Resisting the elements at sea

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Dstl and Swansea University are using AI and ML to design metals that last much longer in extreme environments.

Ships face some of the harshest conditions on Earth – saltwater, extreme temperatures, and powerful currents all combine to wear down metal parts over time. This can lead to costly repairs and even downtime for Naval vessels.

What if we could design metals that last much longer in these extreme environments?

The Defence Science and Technology Laboratory (Dstl) is working with Swansea University to do exactly that by harnessing artificial intelligence (AI) and machine learning (ML) to design and develop new materials with improved corrosion resistance.

Many materials used in ships today can struggle to last as long as needed in harsh ocean conditions, but this research is exploring new combinations of materials to create stronger, more durable metal alloys.

These novel materials could be used within ships and other equipment that operate at sea to make them:

- stronger
- more reliable
- cheaper to maintain

Research partnership using this method

The work has been funded as part of the Defence Materials Centre of Excellence (DMEx), a £42.5 million research partnership between The University of Manchester, the Henry Royce Institute, and 23 other organisations. This research partnership will now use this new AI method to design and test advanced materials much more quickly. It is also engaging with industry to ensure they can be adopted quickly.

Allies are interested in this work too, and discussions have already started about possibly working together.

Benefits of this research

This research could transform how naval vessels are built and maintained – cutting costs, reducing downtime and keeping fleets ready for action. It’s a great example of how digital innovation and science can deliver real-world benefits that will help keep UK naval systems strong and secure for years to come.

This approach exemplifies the Strategic Defence Review call for a step-change in defence capability through digital transformation and scientific excellence.

Read some of our AI biscuit books.

https://www.gov.uk/government/case-studies/resisting-the-elements-at-sea