



Welcome to EFFORTS



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Dear Reader,

my interest in the value of education and human development stretches all the way back to my paternal grandfather who was a teacher. Chief Executive Enda Connellan of Dublin Port Company (DPC) and I agreed that education and development should be regarded as an investment and not a cost. So he and the DPC Board approved the establishment of the DPC Training and Development Unit. Through contact with Professor Jens Froese of Hamburg, we began our involvement in EFFORTS. What excites me most of all is the concept and philosophy that defines the work.

My colleagues in Dublin have benefited greatly from the EFFORTS experience and it is very heartening to witness the degree of genuine friendship and understanding between the ports and other partners brought about by involvement in EFFORTS. EFFORTS has already succeeded beyond my expectations and I can see that the emerging innovations will indeed address some of the operational problems experienced by European port communities.

Yours Kevin

News from the sub-projects: WP 1.3 Port ECDIS

By Jan Prahm, TuTech Innovation GmbH, Germany

The work package 1.3. Port ECDIS, is lead by Dieter Seefeldt from the Hamburg Port Authority (HPA) in Hamburg. He is responsible for all kinds of geographic and hydrographical surveys and information within the whole area of the Port of Hamburg and his department provides the user with up to date topographical and hydrographical information for the ease and safe of navigation and port maintenance.

ECDIS stands for Electronic Chart Display and Information System. The main purpose of this work package is to create a highly precise Electronic Navigational Chart (ENC) which could be used

in an ECDIS especially for port areas and at the same time to be able to update them constantly with the latest topographic and bathymetric data. The precision of the hydrographical survey fulfils the highest level of the brand-new IHO S44 standard, Special Order, published in February 2008. The topographic information is also from outstanding precision, because it would be derived direct from land survey data within cm-accuracy level, especially for fixed aids to navigation, buildings, quay walls, pontoons etc. So, for example, even the exact position of a fender will be given.

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WP 2.1. Clean Energy Management

By Jean-Claude Dellinger, AREVA TA, France

In light of developing countries' legitimate ambitions, industrialised countries will need to reduce their emissions by a factor of 3 to 5 by 2050 to reduce overall greenhouse gas emissions linked to human activity to a level that the planet can recycle naturally by the middle of the century.

This a major challenge in and of itself. It is made even more difficult for the period in question by a spontaneous trend toward growth in energy demand, even in industrialised countries, and by constant readiness to satisfy most of this demand through accessible fossil energy reserves without an immediate risk of running out.

The response to this challenge, which the economic actors have not yet entirely sized up, will call for changes in behaviour, in regulations and in energy prices, but above all for **technological innovations** which are essential to maintain, or further improve, standards of living and international competitiveness, the two of which are inextricably linked together. The priority of priorities must be given to research on energy control (improving energy efficiency and carbon auditing) in such areas of energy use as transportation and industry

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WP 2.2 Water Quality

A multidisciplinary approach for the future port environment management and water quality survey

By Samuel Pineau, Corrodys, France

Port environment is probably the highest interface between human activity and marine environment, including the influence of industries, cities, indirect impact from onshore activities such as industry and agriculture, ships and port activities

Despite the high research effort around the world concerning the marine environment, maritime ports are given up by the scientific community

too, mainly induced by the industrial picture and the complexity of the interrelationships between numerous factors in harbours. Port authorities and European Commission are getting more and more aware of the water quality of port environment, mainly for the anticipation or implementation of directives for the pollutants and as much as prevention of invasive species risks.

