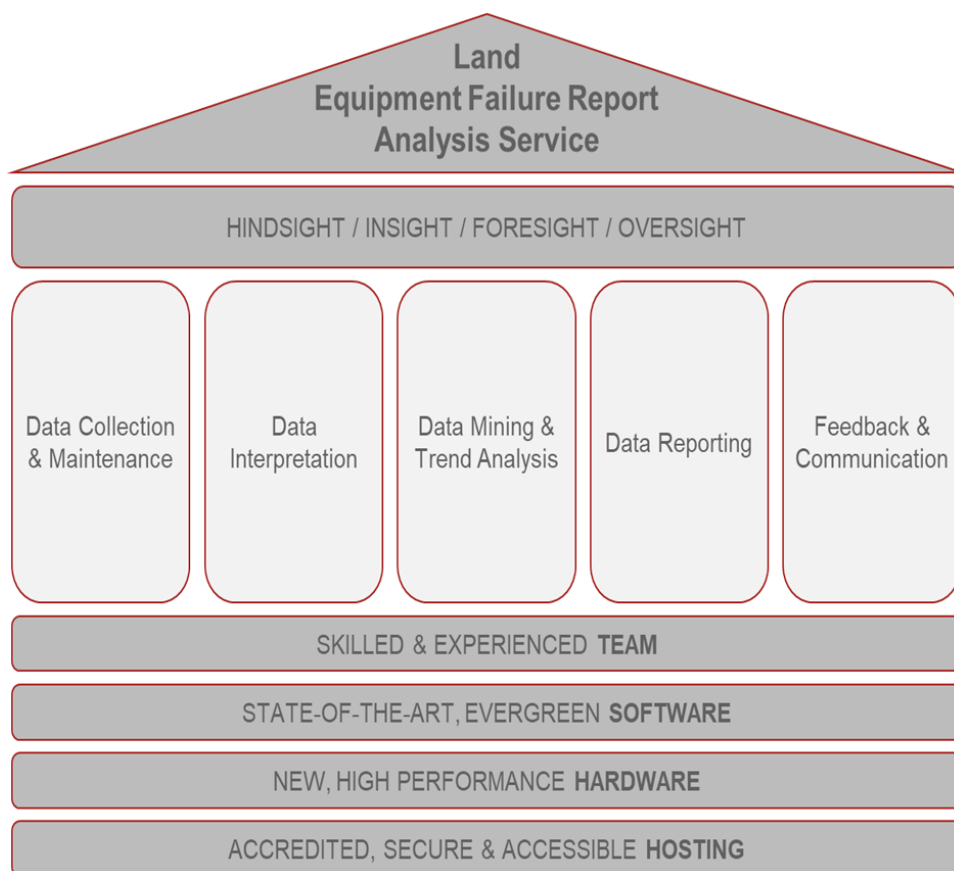
customers that all requirements shall be met by extremely competent personnel. The RED Team is familiar with all Safety Management Procedures, and we pride ourselves on our logical approach to Safety Management, ensuring co-operation with all stakeholders, facilitating a collective effort in the identification & evaluation of all Safety risks, and implementing effective control measures / mitigation to reduce all risks identified to ALARP status. This approach provides our customers with a comprehensive, compelling, and auditable body of evidence that equipment / systems are safe to use in the intended environment.

Integrated Logistics Support & Integrated Product Support (ILS/ IPS) is the management and technical process through which logistic support considerations are integrated into the design and throughout the life cycle of systems. RED provides Supportability Engineering expertise; our approach is to deliver solutions that are tailored to meet the technical requirements of our clients whilst avoiding nugatory effort/ unnecessary cost.

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Equipment maintenance database services. RED is currently delivering a Land Equipment Failure Report Analysis Service (LEFRAS) that equips MoD with the information required for its endorsed Future Support vision. The RED team is delivering a modern, high-quality service that makes available robust failure data to support advanced analysis that illuminates opportunities to bring real world safety, availability, and cost benefits to supported assets.



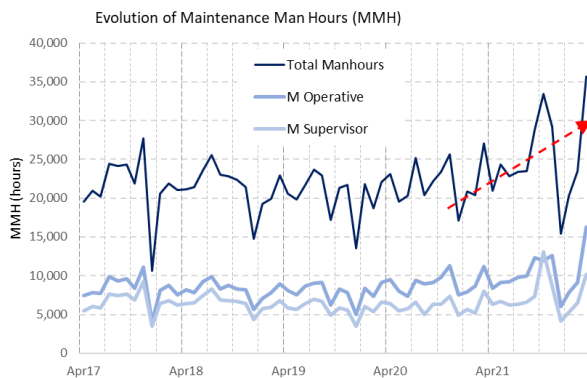
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Insight from Data

One of RED's main offerings is *Actionable Insight From Data*. Two related techniques we use to deliver this are:

Operations Analysis (OA /OR), is a discipline that deals with the development and application of analytical methods to improve decision-making. Employing techniques from other mathematical sciences, such as modelling, statistics, and optimisation, operations research arrives at optimal or near-optimal solutions to decision-making problems.



