

Providing cutting-edge Systems Engineering capabilities to a leading defence client



Defence

Expleo is currently working on a long-term project with a leading defence client on the development of a submarine platform, providing systems engineering capabilities in a number of key areas. Our work has so far resulted in improved robustness of the platform system design, and issues and inconsistencies being identified much earlier in the project lifecycle. This will ultimately result in significant time and cost savings for the programme.

Challenge

The client was facing challenges arising from a lack of internal resources and experienced technical expertise due to industry-wide skill shortages. The client also needed to be able to visualise and see a detailed overview of a very complex network of systems and to provide traceability. But traditionally excess volumes of configuration details were stored within the client's existing systems making it difficult to maintain and hard to find the technical information required. As part of the project, the client was also looking to embed more agile working practices and adopt digital tools to support its ongoing modernisation efforts.

Solution

Expleo is providing its systems engineering capabilities to the platform's management systems such as its power, propulsion, environmental and operational systems.

Expleo is doing this by taking the high level requirements and building them into a digital model using a COTS tool (EA), supported by a client/Expleo developed process set. The model is then able to show the client how the platform breaks down into a system of systems and how they all interact with each other. This enables them to have an overview of a very complex network of systems, captured in a digital manner to be able to drill down and interrogate the threads of information as and when required.

The model also supports the tagging of additional requirements, such as test requirements, verification methods and platform transversal requirements. These can be linked and built into a document as part of a supplier specification, providing additional levels of detail that can facilitate a design, through build to test and verification traceable lifecycle.



Expleo is using the model to produce optioneering reports to help guide the client in the design decision making process where the platform design still wasn't set in stone. The model has been used to present trade-off studies to show the cost benefit analysis, and pros and cons of the various options to help the client decide on the best way forward.

One of the biggest challenges of a project of this nature is working with people on the ground who are used to documenting everything on paper and operating mechanical systems, and trying to move them towards a more digital approach.

As a result, there is also a change management element to the project, rethinking internal process and moving to an increased use of collaboration focused workshops.

Results



Single version of truth

The model encapsulates one view of the platform, providing a single version of truth that can be easily interrogated. Being able to capture this level of information in a digital manner is allowing the client to run reports and undertake checks and balances on the systems much more quickly and easily.

Reduction in errors and reduction in risk

The ability to tag and add further information to derive a supplier specification supports improvements in the platform's supply chain. By providing additional detail we're increasing accuracy and removing the risk of manual errors through transcription. Moving the client away from paper-based specifications more generally also reduces the risk of manual errors in other areas of the project and cuts down the need for printed documents.

Through our work we have been able to highlight issues and inconsistencies early on in the platform build i.e. in the design phase rather than the test phase. The client has been able to make design changes 12–18 months earlier than it otherwise would have previously, before the physical build of the platform begins. This has ultimately saved the client significant time and cost further down the lifecycle.

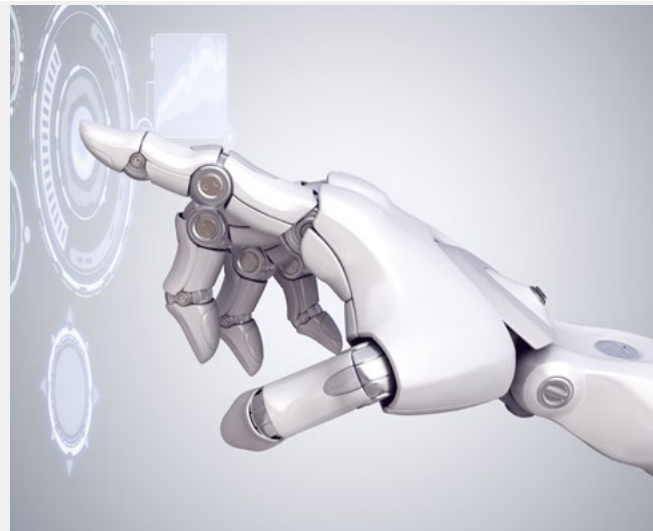


Breaking down siloes

We've been able to break down some of the siloes that existed within the client's organisation by introducing agile management techniques and sprint cycles. This has improved visibility and communication by providing insight to known data and issues earlier allowing them time to fix issues without a significant impact to the project. We're also working with the client on ways to share best practice across different areas of the business.

Moving towards plug and play

Going forward, the models we build will be compiled into a library which can then be sliced and diced for future platform development. Our work is essentially producing a digital logbook for the platform and is a significant step towards enabling a digital twin. The client will be able to backfit the learnings and outputs from developing this platform into existing fleets.



Why Expleo?

Expleo take a pragmatic approach and offer a working solution that can be tailored to the client, rather than a solution-in-a-box. We have a strong background in aerospace and defence and bring a rigorous and disciplined approach from this sector. Expleo also focuses on developing a hub of highly skilled engineers who can think across the domain space, whether that be from signalling, transportation, nuclear or other, and how best practice from these areas can be used in marine.

“We take time to embed with internal teams to understand their challenges and tailor our solution to the customer’s needs rather than trying to fit them into a rigid solution. Our cross-sector experience provides us with a menu of solutions, that can be applied and tailored to meet all stakeholder needs. We’re already in discussions with the client for the next generation of the platform demonstrating the success of our approach.”

**Ed Fry, Engineering Manager at Expleo
and Technical Expert for Systems Engineering**

How we can help you tackle complex systems delivery in highly regulated environments

We help our clients define, develop, and integrate safety-critical systems using a rigorous approach, ensuring inter-connectivity across your systems, maintaining data protection and strict security protocols against external threats. What we do:



End-to-end systems development from initial requirements capture to testing and acceptance



Extensive experience in applying modelling and simulation in the development of systems for safety critical applications



Using a model-based approach to ensure integrity of all requirements



Deep expertise in defining and interpreting end user requirements



Rigorous security protocols maintained