

Effective operations in ports

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“Global logistics chain suffers port bottlenecks”, “Seaports struggling with increase in container vessel sizes”, “Citizen complaints over port neighbourhoods”...

The above list of newspaper headlines could be prolonged endlessly, highlighting that obviously seaports have some technical and organisation problems to deal with. With this in mind, the move by the European Commission to launch a specific port research project within its 6th Framework Programme for Research and Technological Development certainly was a good one. The costs of the project are equally shared between the EC and the project consortium, and the Directorate General Research monitors the project, ensuring a high standard of research.

In May 2006 work started within “Effective Operations in Ports”, or EFFORTS as the acronym reads, and in October of this year it will conclude. What can the port industry and its clients, the shipping companies, expect from this research and investigation?

Changes in the port environment

Port technology and operation is not an area that one can look back on as having a long history of research. The industry has always relied on its practical expertise, and the impressive development of European seaports has proved it right. In the past, getting scientists into the boat would probably not have resulted in rowing faster. First came the extreme boom, specifically the container boom, and now this sharp recession currently being experienced is providing challenges where traditional tools appear partly edgeless. The operational environment has changed in several aspects depicted, for example:

- Close-mesh global transport networks are sensitive to volumes and lead-times hence being complex in the scientific meaning of this term
- Inappropriate legacy infrastructure which makes enhancements take a long time and with huge budgets
- In view of the expected changes, statistical data to base investment and development upon has become less robust, as extrapolating the past will not match the future

So when drafting the research specification, EFFORTS faced a situation where it was not possible to simply proceed with work

that had been initiated by others, the port industry widely being scientific virgin soil. Investigating the actual needs, however, resulted in the potential of keeping an army of researchers on the payroll for ages. A selection of research targets was required and done according to the interests of the industry and the competence available in the European consortium of 37 partners coming from nine member state countries.

Project organisation

In order to organise the project in a transparent and manageable manner, it was grouped into four areas led by the ports of Dublin, Le Havre and Gijón:

- Navigation in Ports
- Port Environment
- Port Organisation
- Training, Education and Human Resources Development as a cross-project activity.

Navigation in Ports

The EFFORTS Navigation in Ports teams work along the lines of researching how large ships can efficiently enter ports which are no longer able to provide a generous amount of manoeuvring space. Three work packages cover:

- Improved modelling of ship-tug hydrodynamic interaction to cater for improved simulation models to train tug masters
- Improved portable pilot units to support ship-borne SOLAS V equipment not sufficiently meeting some of the current navigational challenges in narrow waters and a tailor-made situation display for tugs showing the whole relevant manoeuvring situation in a birds eye view
- Port ECDIS, after inland navigation ECDIS a further component of the maritime geographical information system which was commenced with ECDIS, the electronic chart display and information system. The core issues are port-related features (such as e.g. bollards and even jetty fenders), high accuracy for both navigation and fairway and port maintenance (e.g. dredging) and a gridded 3D-model (ECDIS is based on a 2D-Model where depths are indicated by depth areas amended by selected soundings).

Port Environment

Like almost all industries ports need to meet dramatically increased environmental standards and expectations from citizens living in the surrounding areas. The necessary scope of work includes water and air quality, noise, smell and even visual pollution when people expect white seagulls painted on a blue sea but are confronted which container gantry cranes protruding high into the sky. Currently the EFFORTS Port Environment activities cover:

- Energy management
- Water quality in respect of impacts from ships' ballast water and from diluted aluminium from sacrificial anodes from cathodic protection of steel construction
- Volatile organic compounds (VOC), i.e. light hydrocarbons from e.g. bunker fuel barges
- Perception of port-generated noises by people as a basis for counter measures.



Figure 1. Prototype of portable pilot equipment (Sea Fix), providing the speed, positioning and heading information. Results are shown on a laptop display.

