What is a **SEAMAN** Simulation?

The core of each SEAMAN Simulation is that passion for hydrodynamics and ship dynamics that goes all the way back to the founding of SSPA. In the same way that SSPA functions as a bridge between theory and practice, each SEAMAN Simulation is designed to be a bridge between that knowledge of ship dynamics, and the very concrete problems that our customers bring to us. Even though the design of each simulation is customised for every problem, it generally involves five areas: Ship Dynamics, Modelling, Instrumentation, Visualisation and Analysis.

**Ship Dynamics**
The core of any serious nautical simulation is calculations on how the ship will react under the influence of the control forces and the ship’s environment. SSPA uses its decades of experience in this area to ensure that the accuracy of the simulation is up to our client’s standards. Ongoing participation in several research programmes ensures that our knowledge of ship dynamics stays at the forefront of the industry.

**Modelling**
Even though the laws governing the behaviour of ships in water are the same, every ship is unique. That is why SSPA has tried and true methods of identifying which factors are relevant in the behaviour of a specific ship, and ways that these factors are accurately affecting the simulation of the ship.

**Instrumentation**
To ensure that the ship can be manoeuvred in a way that reflects reality, good instrumentation is fundamental. SSPA ensures that the right type of instrumentation for a specific simulation is used. What is right for a specific simulation can range from a full mission bridge with instrumentation authentic to that of a real bridge, to a simple desktop mouse control.

**Visualisation**
Visually displaying the state of a simulation at any given moment is important. The purpose of this is to give the person controlling the ship the same situational awareness that they would have in a real situation, and also to give other stakeholders in a simulation an intuitive grasp of situations. SSPA delivers several types of visualisations to ensure that the customer gets the option that is right for them in a specific simulation, considering both accuracy of the simulation and the economics of it.

**Analysis**
While the preparation and execution of the simulations are critical, they are wasted if the right conclusion cannot be drawn from their results. Over the years SSPA has created several tools and methodologies to ensure that both quantitative and qualitative results of the simulation can be reported to the customer in a concise manner. The commitment of SSPA to the customer doesn’t stop with the performed simulation, but continues until the correct conclusion has been reached.
What is possible in a SEAMAN Simulation?

A SEAMAN Simulation is designed to solve the customers problems. Due to the extensive experience of simulations at SSPA we know that these problems come in a variety of forms. Therefore, the software behind a SEAMAN Simulation is designed from the ground up to be flexible and extendable. Nevertheless, there are some demands that are common for most simulations. This page attempts to list these demands. However please keep in mind, if something is missing from this page, it does not mean it is not possible in a SEAMAN Simulation, please contact SSPA and we will do our utmost to solve your unique problem.

**General simulation control**
- Full mission simulations
- Part task simulations
- Desktop simulation
- Batch simulations
- Real time simulations
- Accelerated time simulations with autopilot
- Fast time simulations

**Ship Models**
- Displacement and semi-displacement mono hulls
- Catamarans, trimarans
- LNG carriers, tankers, bulkers
- RoRo, RoPax, cruise ferries
- Container vessels of all existing sizes
- Ruddertypes: spade, semi spade, shilling, fish tail rudder
- Continuous pitch or fixed pitch propeller, waterjet.
- DP system simulation
- Extensive model library of 700 ships
- Automatic ship modelling tools based on model tests at SSPA

**Ship Dynamics**
- Six degrees of freedom
- Handles all wind, wave and current conditions
- Windgust and lee effects of nearby structures
- Current model may vary with time, and space in three dimensions
- Bank and shallow water effects
- Engine and rudder dynamics
- Ship-ship interaction effects
- Failure simulation of rudder, engine, bow thruster, etc
- Ship-fender interaction with detailed fender dynamics
- Mooring dynamics

**Tugboat Dynamics**
- ASD, Voith Schneider and conventional tugs
- Automatic tugs controlled by simulator operator
- Manual tug controlled by a tugmaster
- All tugs are dynamically modelled
- Propeller race effect on tug
- Tug-ship water interaction
- Push/pull tug operations
- Indirect or direct mode tugs

**Visualisation**
- Arbitrary number of bridges
- Arbitrary number of viewing screens on each bridge
- Tug bridge has the option of using a 360x180 degree field of view in 3D through the use of virtual reality goggles
- In house development of visual ship and port models
- Snow and rain visualisation with wind effects
- Wave effects
- Visual propeller wash effect
- Multiple bridge view positions
- Bird’s eye view for debriefing and analysis
- Intuitive binocular function based on virtual reality goggles

**Instrumentation**
- Realistic radar generated from the 3D environment
- Nautical chart display adhering to the S52 standard
- Conning display with all relevant indicators
- VHF radio for tug-ship communication