



Vuosaari harbour entrance.

ENGINEERING VISUALISATION

VIRTUAL MODELS ARE PLAYING AN IMPORTANT ROLE IN 3D MARITIME ENGINEERING PROJECTS.

Virtual models are the only media available that allows all project members to see the design from the final users' perspective and integrate different design domains together. Virtual models offers huge potential in maritime engineering projects as a mean of collaboration, integration and communication. Novapoint Virtual Map is a breakthrough technology that allows designers and engineers quickly and cost-effectively create virtual models within seconds. Weather effects such as rain, fog and snow as well as vessel traffic simulations can be visualized. Novapoint Virtual Map is in use at Port of Helsinki in Finland. The first versions of the new harbour's virtual models were built in 1997. Different alternatives have been used for many purposes from public presentations to ships' pilots training.

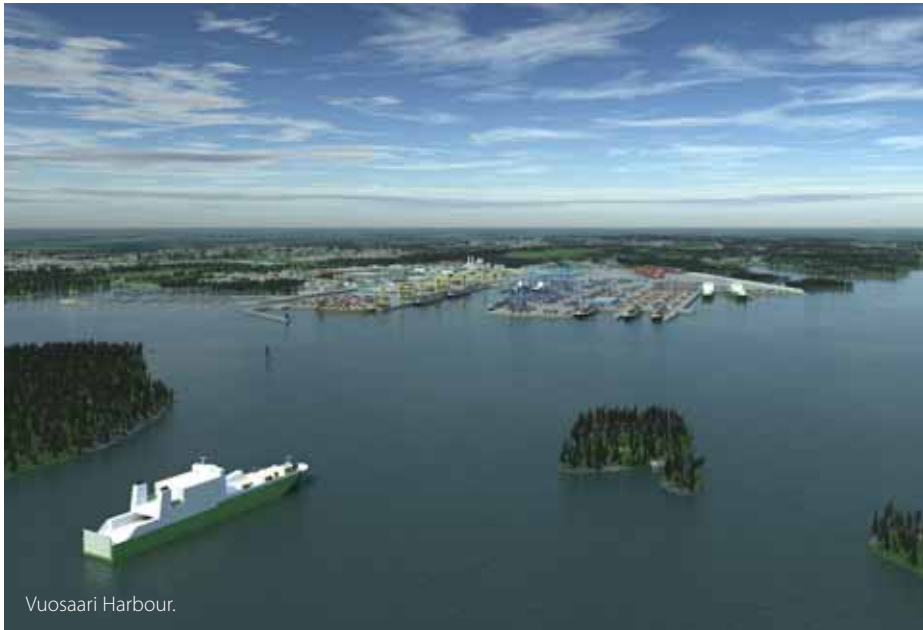
Benefits of virtual models

Virtual model is the only media available that enables politicians, public and experts such as engineers to interact and understand the full extents of a maritime engineering development project and see the end-product before work is even started. Using virtual models engineers and designers can easily create flyovers, pictures and interactive simulations for designed structures, harbours, ports, waterways, channels, underground structures and many other complex maritime engineering development projects.

From an engineering point of view, virtual models provide a

unique analysis tool. Only virtual models can combine different engineering domains, such as road, railway, harbour and fairway, together in a way that engineer may see the design from another engineers' point of view. Traffic and vessel simulations and weather effects may be visualized as well as changes and readiness of the project over the time. Virtual model can be constructed for analyzing quality, safety and environmental fitting of the project any time during the project life cycle. Resulting virtual models can be easily published on the Internet or intranet that allows anyone to interact and move freely in the model anytime.

The strongest benefits of the virtual models are affordability and scalability. With virtual modelling software that costs only a few thousands, euros engineer can build models on a daily basis that may save millions of euros. Basic models may be enhanced with animations or even human actors. Virtual models can be adapted for any situation and presentation purposes. They are cost effective in every phase of the project from feasibility study to construction and maintenance activities. Virtual models are especially effective and powerful when analyzing and visualizing environmental impacts of the project. When millions of tons of earth and stone is moved engineers and designers must be sure that the final product fits into environment properly and that all the environmental requirements are duly met.



