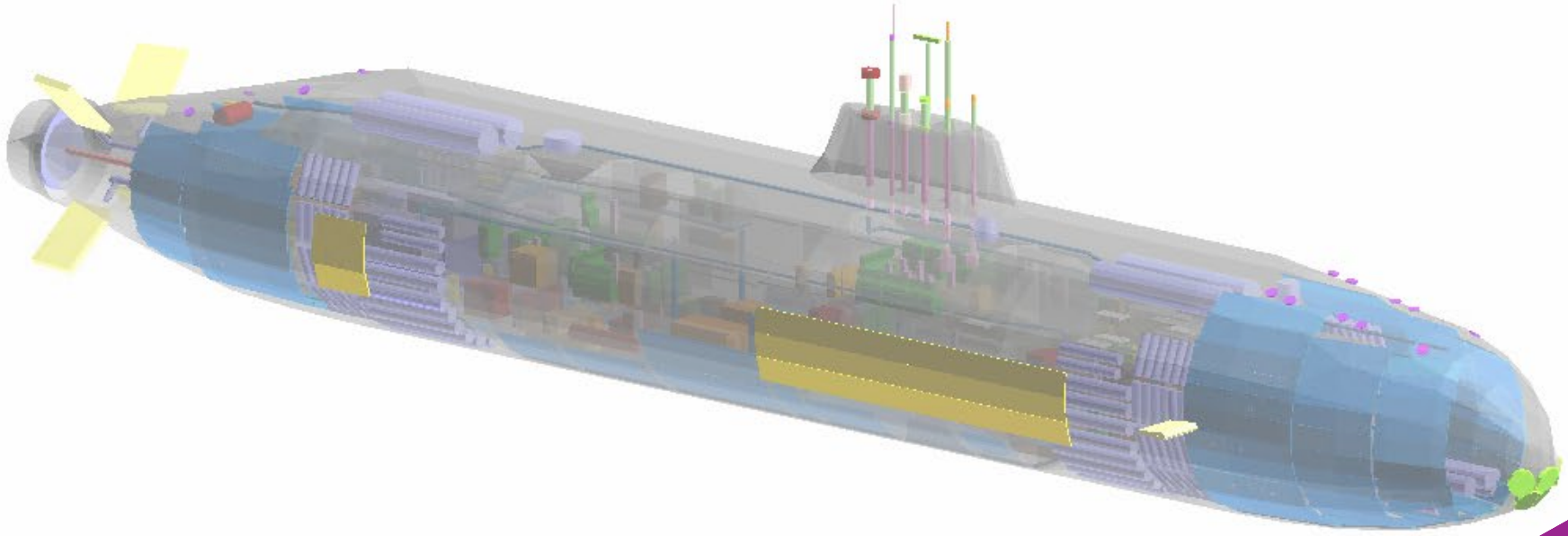
Damage Control and Survivability in Survive® and Survive UK®