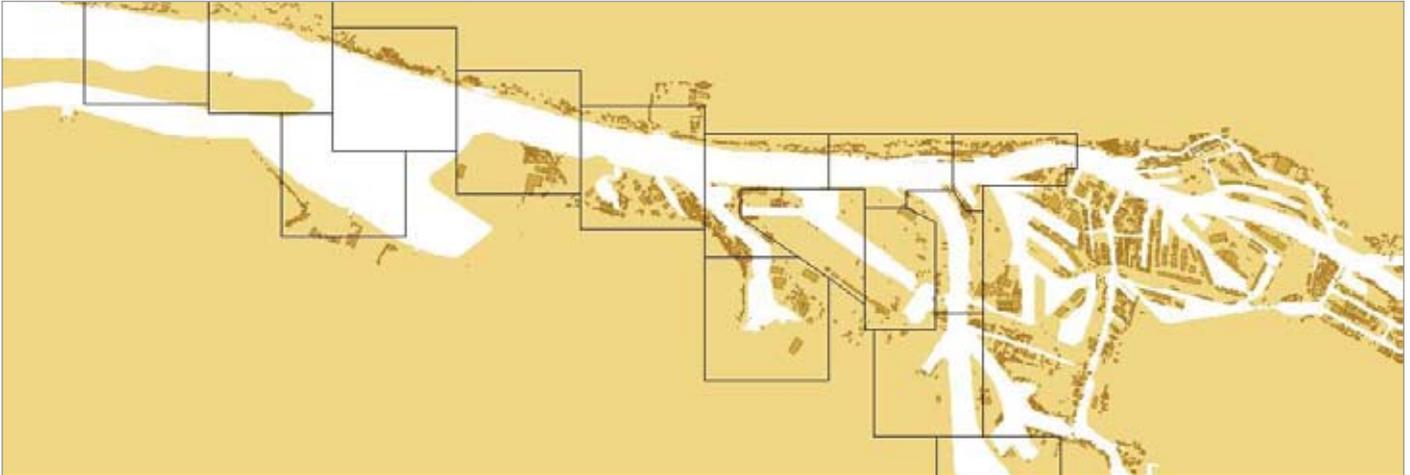
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News from the sub-projects: WP 1.3 Port ECDIS

By Jan Prahm, TuTech Innovation GmbH, Germany

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New PortECDIS in comparison to current ENC cell configuration

Managing bigger vessels, increasing global ship traffic, less harbour space, berth organisation, dredging purposes etc. requires accurate and up-to-date high-resolution geographic and bathymetric data to provide all necessary information, in some cases also in real-time. As a GIS (Geo Information System) the Port ECDIS is able to interact with other port related geo data sources to improve the interoperability of harbour related tasks to support the maintenance work of the port authorities.

These very precise and up-to-date Port ECDIS ENCs will facilitate superior manoeuvring and navigation in ports and support the ease and safety of navigation in narrow fairways, and harbour basins. Also, the flow of traffic in the access channel and the port can be planned much better if the actual depth of the fairway is exactly known. Vessel Traffic Management Systems (VTMS) can use these Port ENC data and may be some kind of Route Planning's could be possible.

Even the representation of the data for large scale charts from 1:500 (for docking manoeuvre?!) up to 1:5000 without losing accuracy is possible. On the other hand the official ENC for the Port of Hamburg was developed only for a scale 1:15000 (SCAMIN 1:1000000 - 1:24999). The HPA is collecting all the bathymet-

ric data in the Port of Hamburg with their own four survey vessels equipped with state of the art hydrographic survey equipment including echo sounder systems like MBES (Multi Beam Echo Sounder) or MCES (Multi Channel Echo Sounder System). The topographic surveyings are also performed by HPA using five land surveying groups and additionally the use of remote sensing data (Orthophotos, LIDAR information).

All base data should be integrated into a Port ENC with much smaller geographical cell dimensions than in the current official ENC, which covers the whole port area for seagoing vessels in only one ENC cell. These new basic Port ENC cells are technically compatible with the existing ECDIS standard so it would be no problem to update the ECDIS systems currently installed on the ships.

There are also some new features that are not described in the current ECDIS standard, but required by the harbour master, pilots and other users like tug masters. And last but not least, we have some ideas for other new features; they are also not yet as standard in the current ECDIS. These are so called reference models (i.e. a 3D model of the planned and theoretical harbour or access channel bottom) and the gridded bathymetry (depth information in a grid form and no

contour lines and depth figures). We want to ascertain the possibility of representing all the data within an extended ECDIS dataset, which is open for future ECDIS developments.

During the project a workshop on 8. April 2008, held in Hamburg, where ECDIS users from other organisations (ports, pilots etc.) were invited to discuss how a Port ECDIS would help them, i.e. what additional requirements they have for such a system.

After the evaluation of this workshop a further systematic development of the Port ECDIS (Port ENC) will be made, integrated and tested in conjunction with the Portable Pilot Unit PPU, currently under development by Marimatech from Denmark, another EFFORTS project partner, in WP 1.2 named Precise Navigation and Manoeuvring in Ports.

When the Port ENC prototype is ready it is planned to test it together with the PPU on one of the HPA survey vessels and later also on larger vessels arriving at or departing from the Port of Hamburg. If these trials are successful and an implementation into the daily routine is possible, helpful and fulfils the requirements of the users in ports, then the Port ECDIS work package reaches the goal and will be finished successfully!

