QINETIQ

Our Customers

QinetiQ is a world leading provider of solutions for naval and commercial surface ship design, analysis and support.

QinetiQ has over 25 years in the market place supplying QinetiQ's maritime design software which has been used by ship builders, designers, operators and owners, as well as academic institutions, to model and analyse an extensive range of designs.

With an experienced team of Naval Architects and Software Developers, product development is at the core of the business' activities. Alongside this, both consultancy projects and training courses are delivered globally to a varied customer base. The highly knowledgeable team within QinetiQ provide direct user support, drawing on years of experience of working with the software.

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QINETIQ

Marine Design Software

Collaborating with QinetiQ

At QinetiQ we bring organisations and people together to provide innovative solutions to real world problems, creating decisive customer advantage.

Working with our partners and customers, we collaborate widely, working in partnership, listening hard and thinking through what customers need. Building trusted partnerships, we are helping customers anticipate and shape future requirements adding value and future advantage.

www.qinetiq.com/en/what-we-do/services-and-products/marine-design-software

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QINETIQ

Survive ®

Advanced Marine Design Software

Survive®

Fine tune your survivability

Survive® is a comprehensive modelling and assessment toolset that helps Naval Architects ensure warships, commercial shipping and mega-yachts are designed to survive in an increasingly complex world.

Survive® offers the ability to rapidly simulate and quantify the likely effects of damage to a maritime vessel caused by a wide range of attacks. This allows designers to compare various damage mitigation methods cost effectively and identify the right survivability strategy. By comparing the vulnerability of a vessel against the lethality of a variety of threats, Survive® can support critical design decisions and in-service alterations to a vessel for the environment it is intended to operate in.

Survive® is a Fast Running Engineering Model (FREM) driven by empirical algorithms that are underpinned by years of trials data, incident reports and highly detailed modelling output. This allows for hundreds of damage scenarios to be rapidly analysed in a matter of hours. This makes Survive® an ideal tool for analysing vulnerability of a ship design at any point within the design process, as many times as is necessary.

Incident Investigation

If any kind of damaging incident were to occur on an in service vessel, Survive® can also be used to audit what has happened and can support investigation of the likely threat weapon that was used.

Casualties

Casualty assessment is also available in Survive®, meaning effective strategies for minimising the effect on crew and passengers can also be investigated. Casualty statistics are broken down showing severity of injury with indications of which damage mechanisms are the cause, making this an effective tool to support medical planning.

Multiple design and analysis tools within Survive®

- Concept through to fully detailed ship design
- Above water vulnerability assessment
- Underwater vulnerability assessment
- Advanced results interrogation tools
- Fire and flood consequence modelling

### Advanced Weapon Customisation

An additional Weapon Editor module is available as an add-on to Survive®, allowing greater customisation of weapons used in vulnerability analyses. For further information on this please email Survive@QinetiQ.com.

Survive® Training Courses and Demonstrations

QinetiQ delivers a training course on the use of the Survive® software. This can be carried out in person or virtually to fit your needs. QinetiQ also offer virtual demonstrations of Survive® which showcase all of the main features of the software.

Ship Modelling

Survive® has powerful model building tools to allow any maturity of ship design to be represented and subsequently analysed
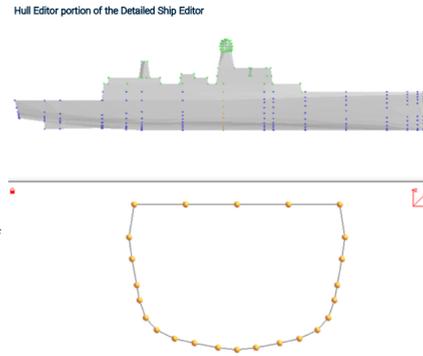
Ship Building Wizard

The Survive® Ship Building Wizard allows for the rapid creation of a concept ship for early use in the design process. The intuitive and powerful Ship Building Wizard consists of seven stages used for modelling the internals and externals of your ship design. A starting point for the basic shape of the hull is chosen first from a choice of frigate/destroyer, carrier, minesweeper, auxiliary and trimaran. This is followed by steps to further customise the hull, superstructure, internal compartmentation, internal components and major ship capabilities.

