

SITUATION

Raytheon Marine produces marine instrumentation products and has been a market leader since 1974. One of its major products is a range of leisure marine radar which it historically sourced from an external supplier. To cut operating costs, increase profit margins, improve quality, and exercise more control over supply, Raytheon decided to bring the design and production of this product line in-house. As the company entered this new field, it wanted to minimize the risk associated with the entire product development process.

OBJECTIVES

- ✓ Develop a range of leisure marine radar which would offer enhanced features while hitting established market price points.
- ✓ Create a more intuitive user interface with a clear display, and improve the product's styling to increase aesthetic appeal to the power boat market.
- ✓ Cut down on manufacturing costs by giving each product the same microwave core and the same associated components, enabling quick and easy production on one assembly line.
- ✓ Bring the first products to market within 24 months.

PROCESS VISION

- ✓ Use solid modeling to reduce the manufacturing risk of more than 130 new tooled components.
- ✓ Produce STL models, epoxy and aluminum investment castings early in the development process to enable physical testing in the marine environment.
- ✓ Involve the toolmakers as the design evolves to reduce lead time for tooling to the minimum.

ACTIONS

- ✓ The company established a dedicated team, with members in the United States and the United Kingdom, and supported them with additional licenses of I-DEAS Master Series™ software. The team communicated concepts produced in Master Series™ software using video conferencing facilities.



RAYTHEON NAVIGATES NEW MARKET WITH I-DEAS™

“Developing new products for a highly competitive and technologically challenging marine environment requires maximum risk reduction. Using SDRC I-DEAS® 3D modeling and analysis software followed on by prototypes dramatically reduced our engineering risk and resulted in a 62% reduction in tool modification costs.”

-Kieran Breheny
Project Manager
Raytheon Electronics
Limited

RAYTHEON NAVIGATES NEW MARKET WITH I-DEAS

- ✓ Six designers in the United Kingdom began to create solid models of each of the components, exchanging information on everything from large high pressure die-castings to technical injection molding components, through the data sharing capabilities of Master Series software.
- ✓ Using the analysis capabilities of Master Series, the designers optimized the size of internal components for the entire range of radar to ensure that they would fit in the same microwave core and still meet performance criteria. They were also able to calculate the weight of each finished product at the design review stage. This confirmed that the weight, which is of significance to boat owners, would be comparable to that of competitors' products.
- ✓ They then used the integrated design and analysis features of Master Series to conduct stress tests on the mast mounting bracket.
- ✓ Rapid prototypes were made for all the components. The core was also produced as an investment casting and a gravity casting to allow full working models to be put together for sea trials. The models were also used to prepare jigs for the assembly line.
- ✓ The 3D model information was sent to the toolmakers in China along with 2D Master Series drawings.

RESULTS

- ✓ The team had a working radar system ready within 14 months, and the entire development process, from research through testing to production, took only 24 months.
- ✓ Design changes were reduced by 60% because the various departments were able to provide input early in the process.
- ✓ The number of iterations at the tooling stage was reduced from 13% to 5%, resulting in a savings of £104,000 (U.S. \$170,000) on a total budget of £1.3m (US \$2.1m), a 62% reduction in tool modification costs.
- ✓ A comprehensive database of 3D modeled parts will enable future products to be designed and manufactured in a much shorter time. The second stage of radar product development has a lead time of just 10 months.

PLANS

Raytheon plans to extend its use of SDRC I-DEAS 3D analysis software throughout the company and is now considering the implementation of SDRC's Metaphase Series™ product data management system to further improve its engineering process.

SDRC and SDRC I-DEAS are registered trademarks, and I-DEAS Master Series, I-DEAS, Master Series, and Metaphase Series are trademarks of Structural Dynamics Research Corporation. All other trademarks or registered trademarks belong to their respective holders.

SDRC