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WP 2.1. Clean Energy Management

By Jean-Claude Dellinger, AREVA TA, France

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As for the energy offer, the recommendation is to bank on the energy mix combining nuclear, fossil and renewable sources. Energy choices also have a major impact in the fight against environmental and noise pollution. Bringing in alternative sources of energy to comply with environmental requirements is an essential approach in this context. The current trend in **primary energy** costs combined with the need to reduce CO2 emissions in the atmosphere requires the different economic actors to address their overall energy need.

- What is/are the energy resource(s) that best meet our needs?
- How can we secure our supply?
- Which combined "energy mix" system will allow us to optimise our primary energy consumption and reduce risks?

In the climate change debate shipping should be regarded as the best available solution to the global need for transportation. Shipping is the most energy efficient mode of transport and the backbone of global trade. Seen in light of the enormous volume of goods carried by ships, the CO2 emissions from shipping are small. The reason for this is that for many decades shipping - even without specific regulation on this issue - has had a strong market driven incentive to focus on reduction of fuel consumption. However we fully acknowledge the need for further reduction of air emissions from shipping in terms of emissions per unit

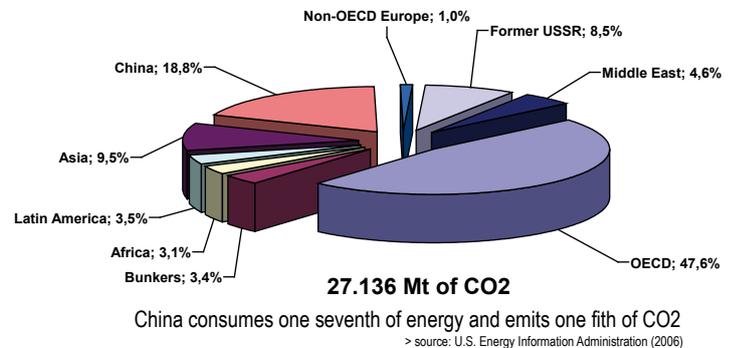
of transport work, in particular in view of the projected growth in world trade and thus seaborne transportation, and is of the opinion that the way to achieve environmental protection must be found in a holistic manner. To be successful, such an approach should take into consideration the availability of technology to reduce emissions, the need to encourage innovation and the economics of world trade. Reducing pollutants such as SOx and NOx may have a negative effect on CO2 emissions. A holistic approach to air emissions is therefore necessary to ensure an overall environmental improvement in the long term. It should also be kept in mind that European shipping plays a key role in global maritime trade with a controlled fleet of almost 41% in gross tonnage of the world merchant fleet.

Consequently it should also be kept in mind that the European ports are high energy consumers which leads to a high environmental impact at the same time, related to air and water quality and noise. Expected evolutions for the future, in terms of traffics, process or legislation may emphasize this situation. In order to improve it, as for shipping, two ways of development are considered (and combined): distributing energy production and integrating of clean energy sources.

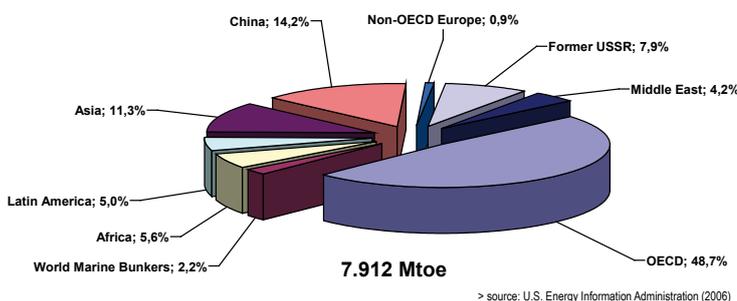
European ports need to develop solutions to ensure the security of energy services, to decrease the cost of energy, to reduce environmental impacts and improve its management. Consequently, there is a strong need to lead research activities regarding the evaluation of renewable energy sources and energy recovery from waste for the development of a "clean" and "secured" integrated concept of distributed production of energy in ports.

The EFFORTS project aims to analyze and propose solutions for management of energy issues in European ports at short, medium and long terms.

World CO2 Emissions



World Energy Consumption



The port consumption model, resulting from the aggregation of the different models of unitary energy consumptions of each port operations, will serve as a basis for the mapping and help to decision tools. Impacts (to be quantified through the help to decision tool) will concern an improved management of energy supply and consumption in ports: (i) lower costs by efficient production, supplying and consuming chain, (ii) reduction (and combined): distributing energy production and integrating of clean energy sources.

