

IN BRIEF

4



Photo: Jeroen Janmaat / TNO

During the measuring campaign BP-07 (Battlespace Preparation 2007) south of Elba an oceanographic/acoustic buoy of the University of the Algarve (TNO project partner) was launched from the Hr.Ms. Snellius, one of the Netherlands Royal Navy's hydrographic recording vessels.

STUDYING CONDITIONS UNDER WATER

TNO investigates the predictability of the world under water.

In the context of terrorism and piracy, there is a need to be able to detect submarines, divers and small, unmanned underwater vessels using acoustic equipment. The range of this sonar equipment depends on the *weather conditions*, also under water.

Within the Military Oceanography project TNO is analysing underwater weather forecasts using an ocean model of the Massachusetts Institute of Technology in Boston. TNO is also using a combination of these forecasts and its ALMOST product, which models sonar performance, to estimate the detection range of the sonar equipment and its variability. Use is also made of sophisticated observations of underwater sound propagation performed some years ago by the Woods Hole Oceanographic Institute. During a monitoring campaign off the coast of the US State of New Jersey an area of several hundred square kilometres of the Atlantic Ocean was mapped using satellites, ships, instruments on the sea floor and unmanned vessels.

With an eye to the effective use of sonar as well as the safety of amphibian landings and the effectiveness of mine counter measures, the seafloor, currents, wave motion and variations in sound speed have been identified. TNO and the two aforementioned institutes are now using these acoustic and oceanographic *in situ* observations to verify what can be expected of the sonar range and the underwater weather.

Plans for a follow-up study this summer in the vicinity of Gibraltar have been delayed due to the unexpected unavailability two of the participating research vessels. The researchers hope to begin the study in the summer of 2011.

Info: mathijs.schouten@tno.nl

METHOD TO IDENTIFY PHOTOINITIATORS

A unique analysis enables the reliable and rapid identification of the seventeen most common photoinitiators used in UV-print inks.

In the printing on packaging materials the varnish or printing ink can be dried using UV. This process uses photoinitiators. If the barrier properties of the packaging material are inadequate, these substances may migrate to the packaged product via the gas phase or directly (direct migration).

In the case of insufficient functional barrier properties the migration of these compounds into foodstuffs and transfer via the gas phase may occur. And if the packaged product is a foodstuff, then the results could be highly undesirable; a while ago migration from the packaging material led to high concentrations of the photoinitiators benzophenone and 4-methylbenzophenone being found in various foods. In the production process of printed food packaging material other photoinitiators are also used, and there is every possibility that these may also migrate to the packaged product.

Now that there is so much focus on the two photoinitiators referred to above, it is not inconceivable that varnish and ink producers will start using other photoinitiators, with all the concurrent risks. Therefore, TNO has developed a reliable and rapid method to identify seventeen photoinitiators used in food packaging materials. This involves making an extract of the packaging material or the foodstuff that is then analysed using liquid chromatography (LC-MS). This method has already been successfully used for several customers (packaging printers, food packagers).

Info: henriette.veenendaal@tno.nl,
karl.ehlert@tno.nl

NANOTECHNOLOGY FOR THE OIL AND GAS INDUSTRY

Can nanoparticles be used in oil and gas reservoir management?

Oil companies are constantly looking for new methods to better chart subsurface oil and gas reserves. Over the past couple of years, attention has turned to nanotechnology since methods based on this technology are expected to enable better utilisation of existing oil and gas reserves. It is in this context that TNO is exploring the applicability of functionalised nanoparticles for reservoir management in the oil and gas industry.

TNO has been studying the usefulness of nanoparticles in medical applications for some time to gain information on the body, for instance. By analogy, this study will be looking at how nanoparticles can be used to gain information about the structure of the subsurface and flows into the reservoir. The

first stage of the research will examine whether synthesised particles can survive the extreme conditions of oil and gas reservoirs.