Detailed Ship Editor

The Detailed Ship Editor expands on the capabilities of the Ship Building Wizard, allowing further customisation and more detail to be added. This tool allows development of a Survive® model beyond the early concept stages, allowing for:

- Finalised design vulnerability assessment
- Post incident audit analysis
- Reassessment of vulnerability after modifications
- Vulnerability assessment for re-role of existing ships

Everything that can be set in the Ship Building Wizard can be adjusted in the Detailed Ship Editor. Additional modelling features that the Detailed Ship Editor gives the user includes:

- A Hull Editor allowing full customisability of hull shape, thickness and material
- Ability to model doors and hatches - important for modelling the spread of blast from an explosion
- Improved ability to manipulate internal spaces to match your design
- A larger set of equipment categories, including recoverability related equipment to allow vulnerability assessments of such items
- Greater customisation of equipment properties
- Greater fidelity crew modelling for improved casualty analysis
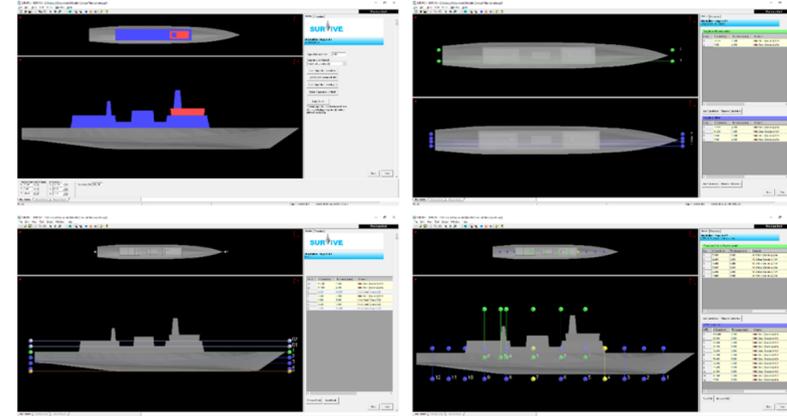
Stages 2 through 5 of the Survive® Ship Building Wizard: superstructure, longitudinal bulkheads, decks and transverse bulkheads

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Above Water Analysis

Ensure your vessel has the best chance of enduring attack from a range of above water threats
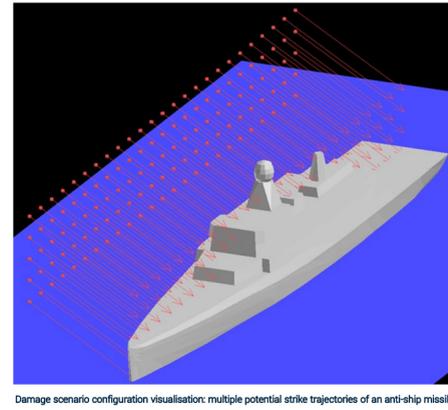
Damage scenario configuration visualisation: multiple potential strike trajectories of an anti-ship missile

Damage Scenarios

Both bombs and missiles can be analysed in the above water domain with the addition of cluster munitions should the Weapon Editor add-on module be purchased. Hundreds of different strike locations from a chosen angle of attack can be analysed to probe your design for weakness. Each of these will result in a different damage scenario which can be interrogated to determine the extent of blast and fragmentation damage.
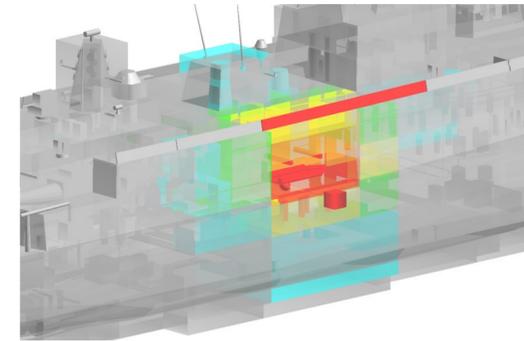
Blast Damage

Blast damage in Survive® is dependent on the user selected charge weight of the warhead, which can either be chosen in Survive® itself or using the Weapon Editor module. Internal and external blast events can be analysed and damage to the hull, internal structure, equipment and crew predicted.