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WP 2.2 Water Quality

A multidisciplinary approach for the future port environment management and water quality survey

By Samuel Pineau, Corrodys, France

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The main objective of WP 2.2 about water quality is to focus an effort research on two complementary topics concerning industrial activity of ports: The invasive species from ships' untreated ballast water discharges (WP 2.2.1) and the aluminium contamination from cathodic protection of metallic infrastructures (WP 2.2.2). These approaches need of several analytical and

expertises domains: microbiology, marine biology, physical-chemistry, electrochemistry, material sciences, eco-toxicology and maintenance, dredging and environment Departments of port authorities. This collaboration include French (University of Caen, CORRODYS lab, IFREMER, Port of Le Havre, TL&A, CET-MEF), Finnish (VTT, FIMR) and Irish (Port of Dublin) entities.

WP 2.2. Water Quality

WP 2.2.1

Ballast water influence during ships reception

Assessment of active substances for the treatment of ballast water, according to their:

- biocide effect,
- environmental acceptability,
- onboard usability.

WP 2.2.2

Aluminium contamination related to the protection of ports infrastructures

Aluminium contamination level in water, sediment and living organisms in the port environment.

Aluminium toxicity to marine organisms and potential environmental impact of the use of sacrificial anodes.



Visible deballasting in Mediterranean port



Visible aluminium anodes on piles (PAH site)

Concerning WP2.2.1, the first phase of this study was the literature survey, which resulted in the identification of numerous scientific publications and other references related to biocides.



Biochemical identification of marine bacteria from ballast water

Most of the biocides are developed for drinking water or sewage applications, therefore the references focusing on ballast water applications were limited. Based on the result of the assessment, it was decided to select three active substances for laboratory tests: two products previously identified and tested for the ballast water treatment (Peraclean® Ocean and SeaKleen®) and one new product with comple-

mentary specificities and never tested for ballast water treatment (Mexel® 432/336, with corrosion inhibitor and biofilm treatment properties). Seakleen® and Peraclean® Ocean will be tested with a limited test protocol while Mexel® needs to be tested with more comprehensive test protocol.

In parallel of this active substances selection, organisms in situ samplings were conducted directly in ballast tanks from several ships in French ports (origin of ballast waters: Europe, Asia, and America). The bacteriological investigation focused on potential human and/or animal pathogen species. From sampling results and literature data the bacterial mix used in the next step of the project will include Aeromonas, Vibrio and Enterococcus genus isolated from ballast water samples. Concerning phytoplankton, the first sampling campaign lets appear some potentially toxic diatoms (such as Pseudonitzschia sp). The most interesting and noxious species, though, could not be sampled by this attempt.

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In such a context and in order to get suitable individuals for experiments, it has been decided to use the strains already cultivated and available in laboratory (particularly dinoflagellates). The brine shrimp *Artemia salina* was chosen as a test zooplankton organism for the laboratory scale test trials, because of its broad availability, ease of culturing and sustaining, extensive previous literature and wide use as a test species in various toxicity tests.

In the next steps of this WP, active substances previously cited will be tested and compared with several criteria (International Maritime Organisation recommendations), including efficiency against organisms and corrosive impacts.

Concerning WP2.2.2, two sampling campaigns in the port of Le Havre have been already performed. During these campaigns, surface sediments samples and water samples were collected on the different sites in the port and in surroundings at different levels in the water column (surface, bottom and half-depth when possible). The analytical method has been optimized for these samples and the analyses performed by ICP-AES are in progress. During 2008, another sampling campaign will be conducted in order to determine Al contamination and speciation with the depth and the geochemical processes in porewaters. Laboratory tests with Al anodes will be performed at the marine station of Luc sur Mer (natural seawater test station). In parallel of this analytical approach, the first step of the determination of aluminium concentration levels in mussel has been performed. In this preliminary biomonitoring study, accumulated Al concentration has been measured in the mussel *Mytilus edulis* collected in the Port of Le Havre in November 2007 and February 2008. Mussels were collected from five sites (same as for sediment and water sampling) and Al concentration was determined in the whole soft body. Analyses were carried out on the resulting solutions by means of atomic absorption spectrophotometry. The spatial and temporal variability of Al con-



« Ballastodrome » developed by IFREMER for the test of biocide efficiency against organisms' mix

centration in mussel will be analysed by 2 additional sampling campaigns to be performed in June and October 2008; an in Vitro test will be set up during the next months in order to study the bioaccumulation rate of aluminium in mussel in controlled conditions such as Oxygen, Temperature and Al concentration in sea water.

