

Problem statement and value proposition

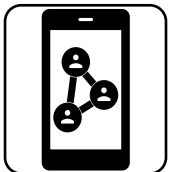
How do we undertake optimisation in an uncertain parameter space with competing definitions of 'success'?



Obstacle crossing and barrier design are complex operations. The time and risk associated with an obstacle crossing is dependent on many factors, such as platforms, countermeasures, field layout and breaching strategy.



Commanders need to understand and minimise risk during obstacle crossings. Since the field properties may be unknown the 'correct' solution can't be determined *a priori* and a stochastic risk based approach must be taken.



How can commanders and engineers robustly answer questions like 'what is the best use of the countermeasures I have?', 'what is the probability of a successful breach?', and 'how best to approach an unknown field?'



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Frazer-Nash and Dstl have worked collaboratively to implement a software solution to improve decision making on asset deployment by using software to encode complex logic to increase flexibility to enable meaningful 'what-if' calculations of both obstacle crossing and barrier design using the same tool.

Collaborate

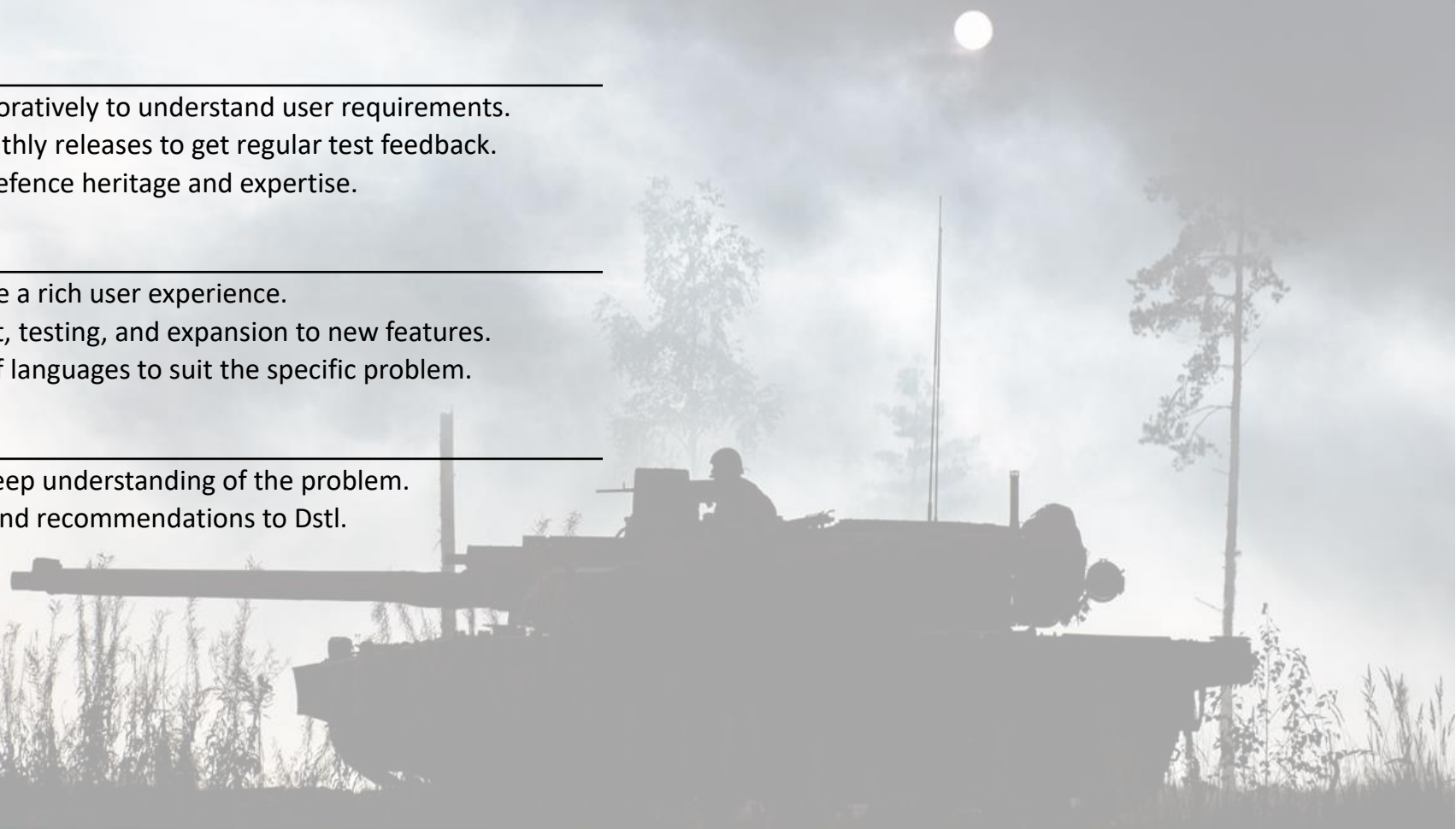
- Frazer-Nash and Dstl worked collaboratively to understand user requirements.
- Weekly technical catchups and monthly releases to get regular test feedback.
- ‘Reach back’ within Frazer-Nash’s defence heritage and expertise.