Fragmentation Damage

Fragmentation damage in Survive® is dependent on the choice of fragmentation pattern for the weapon being analysed (light, medium or heavy). Each fragment will have its own initial velocity, material, shape and mass which affects how much damage it can cause and how far it will penetrate into the ship. Use of the Weapon Editor module allows greater customisation of the fragmentation pattern and fragment properties. The possible paths that the modelled fragments can take are used to evaluate damage to internal structure, equipment and systems.
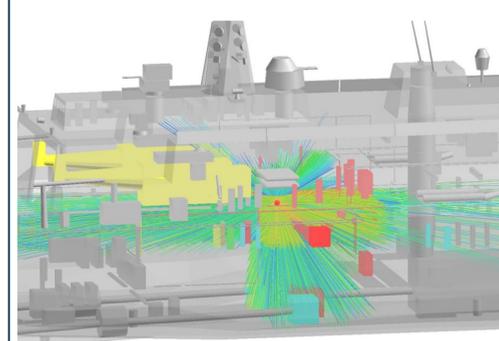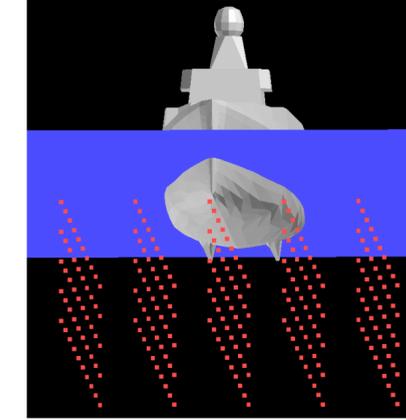

Fragmentation damage; fragmentation lines coloured by velocity; equipment coloured by fragmentation damage

Blast damage; compartment volumes coloured by blast pressure; equipment coloured by blast damage

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Underwater Analysis

Rapidly assess your design's ability to withstand underwater attack

Damage scenario configuration visualisation: multiple different mine detonation locations

Damage Scenarios

Mines and torpedoes can be analysed in the underwater domain. Hundreds of different underwater explosion positions below the waterline can be analysed to test for the shock response along the full length of the vessel. Each underwater explosion will result in a different damage scenario that can be interrogated further to determine the extent of shock damage to the hull and equipment. Subsequent flooding and damage to equipment from flood water is also assessed.

Shock Damage

The underwater effects that are analysed in Survive® are shock damage to equipment and shock holing damage to the hull. The shock energy transmitted through the hull and internal structure is accounted for, with the potential to cause damage to internal components on all decks of the ship. The Shock Categories feature can be used to customise equipment failure levels, ultimately allowing a vessel's shock policy to be accurately represented.

Flooding

Flooding damage to equipment is assessed as a result of hull holing at or below the waterline using a simple and rapid, static flooding algorithm. Flood water will fill the internals of the ship to the waterline and it will be bounded by watertight structure in the watertight zones that experience flooding. Stability rules set within the Survive® ship model are used to determine if a vessel may sink from flooding, resulting in 100% vulnerability of all capabilities for that damage scenario.
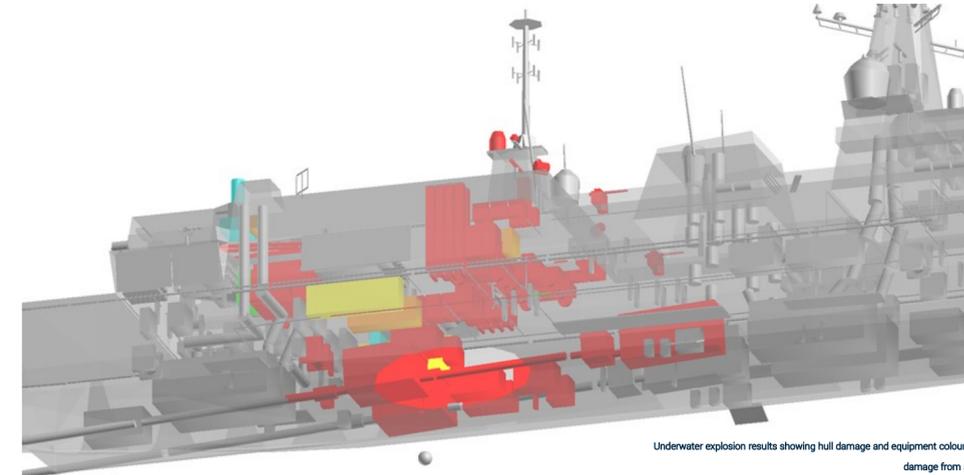
Underwater explosion results showing hull damage and equipment coloured by damage from shock

