

# COMPREHENSIVE NAVY COMBAT SURVIVABILITY

## Surma Ltd

Surma is a private Finnish company specialized in naval combat survivability.

## Products and Services

We provide efficient and comprehensive survivability analysis software for naval and other ship and platform designers, and services for combat survivability and safety level assessment and research.

## Advantages

- Low level of input
- Fast to generate
- Quick reporting
- Reliable and accurate
- Well validated
- Comprehensive
- Saves both work and calendar time
- Increases the safety level
- Enhances the mission performance

## Surma

Software tools for comprehensive combat survivability assessment and services for naval research.

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[ SAFE RETURN TO PORT ]



[ SURMA ]

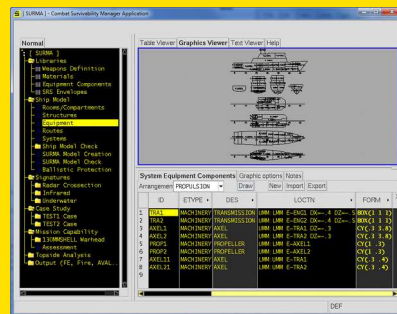
Survivability Manager Application, **SURMA**, is software for comprehensive navy combat survivability assessments.

SURMA takes into account structures, compartmentation, ballistic protection and system features. It estimates the combat survivability level in threats from any number of conventional warheads, already at the early stages of the design process.

Our comprehensive approach and the one model concept ensure susceptibility, vulnerability and reparability are all taken into account and any design change can immediately be analyzed.

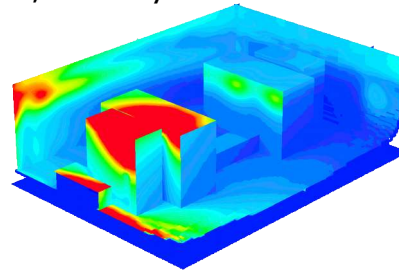
Calculation methods used in SURMA are validated against multinational full scale live fire trials.

## COMBAT SURVIVABILITY



Fire simulation models can be re-created within seconds when changes are made on the design. Results are exportable back to NAPA or other program for further analysis.

For the detailed fire simulations SURMA uses FDS, Fire Dynamics Simulator.



## FIRE SIMULATION

### Features

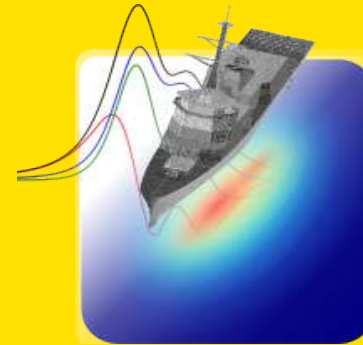
- Geometry
- Materials
- Fire extinguishing systems
- Ship systems

### Results

- Heat distribution
- Smoke and toxic gas spread
- Results are exportable back to NAPA for further processing

Surma methodology ensures the optimization of stealth features without sacrificing any crucial aspects of sea keeping or combat survivability.

Designer can aim for different EM, RCS, IR and visual signature levels. All changes of vessel geometry or hull materials can be immediately analyzed.



## SIGNATURE ANALYSIS

### Aspects

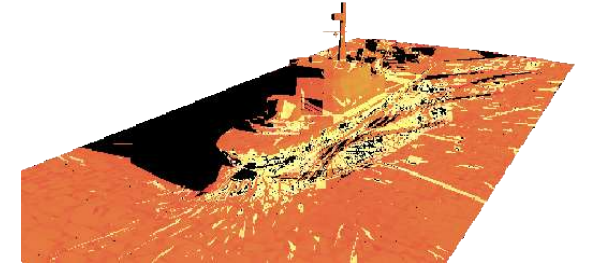
- Underwater EM
- Radar cross section

### Results

- Mine threat analysis
- Degaussing system power
- Input to hit distribution

Our one model concept fits perfectly into early design stage topside radiated EMI/EMC assessments. This ensures the optimization of antenna and sensor placement.

Designer can find potential sources of EMI and other EMI/EMC risks, such as poorly placed sensitive sensors and RADHAZ-areas.



## TOPSIDE DESIGN

### Aspects

- Radiated EMI/EMC
- Coverage calculation

### Results

- EMI/EMC-analysis
- Coverage analysis
- RADHAZ-areas