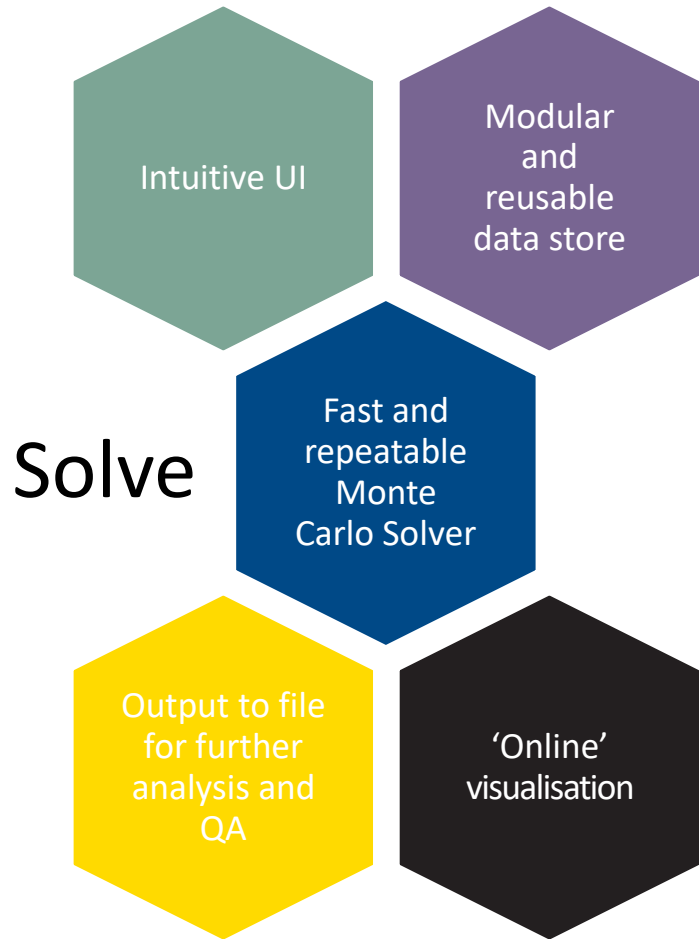
Develop

- Software developed in C# to provide a rich user experience.
- Modular build for rapid deployment, testing, and expansion to new features.
- Frazer-Nash build in a wide range of languages to suit the specific problem.

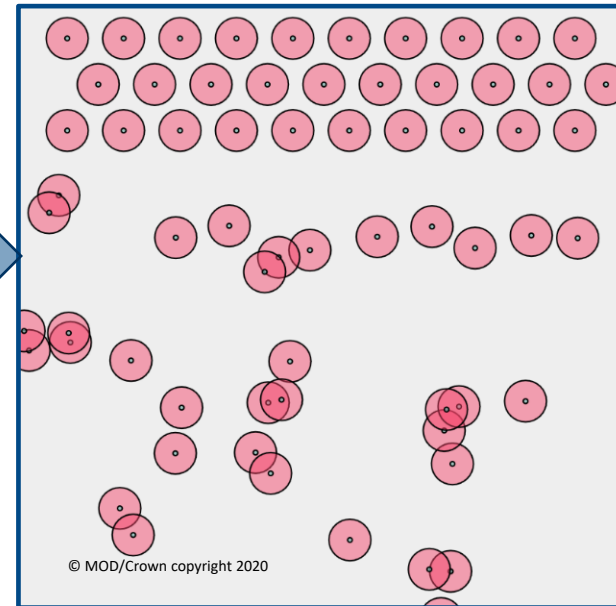
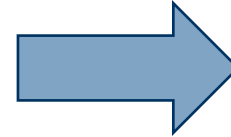
Analyse

- Test cases and ‘real runs’ to get a deep understanding of the problem.
- Understand model improvements and recommendations to Dstl.





Setup

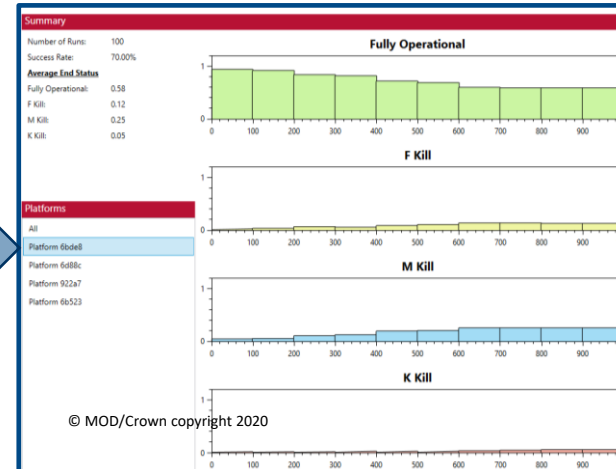
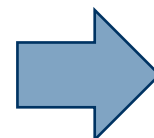


Aid users by displaying obstacle setup prior to run.

Visualisation helps error checking early on.

'Regular' and random fields possible.

Analyse



Results displayed as a mix of statistics and graphics.

Displayed at multiple resolutions.

Output to further 'standard' formats to fit Dstl toolchain.

We provide desktop and cloud-based software systems that provide insight and value, enabling users to make decisions in an efficient manner to further the sustainability, energy, security and transport sectors.

Software service	Benefit	Case study detail
Requirements capture and an Agile development approach.	Answer the right question, at the right time.	Six-week cycles with Dstl analysts, deploying and responding to change.
Background in fast, efficient algorithms and UI design, to be coded in many languages.	Reduced turnaround time for simulations.	Run time reduced from hours to minutes and UX improved through custom designed GUI.
Logging and auditing, including ISO9001 and TickIT <i>plus</i> .	Repeatable and auditable.	Encapsulate decisions as code and automatically write detailed log files.
Expertise in understanding Monte Carlo and its application across a range of sectors.	Informs risk decisions.	Option to set bounding cases and run different ‘what if’ scenarios automatically.
Bespoke software to link to other tools and resources, including pipeline integration.	Informs investment decisions.	Automatic aggregation of cost metrics for the impact of decisions.
Customisable output and visualisation.	Share knowledge to internal and external stakeholders.	Novel visualisation tools and deploying our systems thinking to highlight the key answers.