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Results Interrogation

Survive®'s powerful results viewing features allow for optimal vulnerability analysis, effectively supporting key design choices

Results Viewer separated deck view: a fire modelled in the stern of the ship
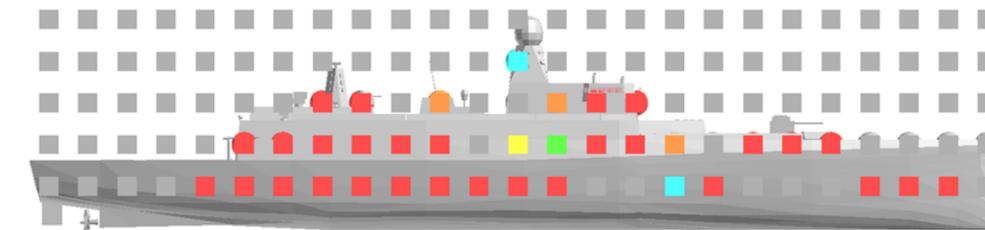
Vulnerability Heatmap

Any points of weakness in a vessel's design can be rapidly identified using the vulnerability heatmap plot which shows the performance of a design against the chosen weapon for each impact trajectory analysed. The damage caused to each of the ship's main capabilities can be viewed for each damage scenario.

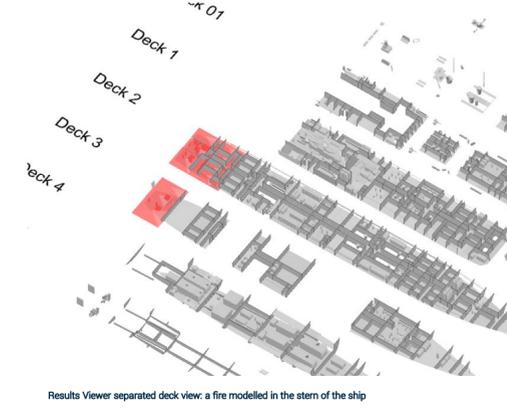### Individual Damage Scenario Interrogation

Damage scenarios of interest identified using the heatmap, such as vulnerability hotspots, can be investigated further using a variety of tools, including:

- Colouring of capability logic trees to identify critical branches and components
- Blast stepping feature allowing blast path to be visualised
- Hull, bulkhead and equipment damage colouring options

These features allow informed decision making for any choice of survivability improvement design principles to be incorporated into the design. Survive® can then be used to modify a design and a new vulnerability profile calculated.

Vulnerability Statistics

Statistical output is also available to support reporting of analyses, including information on equipment, systems and casualties. Summary data for all analysed damage scenarios is also available.

Detailed Spreadsheet Output

If further detail is required, a more comprehensive set of outputs can be exported to an XML file for viewing in spreadsheet packages. This includes data for each of the individual attack scenarios in numerical form which can only be seen visually otherwise. This data export feature is also useful if any post processing of results is required.

Separated Decks

Survive®'s separated deck feature allows visualisation of all of a ship's internal layout and components to be viewed simultaneously. This is an essential tool for modelling systems that span multiple decks and ensuring the general arrangement of your Survive® ship model is accurate.

Vulnerability heatmap available in the Survive® Results Viewer