24 October 2024

QINETIQ GENERAL

QinetiQ – Maritime Survivability Team

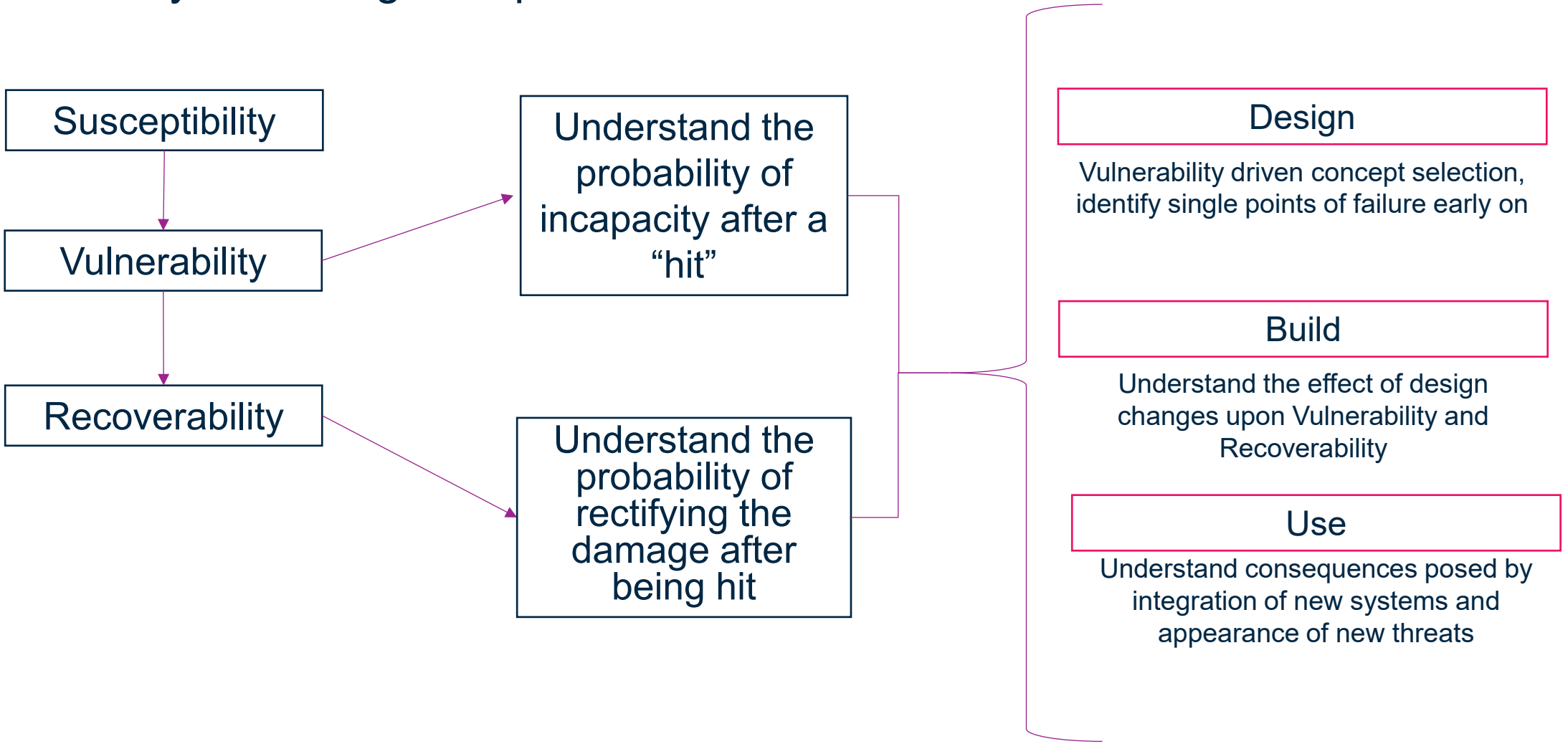
Who are we?

- Team based at QinetiQ's Rosyth site in Scotland
- Part of the wider Survivability team
- Support PDLS as part of QinetiQ's maritime software and consultancy offering
- Regularly collaborate with teams across QinetiQ

Platform Design and Life Support (PDLS)

- Ship/Submarine Design and Optimisation
- Test and Evaluation
- Maritime Life Support
- **Survivability** and Structures
- Maritime Design Software: **Survive®,** Paramarine®, SeaWeigh®
- Maritime Electrical Systems Capabilities

Survivability Modelling - Purpose



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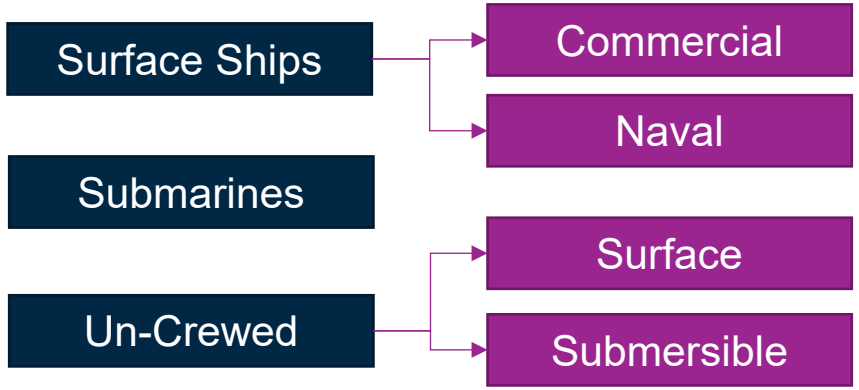
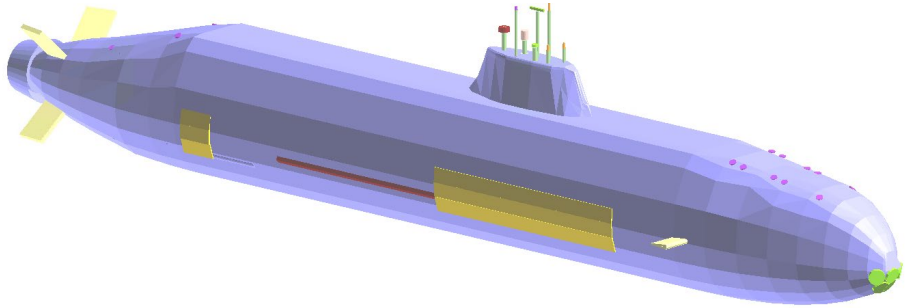
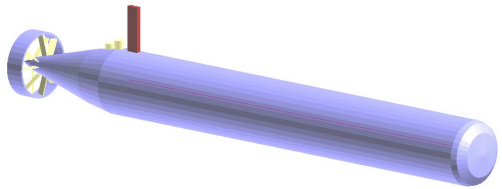
Survivability Modelling- Survive® and Survive UK®

