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Milestone year – DUKC[®] turns 20 and OMC moves into new headquarters

As OMC International (OMC) celebrates the 20th anniversary of its first Dynamic Under Keel Clearance (DUKC[®]) navigation system, the company has also moved its Melbourne headquarters to nearby larger premises to house its rapidly growing staff hired in response to an expanding global workload.

Executive Director Dr Terry O'Brien OAM said OMC's staff had doubled in the past five years to more than 40, including 27 maritime and software engineers, and during that time OMC had won further contracts for customised DUKC[®] systems in the Port of Melbourne, Cape Lambert and the international waters of Torres Strait. It entered the North American market with a trial system at the Columbia River Bar. OMC has also commercialised three new products: Optimiser, a ship scheduling tool; an award-winning ship motion measurement instrument OMC iHeave[®]; and DUKC[®] Chart Overlay, which shows real-time safe and unsafe transit areas ("go" or "no go" areas) within a pilot's electronic charting package on their laptops and is a world-first because this advice also takes into account dynamic under keel clearance (UKC) predictions.

Other DUKC[®] installations have become fully operational or add functionality. Web-based DUKC[®] Series 5, installed by AMSA for Torres Strait, will become operational this year, and last year OMC's 22nd customised DUKC[®] system was delivered to Rio Tinto's Dampier Salt operations at Mistaken Island in Western Australia. The Series 5 web-based 'Platinum Package', which also incorporates DUKC[®] Chart Overlay and Optimiser, is presently being rolled out at Port Hedland.

Just last week, OMC announced it has won a major Canadian contract to install a DUKC[®] system for the draught-restricted section of the St Lawrence River from Montreal to Quebec City. This system is expected to be operational next year as part of Montreal Port Authority's (MPA) and the Canadian Coast Guard's (CCG) integrated e-Navigation solution for the St Lawrence River, which is one of the world's largest inland waterways.

Dr O'Brien said this Canadian contract represents a new direction for OMC because it brings a broader, collaborative industry approach to solving navigation problems. OMC will team with two Canadian sub-contractors in this project, NavSim, the PPU suppliers to the pilots, and XST, the Vessel Traffic Management and Information System (VTMIS) suppliers to the Canadian Coast Guard. The Canadian Hydrographic Services will also participate in the project by providing environmental and bathymetric data for the St Lawrence DUKC[®] system.

"Since we extended our shore-based DUKC[®] technology to operate in transit on ship-based portable pilot units (PPUs), DUKC[®] has increasingly been regarded as an e-Nav tool installed for risk management – which is a major mind shift from the early days when it was the increased efficiency that was the drawback," Dr O'Brien said.

Since March 1993 when the first shore-based DUKC[®] system was installed at Queensland's Hay Point coal terminal, the science of DUKC[®] technology has ensured maximum safety for large ships moving

in and out of ports because it mathematically predicts how much under keel clearance (UKC) they have as they come down shallow channels. In most cases, it allows large ships to go deeper than permitted by static rules and therefore safely load more cargo and/or sail with wider tidal windows.

After outgrowing its former Paterson St premises which it bought in 2004, OMC is now operating from its new Head Office at 13 Harper St, Abbotsford – a stark contrast from 1987 when Dr O'Brien left behind a distinguished 22-year academic career at Melbourne University to establish OMC, and worked alone from the family home.

It was during Dr O'Brien's years at Melbourne University that his fascination with waves, currents, ship motions and the challenges of creating a numerical method of modelling them led him to develop his ship motion model SPMS (Simulation Package for the Motion of Ships). This intellectual property is still used today for the core ship motion computations in all DUKC[®] products.

After an approach from the then British Phosphate Commissioners to work on solutions for mooring the large phosphate ships in Nauru's particularly deep port and also for Christmas Island, Dr O'Brien saw a niche market for his ship motion model and, showing a rare entrepreneurial flair for a scholar, he left academia to set up OMC so that he could work full-time on further developing his model into a working system for commercial shipping.

