

## CASE STUDY

### Repair of Fibre Composite Cylindrical Array Dome for the Collins Class Submarine

**The Problem.** The Carbon and Glass Fibre Cylindrical Array Dome suffered a 1.5 metre by 2 metre penetration damage and the RAN was advised that it was unrepairable. BAC was approached by the Submarine Project Office and a survey was undertaken.



**The Solution.** Following the approach from the Department, BAC prepared a comprehensive repair procedure and project proposal to recover the Dome, while minimising the technical and commercial risk to both the company and the RAN. This proposal included material testing of the recommended repair laminates and the repair technique before approval for the

major repair was undertaken. These tests were successfully completed with the laminates indicating we achieved properties approximately 50% stronger than the specification for the pristine laminates and 47% stronger for the repaired laminate.



**The Requirements.** The project required stringent control of the density, thickness and laminate quality to ensure that the sonar system did not detect any difference between the original laminate and the repaired area, which, after completion, measured well in excess of the original damage to ensure the repair “blend” gave adequate strength transfer as well as thickness control.

**The Results.** The project was completed on time and under budget with a saving over replacement of approximately \$1M. There was close co-operation with DSTO in the testing and material requirements and BAC was congratulated by the (then) DG of Underwater Warfare Systems, Commodore Paul Greenfield who stated that the repair was an example of world's best practice.