Data Science is an interdisciplinary technique that uses statistics, scientific computing, scientific methods, processes, algorithms and systems to extract or extrapolate knowledge and insights from

noisy, structured, and unstructured data. Data Science frequently makes use of Artificial Intelligence and Machine Learning.

Sample Projects

Marine drive optimisation

RED are currently undertaking a study to develop *AI / ML* techniques to optimise both operational efficiency and reliability in hybrid and all-electric marine drives.

Equipment Availability

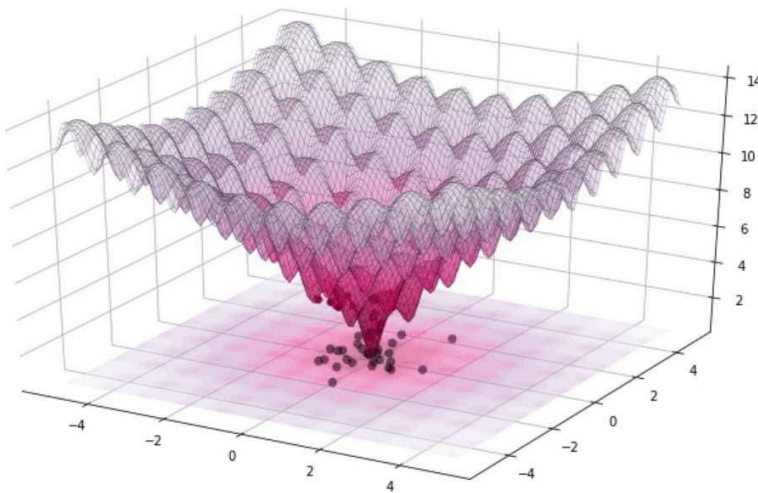
In 2023 we undertook an in-depth study of usage and maintenance data of a fleet of complex vehicles to understand the *causes of unavailability*. Machine-learning models unearthed links between certain activities and system failures that enabled the customer to predict future availability levels and plan resources

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accordingly. Statistical analysis determined that increased holdings of certain spare parts would drastically increase availability.

Literature Review

Literature review of Broad AI and Machine Prediction. Utilising our network of academic consultants we produced two detailed but accessible reports covering latest developments and future directions.



The convergence of a population of candidate solutions (black dots) with respect to an error surface with a very large number of minima. The simulation started with the dots randomly distributed across the surface. It ended with all the dots converged to the global minimum.

Optimisation

Optimisation of commercial trading and technical operation strategies can be a notoriously difficult mathematical challenge. RED analysts undertook a project to tackle this problem for a large fleet of tankers, successfully delivering insight (and annual savings in excess of \$50million!) to the vessel owners.

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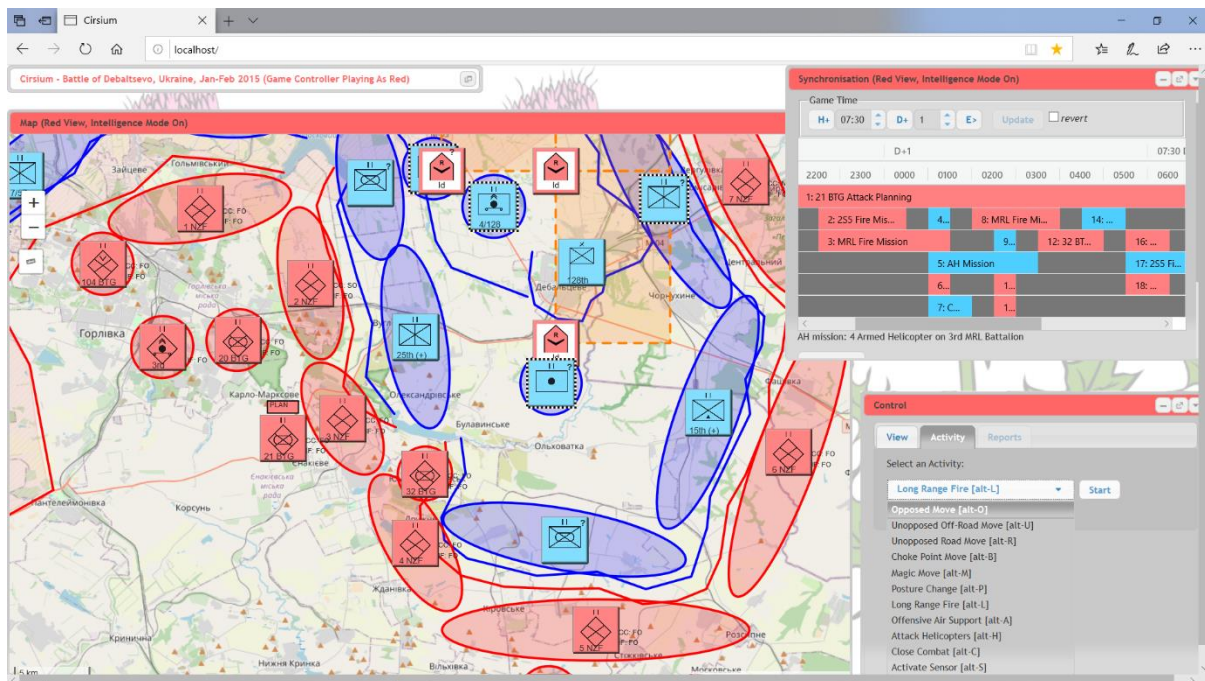
RED Scientific Ltd - The Science Behind Improved Decision Making