TNO is carrying out this study for the Advanced Energy Consortium in the United States. This consortium comprises oil companies and service companies, including BakerHughes, BP, ConocoPhillips, Halliburton, Marathon, OXY, Petrobras, Schlumberger, Total and Shell. American universities like Rice University, Harvard, Boston University, A&M University and the University of Texas, Austin normally undertake the pre-competitive research into production and reservoir management technologies financed by the consortium.

Info: maurits.doorn@tno.nl,
daniel.turkenburg@tno.nl

TNO ANNUAL REVIEW 2009

The TNO Annual Review of 2009 out this month.

The prospects for 2010, the year in which TNO 'warms up' for the implementation of its new strategy for 2011-2014, are favourable. That is the view presented in the TNO Annual Review that appears this month.

In addition to the report from the Board of Management, this publication contains a CSO (corporate social responsibility) annual review, examples of projects that had an impact in 2009 and, of course, a comprehensive financial picture. This shows that TNO made an operational loss in the year under review, something that can be attributed to the economic crisis to which TNO, like many others, fell foul.

Our commitment to the environment means that the TNO Annual Review of 2009 appears in digital form. It can be downloaded via www.tno.nl/annual-review.

Info: saskia.vlaar@tno.nl

TNO PARTNER IN THE KICS OF EIT

TNO is involved in all three Knowledge and Innovation Communities (KICs) so far established within the European Institute of Innovation and Technology (EIT).

New: a European knowledge centre for international top quality, the European Institute of Innovation and Technology (EIT) – an initiative of the European Commission chairman José Manuel Barroso. The Massachusetts Institute of Technology (MIT) serves as the example for the EIT, though in the latter the corresponding centres will not be centrally located but will comprise chains of excellent research groups within Europe. These consortia represent universities, research institutions and companies covering the entire knowledge triumpherate of education, research and innovation.

The first three KICs have already been selected for the themes of Climate Change (*Climate KIC*), Sustainable Energy (*InnoEnergy*) and Future Information and Communication Technology (*ICT labs*). TNO is one of the few European research organisations represented in all three consortia.

Each KIC has five co-locations where the work will be performed. Eindhoven/Leuven is a co-location for *InnoEnergy* (with other co-locations being Karlsruhe, Grenoble, Barcelona, Poland and Sweden), the Randstad (Dutch conurbation in the west of the country) as co-location for *ClimateKic* (others being London, Zurich, Berlin and Paris) and Eindhoven as co-location for *ICT labs* (Stockholm, Berlin, Helsinki and Paris the others).

Info: laurens.hoedemaker@tno.nl



Photo: Rob Hulbers / HH

IN BRIEF

22

THE BUSINESS ASPECTS OF NEW WAYS OF WORKING

How do New Ways of Working relate to business targets? And how can they be captured in a model?

New Ways of Working (NWW) is often associated with working from home, during commutes and at a workplace at the office that best suits your activity. This is conditional on ICT enabling the work to be place and time independent and that the office environment is also adapted to NWW. NWW is regarded as more dynamic and productive than the *old* style. The term sustainability also comes up often: a smaller office suffices and there is less need to travel. But these are all just assumptions; there has hardly been any scientific support or proven effects of place and time independent working. There is a lack of knowledge about the kind of impact NWW has on business and organisational targets or social issues like labour productivity and mobility.

The 'Dashboard for New Ways of Working' project aims to find out whether a comprehensive theoretical model can be developed whereby NWW measures are related to the business aspects of productivity, vitality and sustainability. The project is funded by the Dutch Ministry of Economic Affairs and by KPN, Philips, Rabobank (TeleWerkForum) and Veldhoen + Company. It contains three phases of which the study referred to above is the first. The first phase has a term of six months. In the next phase of this theoretical model will be validated by experimental measurements. The third phase will see the results of the study translated into an instrument that will provide insight into the effects of NWW: a so-called *dashboard*. In addition to those companies already participating, there is still an opportunity for other interested companies to take part in the second phase of the project.