- Survive UK®, and its commercial counterpart Survive®, are Fast Running Engineering Models, primarily used to model maritime platform Survivability
- They are built upon decades of trials and hostile and accidental events
- They can provide assessment of concept, in-build and in-service platforms
- Survive module now available in Paramarine®
- Both can model
  - **Vulnerability:** Ability to understand a platforms capability in surviving an attack
  - **Lethality:** Ability to understand the efficacy of a weapon against a platform
  - **Recoverability**: Ability of the vessel and its crew to respond and recover from an attack
- Platforms Modelled:







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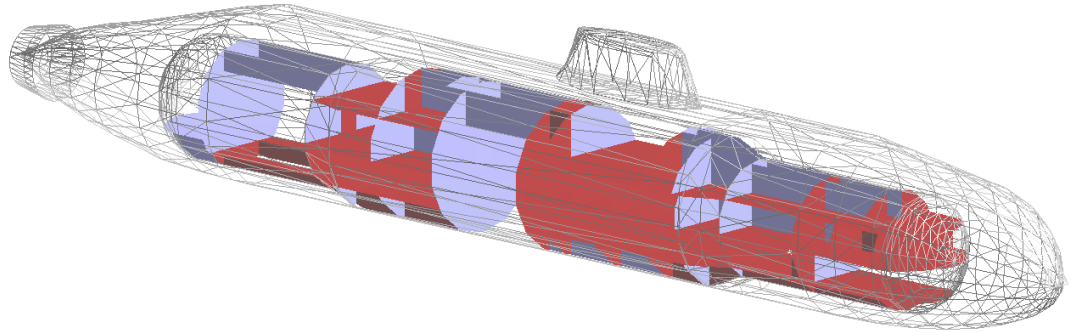
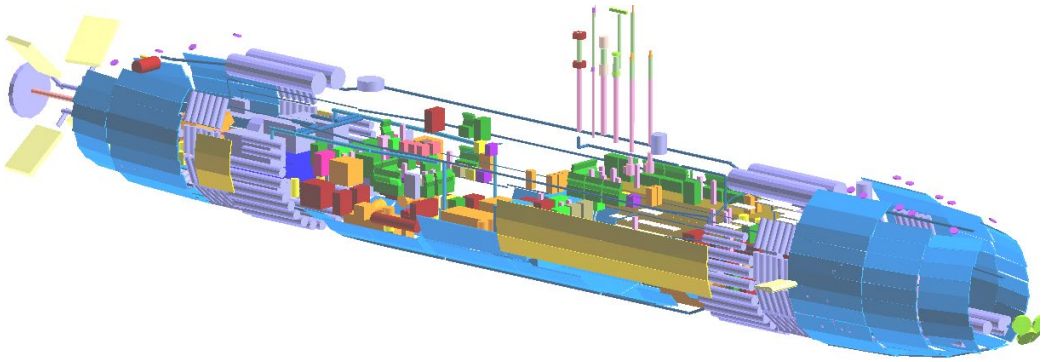
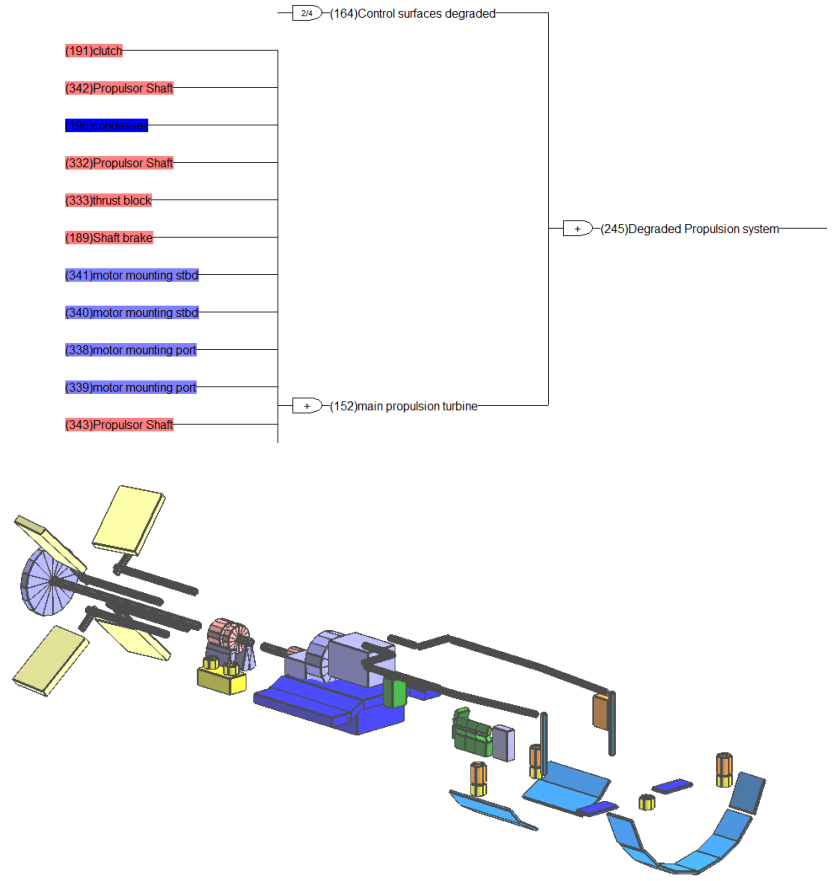
Survivability Modelling - Platform Modelling Method