Mathematical modelling has been a mainstay of the RED offering for many years. We would be happy to discuss with you how modelling can help with the *decision-making process* in your business.

Modelling Example: Cirsiium

Wargaming is an aspect of OA that can be used for a number of *strategic and tactical* (operational) ends such as testing existing or new approaches or for staff training.

RED have used their inhouse wargaming, analysis and software development skills to develop Cirsiium, a digital wargame that is used by the British Army and NATO to run realistic wargames for a variety of purposes. Cirsiium is effectively a playable mathematical model of a military engagement.



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To build an effective Model / Digital Twin we have combined a number of RED strengths:

Analysis: To model something effectively you need to understand its structure and how it works. RED have used skills in research and analysis to understand military engagements and how they work. Detailed analysis of a large number of datasets has enabled us to develop algorithms that closely model real world behaviour.

Mathematics: Statistical Analysis of historical research and other data has allowed us to develop algorithms that accurately model various aspects of the situation being simulated. Maths is also the foundation of AI and ML and these techniques are increasingly being used in model development.

Software Development: Using an Agile process, RED have incrementally developed the game in a structured way using an open-source technology stack. A key aspect of the development process has been ***ongoing stakeholder engagement*** to not only ensure that the software delivered meets the requirements but to give the customer understanding and ownership of the software.

Collaboration: RED associate Shield Reply have used their expertise in cloud architecture, databases and low code user interfaces to develop a highly functional user front end to facilitate the creation and maintenance of the highly complex games files that define the scenario to be played.

These techniques are equally as applicable to industry and the private sector as they are to defence.

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Routes to Market

The RED business model is *diverse and inclusive* – we can accommodate most forms of relationship and we regularly team with other companies, Academia and research organisations, as well as micro businesses. Associates and partners who join the RED Network are able to *benefit from our Frameworks and Routes to Market* (please see below). The opportunities we see via our frameworks allow us to join with members of the network as partners or subcontractors in order to form teams to undertake larger tasks.

Once we understand your capabilities, we can explore new opportunities for assembling a team with the ideal experience and know-how to delight a potential customer.

- Analysis for Science & Technology Research in Defence (ASTRID)
- Public Sector Resourcing (PSR)(formerly "Contingent Labour TWO (CL2))
- Progeny Maritime Research Framework (PMRF)
- Research Cloud (R-Cloud) v4.00
- Engineering Delivery Partner
- Serapis
- NATO Support Agency (NSPA) Supplier Framework
- Artificial Intelligence Services DPS
- Cyber Security Services 3 (CSS3) DPS Inc Accredited NCSC Resources
- Counter-Explosive Ordnance, Defence Engagement (CEDE) – DPS
- ESPO Consultancy Services Framework
- Highways England Specialist Professional and Technical Services (SPaTS2) FUTRAN

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- WRAP Resource Management Technical Advisors Framework Lot4
- CCS Low Value Purchasing System DPS
- Digital Specialists and Programmes 6
- Digital Outcomes 6
- Research & Insights DPS
- EDP Futures Lab Provider Network
- Data Sources and Services Including Expertise (DPS DATA SaSiE)
- CCS Construction Professional Services DPS
- Fusion21 Consultants Framework
- Space-Enabled and Geospatial Services DPS
- G-Cloud 13
- Heath Trust Europe Artificial Intelligence Solutions in Healthcare DPS

In addition to our own technical staff, we maintain a large pool of individual associates as well as teaming arrangements with other organisations and strong links with a number of UK universities. This model allows us to combine the core attributes of a Small to Medium-sized Enterprise (SME) – customer focus, agility, flexibility and value for money – with the breadth of technical & specialist skills and footprint more usually associated with much larger organisation.

To learn more about how RED can help your business please call 01420 80011 or email: info@red-scientific.co.uk

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