

Safer Shipping | Smarter Ports



Statement of Capabilities

Metocean data processing

omcinternational.com
+61 3 9412 6500

Background

OMC International Pty Ltd (OMC) is a specialist company providing consulting services and operational systems to the international maritime industry. OMC is the world's only provider of independently validated and widely operational real-time under keel clearance technology, the proprietary Dynamic Under-keel Clearance System (DUKC®).

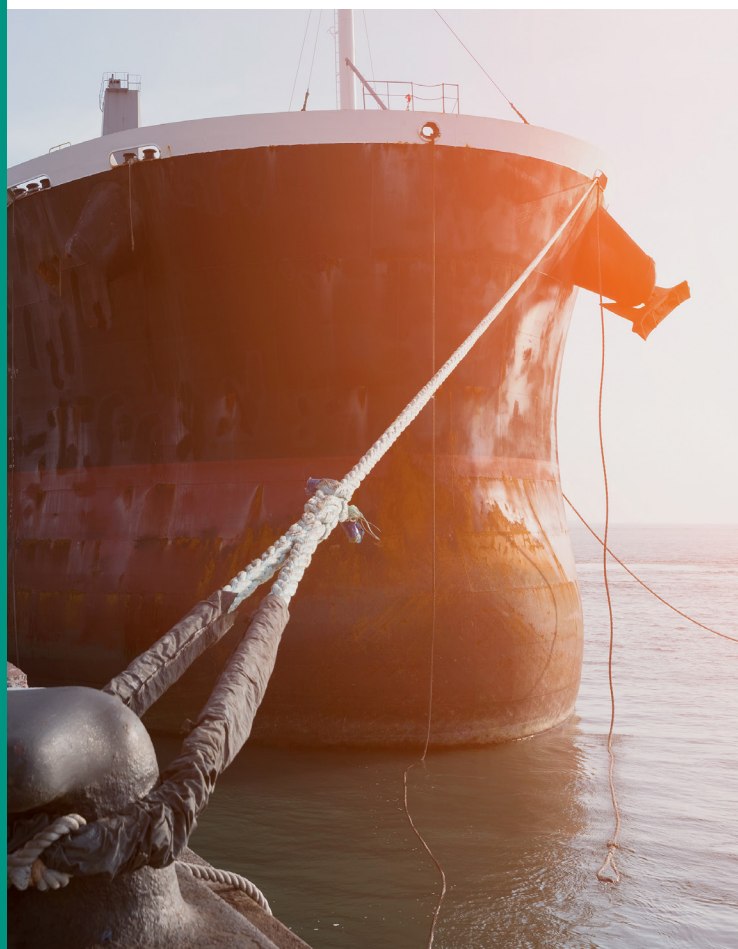
DUKC® has safely facilitated 165,000+ transits for 120 ports, terminal and waterways, and is the most comprehensively validated UKC management system. On average, a vessel sails under DUKC® advice somewhere in the world every hour.

DUKC® is the standard underkeel clearance management tool adopted by more than twenty ports within Australia, and internationally, including the world's largest bulk export ports, container ports, and tanker facilities. DUKC® is recognised as the leading UKC management system in the world.

The terms "Dynamic UKC®" and DUKC® are both registered trademarks of OMC.

In addition to DUKC®, the services and systems provided by OMC to our clients include:

- Optimised channel dredging design and planning
- Under-keel clearance studies
- Horizontal navigation and vessel manoeuvrability studies
- Fast time simulations using SimFlex4 from Force Technology
- Full scale vessel motion measurement and analysis
- Probabilistic analysis and risk assessments
- Operational static UKC management (KeelCheck)
- Measured & forecast environmental data displays (PortWeather)
- Optimisation of Port throughput using our Dynamic Port Capacity Model
- Mooring analysis – deep sea, CBM, conventional and suction pad mooring systems
- Moored vessel motion and mooring line warning systems (Berth Warning System, BerthAlert)
- Hydro/meteo analysis, modelling and forecasting
- Hydro/meteo data processing and quality assurance



The client base of OMC is varied across a range of organisations around the world. Our products and services are provided to Port Authorities, Government Regulatory Bodies, Pilot Organisations, Research Committees and Institutions, Shipping Lines, Terminal Operators and other stakeholders across the maritime and shipping industry.

In recognition of OMC's international standing as the world's leading developer and operator of real-time UKC systems, its founder, Dr. Terry O'Brien, was appointed Chair of PIANC Working Group 54 tasked to develop guidelines for the use of hydro/meteo data to optimise safe waterway access. These guidelines have been published as PIANC Report No 117-2012 – Use of Hydro/Meteo Information for Port Access and Operations. Dr. O'Brien is also a member of PIANC Working Group 49, tasked with determining the new design guideline for navigational channels with regard to horizontal and vertical navigation. These guidelines have been published as PIANC Report No 121-2014 – Harbour Approach Channels Design Guidelines.

DUKC® technology has been proven in operations over 25 years and more than 165,000 transits without incident. OMC's ship motion modelling has an unrivalled level of full scale validation and testing. Each DUKC® system is validated at each port or waterway using high-precision DGPS survey equipment to accurately measure the movement of vessels in all six degrees of motion while transiting a waterway. The results are compared with the DUKC® predictions of vessel motion and position. OMC has performed over 600 full scale vessel measurements. These validation measurements have been undertaken in a wide range of waterways around the world on a large variety of ship sizes, types and load states.