Structure



Equipment



Systems

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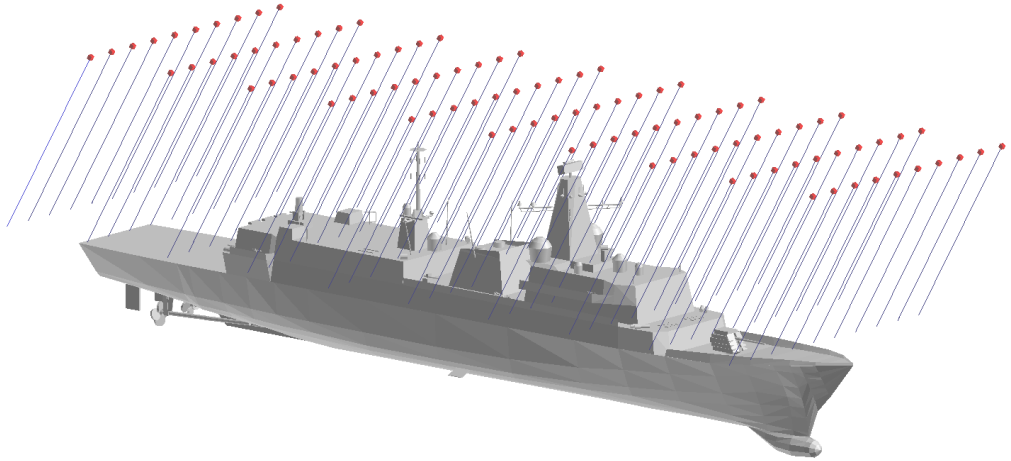
Survivability Modelling -Vulnerability Analysis

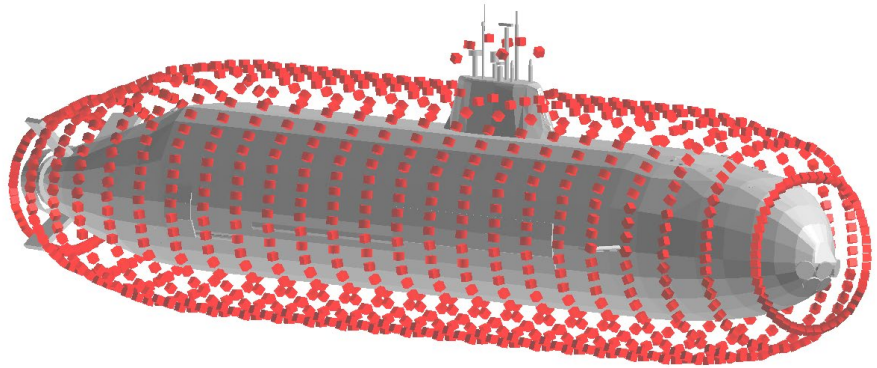
Vulnerability analysis is configured using:

- A user defined or premade weapon(s) such as:
  - Torpedoes and mines
  - Missiles and bombs
  - Bullets and shells
- Weapon is employed against target using attack grids such as
  - 2D & 3D grids,
  - Range to hull analysis,
  - User defined attack points



A Vulnerability analysis will then output:

- Primary damage inflicted
- The availability of equipment, systems and capabilities post attack
- Single points of failure within a ship design
- The vulnerability footprint of the overall platform as well as specific functions and systems



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Properties	Visualisations	A	Systems
Model Options	Yes		
Separate Decks	Off		
Deck Spacing (m)			
Hull Display	Solid		
Sec Hull Display	Solid		
Colour	Material		
Hide Values	None		
Equipment Display	Solid		
Colour	Category		
Show Data	None		
Hide Values	Off		
Cuboid Display	Off		
Plate Display	Solid		
Colour	None		
Show Data	None		
Hide Values	Off		
Compartment Display	Off		

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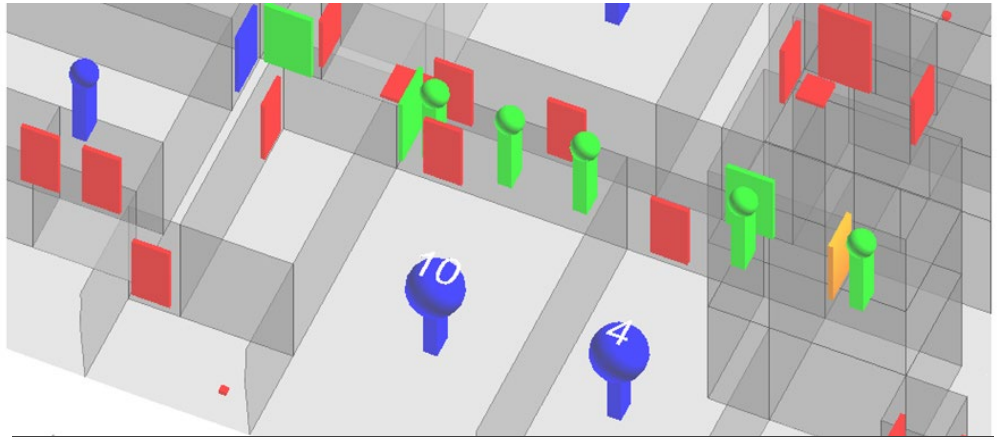
Survivability Modelling-Recoverability Analysis

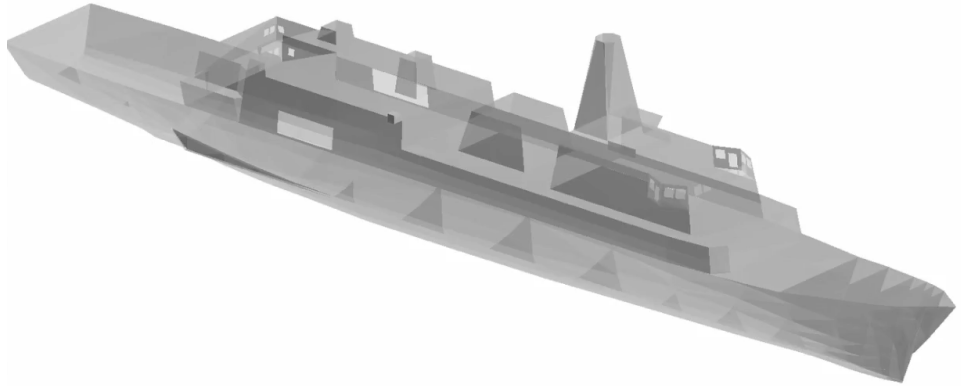
Recoverability modelling can be initiated through a number of methods:

- **Initiate an attack** using a user or pre-defined weapon system, produce vulnerability results that support a recoverability analysis
- **Use the synthetic damage feature** to inflict a user defined scale of damage to an area of a vessel, analyse the crew's response to this
- **Trigger an evacuation** and analyse how capably the crew conduct this for a given configuration



Recoverability analysis will output:

- Crew effort to fight fire and flooding including repairing damage inflicted by an attack upon equipment and structure
- Effect of fire, smoke and flooding upon crew movement
- Crew casualties
- Degradation or recovery of vessel equipment, systems and capabilities over time
- In a worst case, the ability for crew to evacuate, this includes the routes taken, areas of congestion and overall time taken to evacuate
- Also includes crew interaction with DCFF equipment and life-saving apparatus



