DMTC
DEFENCE MATERIALS TECHNOLOGY CENTRE

Maritime Platforms

Maritime Platforms at the focus of this program primarily include surface ships and submarines. Materials technology developed for this program will also apply to other platforms such as landing craft and land-based platforms.

Projects under this program will examine the structural integrity and fitness for purpose for surface and submarine components, electromagnetic shielding, frequency selective surfaces, and structural health monitoring systems.

Other optimum application technology for rebuilding and enhancement of the erosion-corrosion performance of critical metallic components will be conducted through micro-structural modification of components like valve seal, valve casings, valve disks, complex sea water piping systems and propulsion system impellers.

Ability to repair complex-shaped components using robotic manipulation will impact the development and application of other materials processing technologies using friction-stir processing and low-plasticity burnishing techniques.

Layered construction allows antennas, sensors, wiring and connectors to be integrated into the structure while at the same time reducing weight, improving stealth characteristics and hardening the antenna/sensor structure against external threats such as foreign object impact and lightning strikes.

Primary modification techniques will include laser surface melting and gas metal arc cladding. Sample plates will be exposed to surface treatments and the erosion-corrosion performance assessed.

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Project example:

DMTC will investigate the development and application for higher strength steels for surface ship platforms in order to replace conventional hull and superstructure materials with more modern thermo-mechanical processed steels. Fabrication techniques will be investigated such as laser, hybrid and twin wire gas metal arc welding and hull fabrication direct from coiled strip to eliminate a substantial number of vertical joints in the outer hull.

Program Benefits:

- New alloys to increase steel strength by up to 30 percent and provide considerable weight savings
- Improvements in sea-keeping stability and payload
- Comparable cost and ease of fabrication to existing materials
- Reduction in the number of vertical joints in outer hull structures
- Cost-effective component reclamation
- Improved service performance and increased sea-time
- Robotic manipulation for repair of complex-shaped components
- Enhanced mechanical properties and improved fatigue and corrosion resistance
- Improved aerodynamic efficiency due to lack of protrusions
- Embedded health monitoring systems provide for continual assessment and through-life support
- Use of new repair technologies that are internationally competitive
- Highly-skilled domestic industry
- Building the whole-of-supply-chain for delivery of manufacturing technologies within Australia will provide strong competitive advantage in marketing total service to domestic and international clients
- Improved manufacturing and operational efficiency

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