By 1992 Dr O'Brien had, with the support of Ports Corporation Queensland (now known as North Queensland Bulk Ports Corporation), developed his ship motion model sufficiently for its installation and trialling in Queensland's Hay Point coal terminal. For this 18-month period Dr O'Brien, a father of six, set up office in Brisbane – and relocated his wife and their youngest son from their Melbourne house into a Brisbane flat. During part of this time, one of Dr O'Brien's other sons, Peter, worked with him in Brisbane witnessing the early development of the DUKC[®] system as part of his postgraduate engineering training. Peter was later employed interstate by two major consulting engineering firms for several years before leaving for the Netherlands to complete a Master of Science Degree (Distinction) in Port and Coastal Engineering. He rejoined OMC in 2000 and is CEO.

The system in Hay Point was fully implemented in 1993 and since then this technology has provided more than \$15 billion to the exporters worldwide.

In 1994, Dr O'Brien, who is the world expert in UKC management, returned to Melbourne and continued working from the family home for a few months and successfully installed the second DUKC[®] system in the Port of Fremantle, before opening his first office in nearby Hawthorn with a staff of five – a mathematician, two engineers, a naval architect and a secretary. This small staff faced the challenging task of 'rolling out' DUKC[®] technology to other ports prepared to trust their UKC management to a computer program, which were Port Hedland Port Authority for BHP and Dampier in 1995 and Brisbane and Bunbury in 1996.

In 1999, OMC moved to a larger office on the Yarra bank in Abbotsford as the team had grown to 16. This expansion was partly funded by three major Research and Development (R&D) grants awarded to further develop the technology in support of user needs. The first R&D grant was for a Berth Warning System (BWS) which Dr O'Brien believed could be developed from the mooring technology he designed for Christmas Island and Nauru. While the system was installed at Hay Point and Botany Bay's Submarine Berth, there was little demand for further systems for at least a decade. However, with the growing emphasis on safety of navigation, four BWSs will be installed in 2013 at Cape Lambert, Dampier (2) and Cape Cuvier.

A second R&D grant was awarded in 2003 for the development of a ship-based DUKC[®] system, a portable pilot unit (PPU) which would calculate the UKC of a vessel in-transit and the third supported the installation of shore-based DUKC[®] into the VTS system at Port Hedland and Melbourne. In 2004, OMC celebrated 10 years of safe operation at Hay Point with a move to its own office also in Abbotsford and it was estimated that worldwide about 30,000 ships had sailed safely under DUKC[®] advice in that time.

Dr O'Brien said another significant turning point for OMC was when New Zealand's Marsden Point became the first port to have DUKC[®] installed purely on safety grounds after two super tankers were grounded within three months of each other in the channel leading to NZ's only oil refinery. It was later shown that a DUKC[®] system would have advised that these sailings not take place on those days due to inadequate UKC.

"Interestingly, there had been no grounding in the preceding 30 years of operation under the Static Rule," Dr O'Brien said. "Unfortunately, people often think that existing practices are safe because no incidents have previously occurred. I believe it will become increasingly difficult for port and waterway authorities to defend themselves in the event of a future grounding under static rules, given that a more accurate, and therefore safer, UKC management system developed by OMC exists and has been operating safely in ports for the past 20 years!"

OMC's history has been of slow, steady organic growth combined with the in-house development of its own UKC management technology. With Dr O'Brien mentoring the next generation of maritime engineers and his son Peter at the helm of OMC's very experienced team, which includes young talented graduates, OMC is in very good hands and the company will continue to grow so that its expertise and experience can be passed on to the next generation whilst maintaining a watchful eye on its core focus of providing accessible scientifically determined real-time advice on the optimum UKC commercial vessels can sail with safely, efficiently and effectively.

***Major award wins:** In June 2010, in the Queen's Birthday Honours List, OMC Founder and Executive Director Dr Terry O'Brien, who is a Melbourne engineer and former academic, was awarded a Medal of the Order of Australia (OAM) for services to the maritime transport industry.

OMC's upgraded web-based DUKC[®] Series 5 product suite, which incorporates the new DUKC[®] Chart Overlay, was awarded 1st Runner-Up in the internationally acclaimed 2012 IHS Safety at Sea Award for Engineering Excellence. OMC iHeave[®] won the prestigious 2012 International Bulk Journal (IBJ) Awards 'Innovative Technology' (Marine) category.

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