# **CMST News**

The Newsletter of the Centre for Marine Science & Technology

## High Performance Computing and Visualisation

CMST was recently successful in gaining two of the inaugural internship research grants from iVEC (the Interactive Virtual Environment Centre). The two internship projects are:

**3D CFD Modelling of an AUV** Daniel Veen is studying the flow around the control surfaces of an Autonomous Underwater Vehicle (AUV) using Computational Fluid Dynamics (CFD). He started this work by investigating twodimensional flow as part of his undergraduate degree project and is now extending it to three-dimensional flow by making use of the iVEC high performance computing facility. Daniel is supervised by Dr Kim Klaka from CMST and Dr Stuart Midgley from iVEC. Stereo-3D Compatibility of **Consumer DLP Projectors** Tegan Rourke has been testing a wide range of consumer DLP (Digital Light Processing) projectors to determine which projectors can be used for stereoscopic visualisation using liquid crystal shutter 3D glasses. The project has

Modelling of fully separated flow around an AUV control surface at 13 degrees angle of attack, using Fluent CFD software.

found six consumer DLP projectors which allow 85Hz stereoscopic 3D viewing. The use of these low-cost projectors brings stereoscopic viewing to a far wider range of application areas. These two projects follow on from a previous project supported by iVEC which investigated the feasibility of a Virtual Hydrodynamic Test Facility for the Western Australian marine industry.

May 2006

## **Fisheries Acoustics**

CMST PhD student Miles Parsons has been active over summer using single and multibeam sonar to map fish aggregations. The work is part of a Fisheries Research Development Corporation grant run through WA Fisheries with CMST as a collaborative partner. Using WA Fisheries vessels we have collected multibeam and

single beam samples of Samson fish aggregations, which form over wrecks west of Rottnest Island. The project researchers are also investigating sound production by fish as a technique to study fish aggregations. Two seasons of sea noise recordings have already been collected in the Swan River to monitor Mulloway.



Representation of two aggregations of Samson fish near Rottnest Island.

## Ships in Shallow Water



A container ship in Hong Kong harbour

In early 2005 CMST was contracted by the Hong Kong Marine Department to perform ship motions trials on 16 of the world's largest container ships transiting in and out of Hong Kong harbour. These trials used high-accuracy GPS receivers and a base station to measure vertical motions of each ship to within 5cm. This research has led to an increased understanding of ship underkeel clearance, so that cargo carrying can be maximized, with reduced risk of the ship running aground. The work was conducted in cooperation with Perth based company MetOcean Engineers.



#### Sea Gyro Reducing Roll

January 2004. The company

designs, builds and licences

motion stabilisers for boats

and small ships. Field tests

have shown that roll motions

are reduced by more than

50% by Sea Gyro. The first two prototypes were

installed on a 20m motor

with excellent results. They

were subsequently sold to

operates a 22m dive

scheme for business

Show in Shanghai.

a very happy customer who

charter boat out of Broome.

AusIndustry COMET grant

development and recently

exhibited its products at the China International Boat

The company has been awarded funds from the

yacht in May 2004 and tested in Cockburn Sound

In 2002 Colin Ayres joined CMST as a postgraduate student researching roll motion of small marine vessels. As a consequence of his work, Curtin established a spin-off company Sea Gyro Pty Ltd in



A Sea Gyro installed on a 22m dive charter boat operating in Western Australia



Comparison of roll motion of a vessel without (blue) and with (orange) Sea Gyro.

### Mini-3D Camera Destinations

CMST completed development of the latest underwater stereoscopic video camera (the Mini-3D) in early 2005. Since that time the cameras have travelled widely, including to the following offshore oil and gas facilities: Uisge Gorm FPSO (Fife Field, North Sea), Bleo Holm FPSO (Ross Field, North Sea), Draugen FLP (Norway), Jotun FPSO (North Sea near Norway), Asgard A FPSO (Norway), Alba FSU

> (North Sea), and Triton FPSO (North Sea). The small size of the new camera allows it to be used on a wide range of ROVs including small inspection ROVs.

The Centre for Marine Science & Technology (CMST) conducts consulting, research, development and education for the marine industry and for government agencies.

#### For further information contact:

Centre for Marine Science and Technology GPO Box U1987, Perth WA 6845, AUSTRALIA Phone: +61 8 9266 7380 Fax: +61 8 9266 4799 Email: Director@cmst.curtin.edu.au Web: www.cmst.curtin.edu.au

## **Completed Research Theses**

The following PhD Research Degree Theses have recently been completed by CMST postgraduate students:

- An Improved Operator Interface for Underwater Remotely Operated Vehicles - Peter Henley
- The Role of Canyons in Upwelling Along the Western Australian Coast -Susan Rennie

## New PhD Research

Two new PhD students have recently commenced study at CMST:

**Binghui Li** joined CMST in December 2005 and is studying *The Acoustic Detection of Ice Calving Events in Antarctica*, under the supervision of Dr Alexander Gavrilov. This work is supported by the Australian Research Council under an ARC Discovery Grant.

**Mischa Cousins** was awarded an Australian Postgraduate Award and joined CMST in March. She is studying An Evaluation of Historical Exposure of Western Australian Humpback Whales to Marine Seismic Surveys. Prior to joining CMST she was an Environmental Officer with the WA Dept of Environment. She is supervised by Dr Chandra Salgado.

CMST is currently offering two new PhD scholarships, supported by DSTO, to apply work domain analysis to submarines. See the CMST website for more information.

#### International Linkages

Chinese Academy of Sciences and Second Institute of Oceanography, China.

A delegation of Chinese scientists visited CMST in March for three days to establish a memorandum of understanding (MOU) between the Second Institute of Oceanography and Curtin, and to plan a workshop in marine acoustics to be held in Hangzhou, China in early 2007. The focus of activities is on the sensing of coastal water column and sea bed environments for

#### Chalmers University, Sweden.

CMST recently hosted a six month visit by guest researcher Lucie Lambert from Chalmers University, Sweden. She worked with Dr Tim Gourlay and Dr Kim Klaka on improvements to predicting roll motion of ships, and the calculation of ship motion in shallow water. A simple empirical method was developed, giving good results for basic ship hulls, to help with the estimation of roll damping.

environmental purposes.

### CMST Lunchbox Seminars

CMST holds weekly seminars, with speakers from interstate and overseas, as well as CMST staff.

The schedule of seminars is listed on our website: www.cmst.curtin.edu.au/seminars

If you would like to receive email updates regarding CMST seminars, simply send an email to the following address: seminars@cmst.curtin.edu.au