With the knowledge being developed in this project, the companies involved will gain broad insight into the introduction of NWW in terms of their individual business targets, and TNO will build up penetrative knowledge in the field of working conditions and supporting technology within the knowledge economy.

Info: christiaan.vandenberg@tno.nl,
merle.blok@tno.nl; www.tno.nl/hnw

TORPEDOES: SIMULATING USE AND DEFENCE

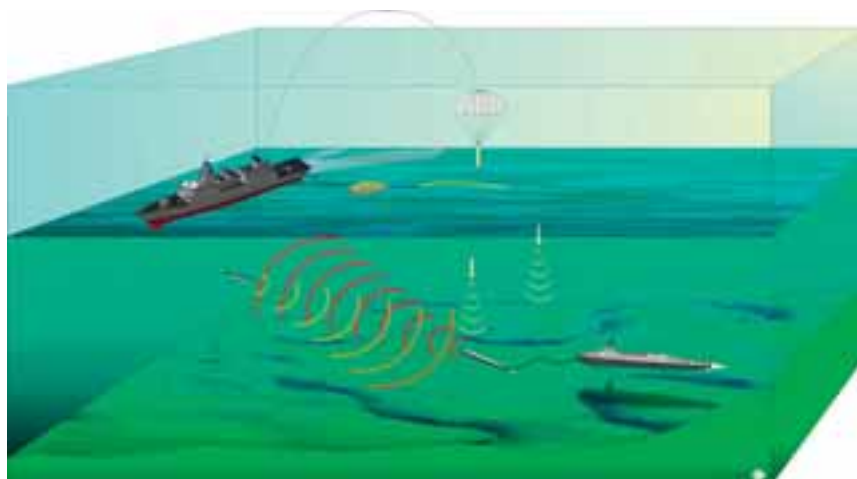
On 12 March TNO presented the TDSTB simulation tool to the Maritime Doctrine and Tactics Centre (MDTC) of the Royal Netherlands Navy.

Torpedoes fired from submarines are among the most destructive of weapons, with a single torpedo able to sink a large ship. One way of developing and evaluating effective defence against such *heavyweight torpedoes* is to perform torpedo firing exercises, but that is both expensive and, consequently, limiting. Using torpedoes is a complex business, in part because of the relative movement of the target and prevailing oceanographic and acoustic conditions; one wrong move may lead not to the destruction of the intended target but to the betrayal of the submarine's presence.

In order to gain greater insight into the use of and defence against modern torpedoes, TNO has developed a range of simulation programs for the Ministry of Defence. The current Torpedo Defence System Test Bed (TDSTB), which contains the realistic modelling of different torpedoes and ships as well as the characteristics of the underwater world, enables extensive scenarios to be created. This means that use and defence tactics can be tested and evaluated, with torpedo firing exercises (that remain necessary) becoming an even greater spin-off.

TNO has now developed a standalone version of the TDSTB for the MDTC so that torpedo firing exercises can be prepared and the effectiveness of the current NIXIE 25A torpedo defence system investigated.

Info: danielle.keus@tno.nl



Screenshot of the TDSTB.

TOOL FOR EFFICIENT GAS PRODUCTION

A new monitoring system supports operators and so enables more efficient gas production.

Natural gas production is becoming increasingly more difficult not only because existing reserves are dwindling and the conditions in the gas fields themselves are complex but also because the contractual conditions for production are becoming more and more complicated, a result of the liberalisation of western European energy markets. Now, more than ever, there is a need for an optimal production strategy. The German energy company BASF/Wintershall has developed a real-time monitoring system for this. It enables the company to monitor and optimise its gas field production in the southern part of the North Sea.