An active biomonitoring test will be performed by mussel transplanting in study site from a reference station in order to assess the real Aluminium bioavailability to biota. Finally, it will be performed bioassay tests based on percentage of abnormal D-larvae (oyster) or performed on sea-urchin.

It's probably one of the most analytical WP in EFFORTS project, requiring large equipment, several scales of experimentation and a strong collaboration between different scientific topics. Several new investigation methods will be performed which could be used in the future for the environmental survey and pollution prevention.



Flame Atomic Absorption Spectrometry for aluminium analysis from mussels

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Efforts ports

In every EFFORTS Newsletter we present a short description of one of the participating ports. This time we present the Port of Livorno



LIVORNO PORT AUTHORITY (LPA)

Livorno Port Authority as a Public Body is responsible for guiding, programming, coordinating and controlling port operations and other industrial and commercial activities carried out in the Livorno port. It elaborates and adopts Port Master Plan; leases maritime domain areas and assets falling under its jurisdiction; issues authorizations to work in the port; sees to dredging seabeds and, in general, to the maintenance of the common parts of port areas; assigns and oversees activities aimed at providing services of general interest.

The Port of Livorno

LPA VOCATIONAL TRAINING CENTRE



Since 1998 Livorno Port Authority (the first in Italy) has set up its own Vocational Training Centre (VTC).

The VTC manages a training, certification and accreditation system that benefits the whole port community, developing and upgrading the port workers' skills, with the aim of helping the improvement of safety and quality standards in the operational services.



The Vocational Training Centre (VTC) of the Livorno Port Authority

The areas on which the Livorno Port Authority VTC operates are:

- Vocational Training activities for Human Resources (HR) re-training and upgrading;
- Certification of professions and skills accreditation activities for existing professional profiles in the port sector;
- EU, National, County and District level funded projects devised to promote HRs development in the port sector, with the aim of optimizing both financing and devising resources to implement the labour policies for port workers;
- Cooperating with Universities and Research Centres in order to facilitate the transfer of know-how and technological innovations to the port sector;
- Development of Innovation and IT in Vocational Training Activities, such as managing a Simulation Centre for training of operational port workers, devised for developing and testing innovative methodologies and contents for learning through simulation.

THE PORT VOCATIONAL TRAINING SYSTEM

The main objective of Livorno Port Authority in the Vocational Training sector is to guarantee that port sector workers skills meet the job profile requisites foreseen both in the national port legislation from the 84/1994 Port Reform Law onwards and EC guidelines and directives.

This objective is pursued through the following:

- Training need and work organization monitoring activities;
- Certification and accreditation system through entry-training and re-training modules for each port job profile;
- Implementation of standard training modules through using simulators;
- Verifying and auditing the re-training of temporary port manpower;
- Planning and directly or indirectly carrying out continuous training for all personnel authorized to work in the port sector;

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Port of Livorno

LPA VTC WITHIN EFFORTS PROJECT

The main activity of LPA Vocational Training Centre within the EFFORTS project is the implementation of a web-based tool for training needs detection, called "EFFORTS Observatory", exploiting previous EU projects results achieved in the port of Livorno and also on the basis of a common experience between Dublin Port Company and LPA VTC in the field of Vocational Port Training Networks.

The EFFORTS Observatory will act as a "support tool" for facilitating the gathering and analysing of several kinds of training-related information such as work processes, employees' roles, duties, skills, competencies, expertise, etc..., allowing EFFORTS partners the possibility of recording, organizing, sharing, comparing and analyzing these information.

Moreover, LPA VTC aims to cooperate with EFFORTS partners in order to share, discuss and improve its already existing modalities for releasing a "certified curriculum".

For these reasons EFFORTS is a perfect opportunity for LPA VTC for developing a European level common needs analysis system, defining a common port training model transferable to the European context and adopting and disseminating the "Skill Passport" system (i.e. a recognized skills certificate workers are required to have in order to be authorized to work in the port).

Finally, the hope is that this project will enable to strengthen the cooperation with other partners.

Events

- 17-19 June 2008
transport logistic China, Shanghai, China
- 25-26 June 2008
TranSec World Expo, Amsterdam, Netherlands
- 18-19 September 2008
International Symposium on Ship Operations, Management & Economics, Athens, Greece

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