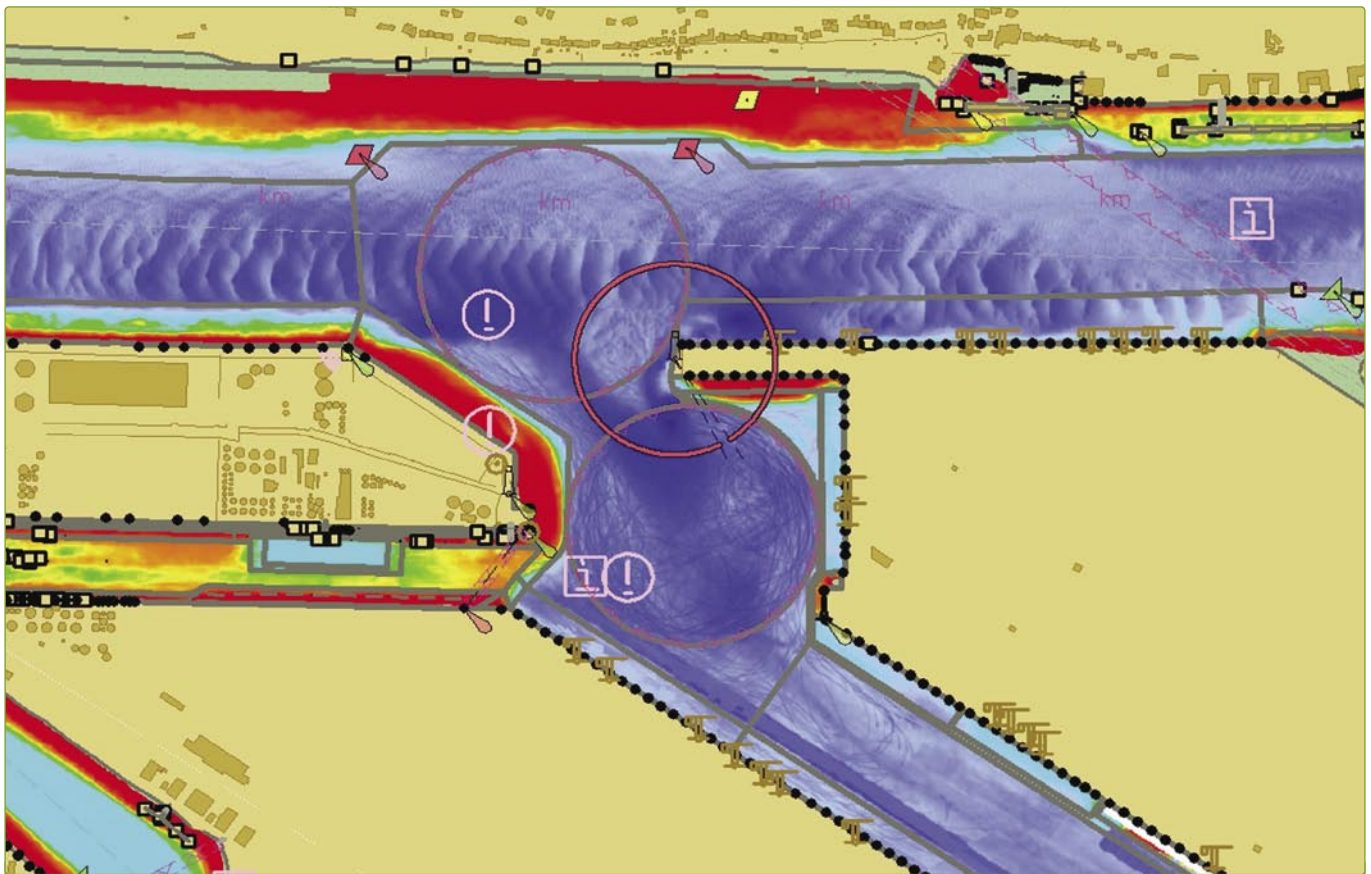


Figure 2. Results of a Port ECDIS test in the port of Hamburg (high resolution bathymetry).

Port Operations

Aside from very small ports, European ports usually are industrial cities rather than just ship-to-shore cargo transfer points. Logistics logic causes manufacturers to search the vicinity for material and goods import and export gateways. The operation of ships in ports as the core activity depends on a wide variety of services, and all kinds of cargo and passenger operations in and around terminals generate further services. Thus a classification scheme was needed to clearly allocate project activities to the relevant port area but also identify horizontal and vertical interactions within the complex port system. This classification methodology, however, should have the potential to survive the project and become a sustainable port management tool. The development of such a tool is found under the topic of Port Operations, providing the umbrella for:

- Port process taxonomy
- Risk Assessment Framework.

Port Training, Education and Human Resources Development

The aim of the cross-project activity Port Training, Education and Human Resources Development is to factually and formally improve vocational training in ports on a European standard and provide further education on the academic level in order to

familiarise university graduates with ports and allow for port-specific promotions.

Conclusion

Today, globalisation no longer allows ports the ability to operate in a kind of natural reserve, hence, even in the view of strengthening the competitiveness of European ports, does standardisation play a key role, and it may not stop in front of Europe's borders. In addition to the original role of standards that ensure a defined level of quality, the assurance of high financial investments in product development and infrastructure has become an even more important role. EFFORTS therefore must address the whole port related industry, the administrations and communities to convince them that the project is on the right track and requires their support in order to ensure sustainability of results, and thus motivate others to push the car after the EFFORTS team steps out at the end of the project.

A number of specific demonstrations in Lyngby (Denmark), Hamburg, Dublin, Le Havre, Thessaloniki and Brussels (which is not a seaport but the home of the European Commission), will provide people opportunities between June and October of this year to become familiar with the project achievements and trigger new ideas to make the port industry an innovative one in order to be best prepared to meet the next boom.

ABOUT THE AUTHOR

Jens Froese is Professor and Director of Maritime Logistics/ISSUS at Hamburg University of Technology as well as Professor of International Logistics Management and Engineering at Jacobs University Bremen. He holds a Geodesist specialisation in sea survey and hydrography along with Industrial Engineer specialisation in sea transport, and a Master certificate unlimited (experience as ship master world-wide trade). Prof. Froese is currently a member of the Germanischer Lloyd Technical Board and the Danish-German Working Group for Fehmarnbelt crossing, and has many years of experience in research and industrial development projects in

the field of ports and shipping, mainly covering the areas of: safe and efficient navigation, port and terminal operation, environmental protection and sustainable operations, and safety and security.

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