

# Efficient Procurement of Low Vulnerability Warships

J S Schofield<sup>ab</sup> MMath MA (Cantab) CMath FIMA MRINA, D J Wright<sup>a</sup> BSc AMIET

<sup>a</sup> *Survivability Consulting Limited, Dunfermline, UK*

<sup>b</sup> Corresponding Author. Email: jschofield@survivability.co.uk

## Synopsis

In recent decades the UK has made significant advances in its approach to, and its results from, the management of naval platform vulnerability. This paper explores the history, guiding principles and assessment techniques of successful vulnerability management.

World War II lessons learned are reviewed and shown to be still relevant today. These include structural and systems design features for the management of blast and fragmentation.

Requirements must be set which are realistic and contractual. Through the design of several classes of ship using current vulnerability management principles it is now clear what can be achieved. Therefore realistic requirements can be effectively set.

Quantitative vulnerability assessment is a key part of the design process, from the earliest concept to build and beyond. It is never too early to consider vulnerability, as the biggest gains can be made for the least cost during the early concept phases. However, early promise can be compromised by careless addition of supporting systems and services, so continuous monitoring is required.

In order for vulnerability assessments to keep pace with and guide the direction of the developing design, efficient assessment tools are needed. If the model takes too long to build, the tool offers purely an audit function, rather than being a design aid. Such a tool is also an important input to Operational Analysis of the in-service fleet. As such, very large parameter spaces of results are needed, for the full threat spectrum against the whole fleet in a range of scenarios.

SCL has developed the Purple Fire tool to facilitate the sorts of assessment required for modern platform designs, weapon programmes and operational analysis in support of the fleet. It provides the analyst with the ability to construct platform representations very quickly, meaning less model build time and more analysis time. It automates the consideration of large parameter spaces allowing in-depth assessments to be conducted quicker than ever.

*Keywords:* Vulnerability, historical lessons, requirements specification, vulnerability assessment, Purple Fire.