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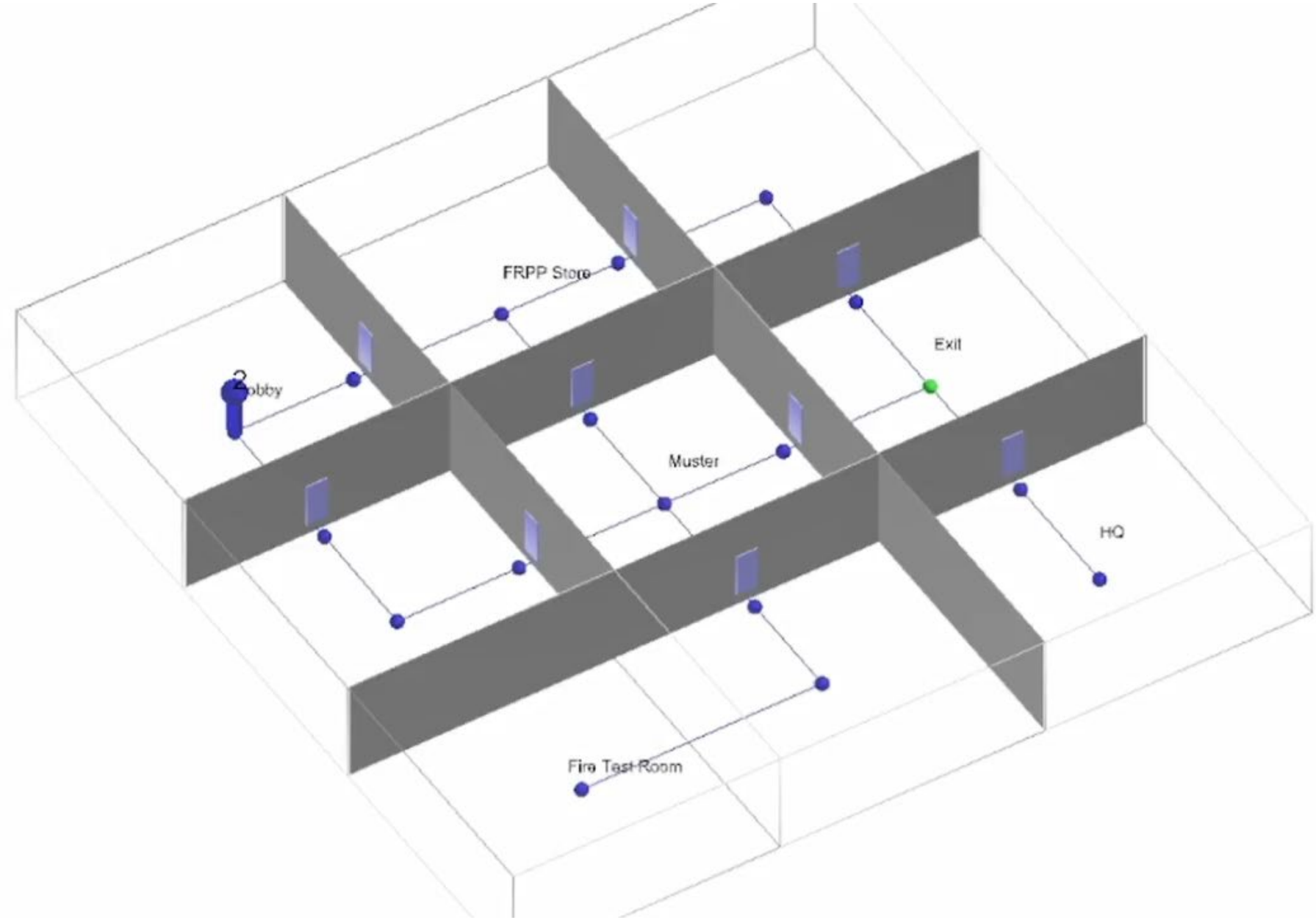