OMC applies this same technology and experience to channel design, dredge optimisation and port operability studies, achieving significant benefits over the standard methods.



Oceanographic Instrumentation Data Processing

Metocean data processing services can involve conversion of raw to processed data, quality assurance and control measures, real-time transmission, as well as monitoring of all these aspects. The optimisation of the data processing can be device, location and data use specific, and usually involves a network of different instruments and transmission options. For use in operational real-time applications such as the DUKC[®], the efficient

and reliable management of all these aspects is particularly important. OMC has developed a data processing capability that is both tailored for real-time use, as well as to the benefits of the many other users of the data.

The closer to a device that OMC can obtain its raw data stream the greater the options and benefits available.

Benefits

The main advantages in using OMC's metocean data processing services are:

1. The data processing and QC is optimised for DUKC[®] use;
2. The data processing and QC is transparent, best practice and standards based; and
3. They enable OMC to be the single point of contact for all issues metocean and DUKC[®].

Having OMC responsible for the data processing can also enable a port to mitigate its risk by having the DUKC[®] environmental data handling provided by an organisation able to provide certainty of long term supply and 24/7 support. Furthermore, being an end user of the data provides the highest impetus for OMC to deliver a comprehensive service and promote data integrity.

QA/QC

Quality Control (QC) measures of monitoring and automated test procedures rely on effective preventative Quality Assurance (QA) measures. As OMC does not provide any physical handling capability, the QA measures such as maintenance, levelling and calibration need to be managed by the port or through third parties.

The QC software that has been developed for wave, tide and current data is optimised for DUKC[®] purposes. Benefits for DUKC[®] users are increased safety, data availability and potentially draft availability depending on the device. For example, a wave buoy's watch circle can be linked to the QC status thus providing an automated DUKC[®] response to increase safety. Also increased data availability through the processing of raw data to remove errors, while maintaining useful data

has been achieved by minimising the effect of transmission and GPS errors in the case of Datawell DWR-G data. Erroneous data from some devices can result in overly conservative wave energy being introduced, which if sustained can result in loss of sailing draft and planning noisiness.

The processing methods employed by OMC are based on the latest international best practice. Quality Assurance of Real Time Oceanographic Devices, or QARTOD, are guidelines developed by instrument manufacturers and their largest US based users. OMC have implemented these for the QC processing of waves and tides at several ports, and will do so also for currents. For further details please refer the technical paper published in Coast and Ports 2017, 'Quality Control Experiences using QARTOD in Australian Ports'.





Reactive Support

OMC's 24/7 support helpdesk objective is to keep a port's DUKC® in operation. A common cause of downtime is an interruption in the real-time environmental data due to IT and transmission issues. In having access to the raw data stream enables a support engineer to more quickly determine if the cause of a data outage is QC or transmission related and so provide a faster diagnosis response.

Physical handling issues will need to be coordinated during business hours through contact with a ports' coordinator.



Displays

The Metocean page of the DUKC® Series 5 system is a proven display solution providing overview with widgets and time series plots for investigation. If these displays are on the consolidated hosting system, they will be available to anybody with internet access and an account.



Data Archiving and Provision

OMC can also maintain an archive of historical records. A user download facility can be provided through the DUKC® to enable requests for data to be managed directly by the port. This will provide data files of either self-referencing netCDF files or ASCII CSVsw.

Experience

Port of Melbourne	Waves and Tides using OMC's DataFilter	since 2005
Torres Strait for Australian Maritime Safety Authority	Waves, Tides and Currents	since 2010
Port Hedland for Pilbara Ports Authority	Nortek AWACS (waves, currents), Datawell DWRGs (waves), VegaPuls (tides) using QARTOD	since 2015
Fremantle Port	Datawell DWR (waves,), Digiquartz pressure gauge (waves and tides) using QARTOD	since 2017
Hay Point for North Queensland Bulk Ports	Aandeera (currents) using QARTOD	planned for Q3 2017

DELIVERING TOTAL PORT SOLUTIONS



DUKC® has assisted more than **120 port facilities, terminals, and waterways to safely and efficiently conduct 165,000+ deep draft transits**. Utilising state-of-the-art modelling techniques, DUKC® is the world's most comprehensive, and extensively validated, operational UKC management system.

Drawing on a team of engineers, environmental scientists, naval architects, and master mariners, OMC's waterways design expertise is built on a 25 year history of leading the development and implementation of operational UKC technology (Vertical Dimension).

Our unique technology has been extended to include the Horizontal Dimension, port operations and statistical modelling techniques. This enables us to provide an even more precise cost benefit analysis for our clients.

Our optimisation methods enable dredging to be targeted, ensuring maximum return on investment and minimum environmental impact.

OMC's additional capabilities:

- Horizontal and Vertical Channel Design
- MetOcean Data Measurement and Forecasting
- Capital and Maintenance Dredging Optimisation
- Channel Siltation and Maintenance
- Dynamic Port Capacity Modelling
- Ship Motion Analysis
- Mooring Design and Berth Warning Systems
- Ship Simulation