As part of this initiative, Wintershall and TNO Science and Industry are developing a model-based advisory tool that uses real-time production monitoring data to optimise production. The tool is being used for early event detection, intelligent condition monitoring and to support operators and engineers to make informed decisions that have direct added value to operations. The tool is already in operation at one of the Wintershall fields and its functionality is currently being extended and made available for new fields.

Info: anton.leemhuis@tno.nl

IPCC WORKSHOP AT TNO

TNO hosted a special workshop of IPCC experts in Utrecht from 23 to 25 March.

One of the activities of the IPCC (Intergovernmental Panel on Climate Change) is to develop guidelines for estimating and reporting greenhouse gas emissions. The workshop saw some seventy specially nominated participants from around fifty industrialised and developing countries discussing the uncertainties in and the quality of the emission estimates that could be made using these guidelines.

TNO was given financial support from the Dutch Ministry of Housing, Spatial Planning and Environment to host this workshop. TNO is a key contributor to the development of the method employed by the IPCC and put its expertise in this field to good use during the workshop.

Info: tinus.pulles@tno.nl

SAFETY OF AIR VENT CAPS

TNO to determine the safety level of air vent caps on ships.

Are ships' air vent caps sufficiently safe to be considered water-tight in the new leak stability calculations of the International Convention for the Safety Of Life At Sea (SOLAS 2009, a set of technical and equipment regulations for sea-going vessels)? The Air Vent Cap project has been set up within the Maritime Innovation Programme to find an answer to this question.

A working group of shipowners, shipyards and suppliers has commissioned TNO to visit ports and ship repair yards affiliated to the VNSI (Association for the Dutch Shipbuilding Industry) to investigate defects. This investigation along with the on-board findings will enable calculations to be made to determine the level of safety of these vents in terms of SOLAS 2009.

Info: lex.vredeveltdt@tno.nl

As an independent organisation, TNO turns knowledge into practical applications and so contributes to the innovative capacity of business, both at home and abroad, as well as social and international organisations.

TNO has a broad package of products and services, from advising on policy, products and services and performing contract research to the testing and evaluation of products and systems and certification according to international standards. In addition, TNO focuses on future knowledge issues through the TNO Co-financing programme, with co-financing through business that helps establish the direction of this knowledge development. Finally, TNO provides licences to some 700 inventions in its patents portfolio.

The expertise of nearly 4,300 employees has been brought under five core areas:

- TNO Quality of Life
- TNO Defence, Security and Safety
- TNO Science and Industry
- TNO Built Environment and Geosciences
- TNO Information and Communication Technology

The TNO Companies holding company brings innovations to the market via its specially founded subsidiary companies.

TNO magazine

TNO magazine is a quarterly technology update issued by TNO, the Netherlands Organisation of Applied Scientific Research.

Coordination

TNO Corporate Communications Department
P.O. Box 6050
2600 JA Delft
The Netherlands
phone +31 15 269 49 90
fax +31 15 262 73 35
e-mail redactie@tno.nl

Editors

Jan van den Brink
Renée Heijligers

Text production

CPLS text & copy, Goirle

Art direction

Onnink Grafische Communicatie b.v.,
Oudenbosch

Lithography and printing

Koninklijke de Swart, Den Haag

ISSN

1386-5447
© TNO

Reproduction, in whole or part, of the contents of this magazine is only permitted with the prior consent of the Editor and with acknowledgement of the original source. Photographs or other illustrations can only be used if permission is obtained from the photographer or artist in question. Although every effort has been made to ensure the accuracy of the information contained in this magazine, TNO cannot accept any claims for damage or loss resulting from the use of the information or data contained in this magazine.

TNO Infodesk

If you are looking for specific expertise within TNO, would like to contact someone about the products or services or would like further information about any of the topics covered in the TNO magazine, please contact the TNO Infodesk.

T +31 15 269 69 69
F +31 15 261 24 03
E infodesk@tno.nl
www.tno.nl/wegwijzer

TNO | Innovation for Life