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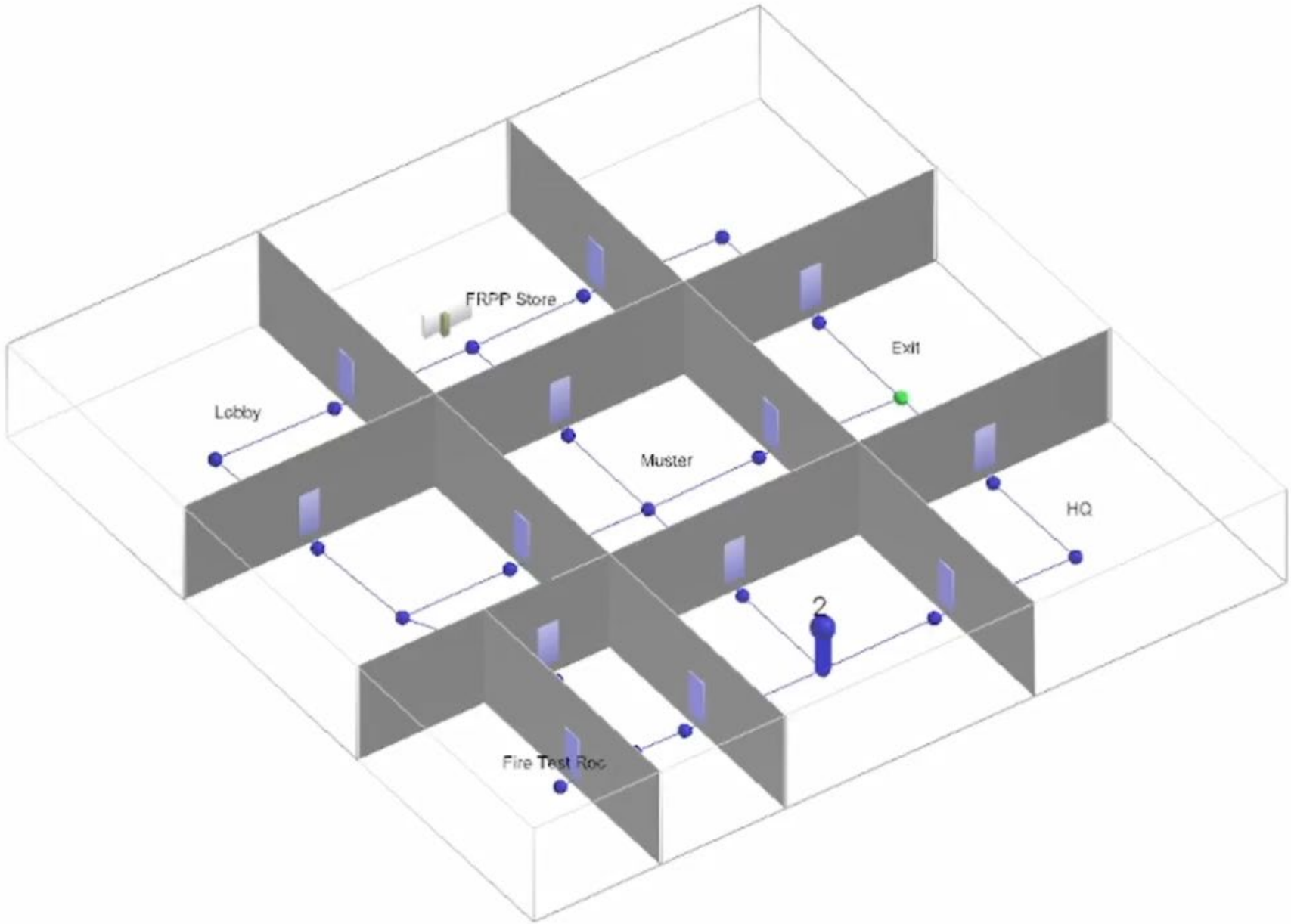