Vuosaari Harbour.

The Case of the Vuosaari Harbour

The Port of Helsinki in cooperation with the Finnish Maritime Administration, the Finnish Rail Administration and the Finnish Road Administration is conducting the project. The harbour's cornerstone was laid on 7 January 2003. The harbour will go into operation in 2008 and will reach its full extent in 2009. The harbour capacity is 18 million tons. Current cost estimate for six-year project is 508.5 million euros. The length of the fairway is 36 km and draught depth of 11 m. Virtual models have been used and they still are in use at the Vuosaari harbour project. The first virtual models were built at 1997 and updates have been made ever since 1-2 times in a year. The software used for building the models was Novapoint Virtual Map already. In the case of the Vuosaari project, the Novapoint Virtual Map software has been used to incorporate all the harbour design domains together, including a cargo harbour, a logistics area, traffic channels (harbour road, harbour railway line and fairway) and residential areas.

The adaptations of the Vuosaari virtual model are many including the exploration through the Internet that is available at <http://www.vuosaarensatama.fi/en/index.html>. Example of the adaptation of the model for a specific purpose is pilot training. Pilots use virtual model to see through the water surface in order to find out potential bank effect locations along the fairway and get an impression about the fairway in different weather conditions.

The Vuosaari virtual model has evolved during its lifetime and it has been used for port and harbour planning, public presentation, architectural design, civil design and construction and even movie making purposes. The total costs of the all customized virtual models and work related to them in the Vuosaari project were less than 1/1000e of the project total costs.

Novapoint Virtual Map

Novapoint is a professional, integrated, civil engineering design and construction software with a strong emphasis on infrastructure design – it is developed with professional users in many countries. Road designs, railway designers, waterways designers, public works departments, consultants and universities in Europe use Novapoint. In all main markets, the product has been customised to meet local design norms and standards in co-operation with the relevant local civil engineering authorities. Since its introduction in 1988, Novapoint has consistently expanded and improved its line of software modules to serve civil engineers in these different fields in Europe. The software has an installed base of over 10.000 users and continues to expand, specifically in Spain, the United Kingdom and Ireland, and more recently, in France. Novapoint Virtual Map is a simple and easy to use tool for a user to create a fully interactive visualization environment. Users can walk, drive and fly freely inside the model and analyze design results. Novapoint Virtual Map is web enabled so that users may easily publish virtual models in the Internet. The most important benefits of the software read as follows:

- 1) Wide range of input data. Novapoint Virtual Map can use almost any data from AutoCAD drawings.
- 2) Automatic model generation. Based on the user configuration, the virtual model is generated automatically from input data. User doesn't need to take care of any 3D specific definitions because the software does them. It is easy and fun to use.
- 3) Novapoint integration. Novapoint Virtual Map integrates with other Novapoint civil design tools. Design models like channels; harbour and port plans, roads and railways, bridges, and landscaping elements can be imported to Virtual Map directly from other Novapoint civil design applications.
- 4) Novapoint Virtual Map includes free Model Viewer. Novapoint Virtual Map costs only few thousand euros and it includes its own efficient viewer module for real time viewing of virtual models. Virtual models created with Novapoint Virtual Map may be viewed free realtime in any computer, by anyone anywhere - the free Viewer is included into model itself.
- 5) Publish models on the Internet. Virtual models can also be published on the Internet with the new Virtual Map ActiveX technology.
- 6) Animation. In the Novapoint Virtual Map viewer the user can record every move made in the model and play this movement back immediately or render this directly to video (*.avi).

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References:

- Vuosaari Harbour Project, "Vuosaari Harbour - The Most Modern Baltic Harbour Under Construction", 2004
- Vuosaari Harbour Project Internet page: <http://www.vuosaarensatama.fi/en/index.html>
- Novapoint Internet page: <http://www.vianova.fi/vm/>



Vuosaari dock cranes.