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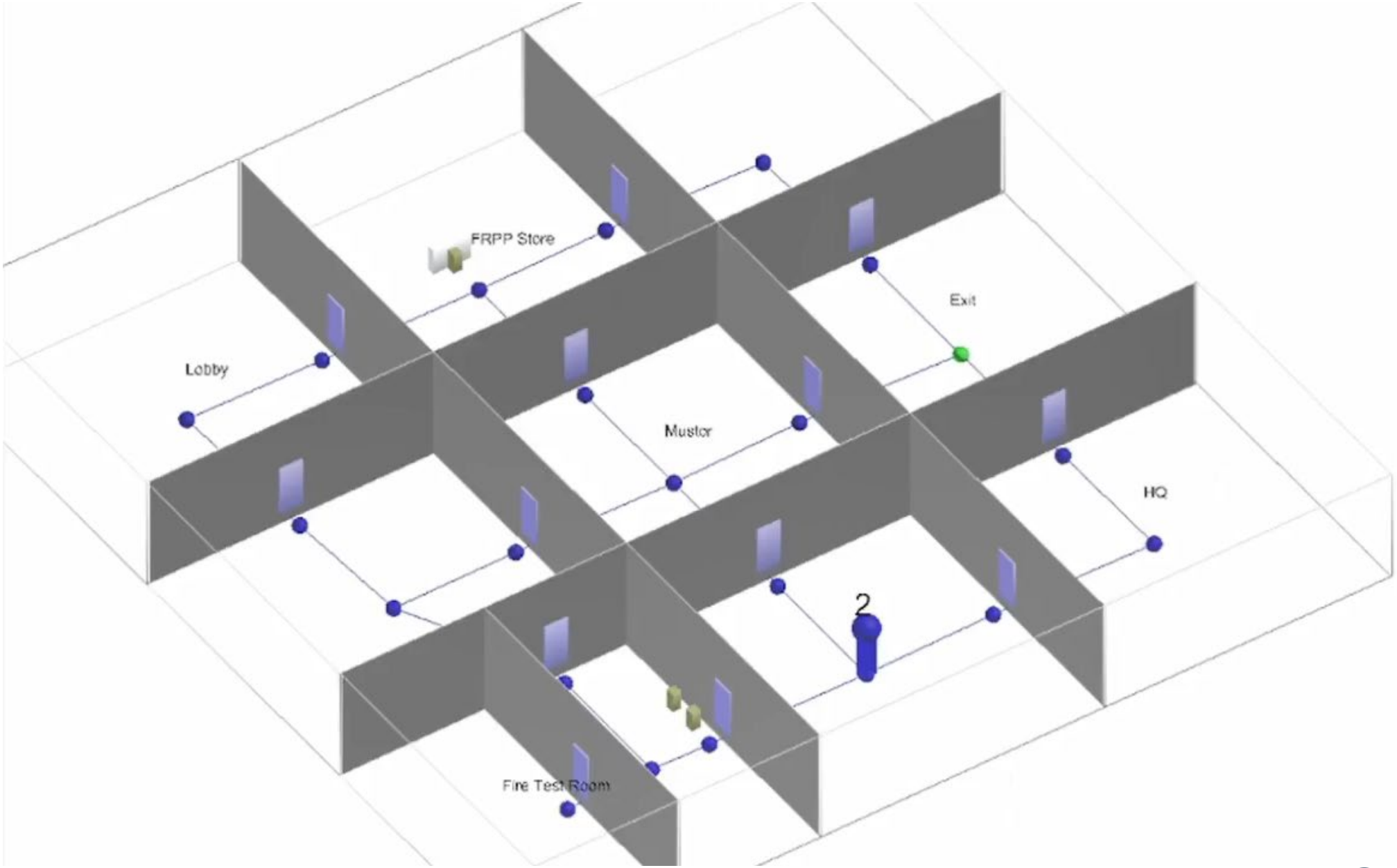

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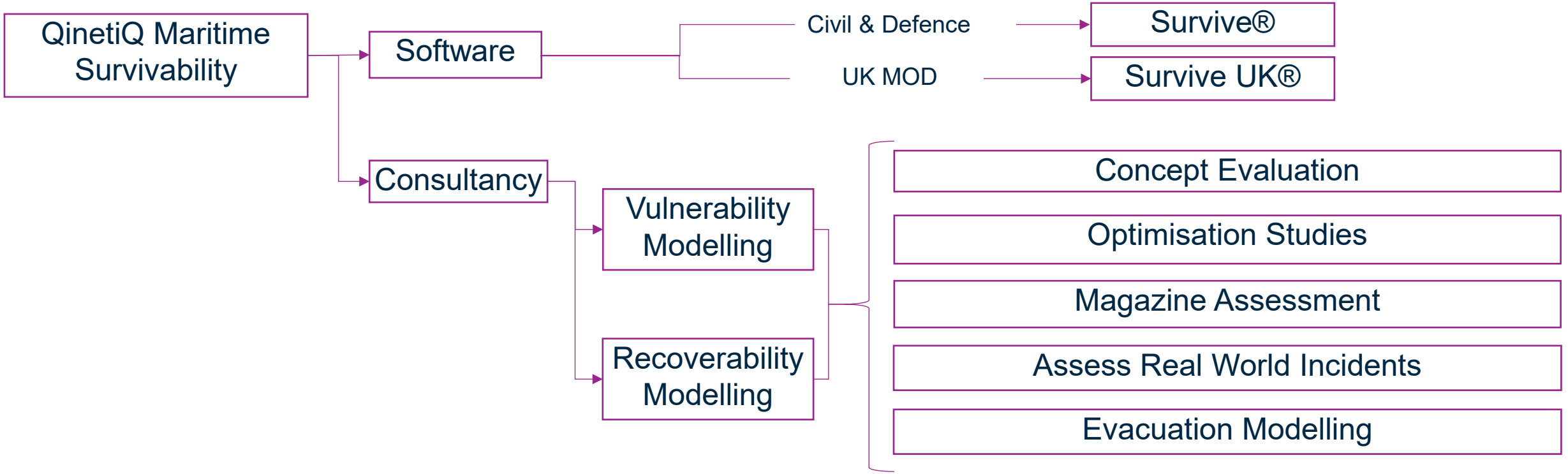
Survivability Consultancy Services and Software Sales



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