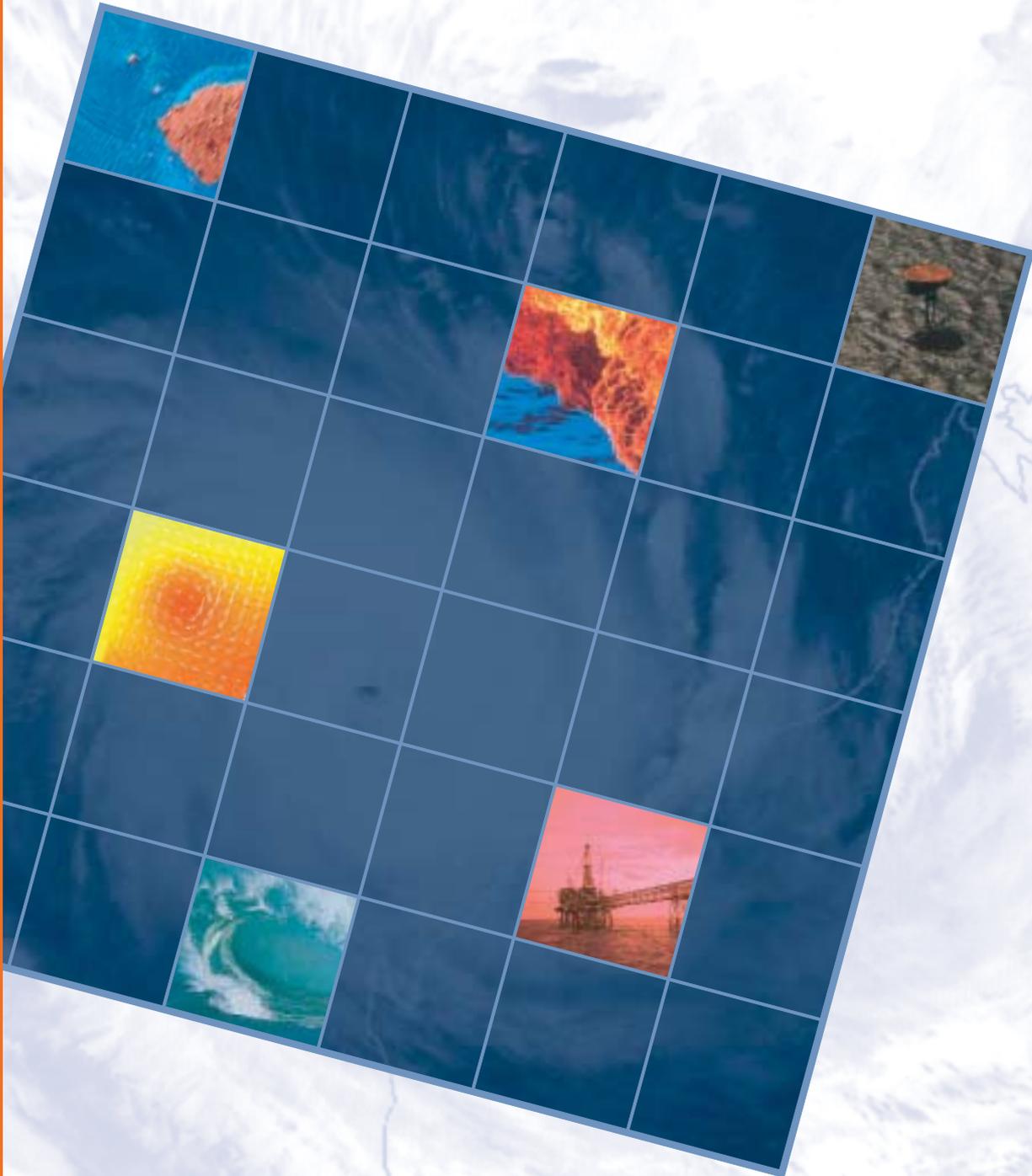




METOCLEAN
ENGINEERS



OCEANOGRAPHERS AND
METEOROLOGISTS

MetOcean Engineers is internationally recognised as setting the standards in physical oceanography and marine technology.

(photo courtesy WAPET)

Company Overview

MetOcean Engineers is a leading consultancy providing oceanographic and meteorological services in support of coastal and ocean engineering and environmental protection.

Through established links with affiliated companies, MetOcean Engineers has access to a powerful source of global information, and is world-renowned for its depth of experience and breadth of capability.

Our major focus is on physical oceanography, supplemented by strong resources in marine and local, land-based meteorology. We have more than 30 years experience in the collection, analysis, interpretation and application of metocean data.

Our core business activities are:

- Oceanographic Measurements;
- Metocean Monitoring Systems;
- Coastal and Ocean Engineering;
- Environmental Consultancy; and
- Data Management

all of which are described in the following pages. These activities, and the functions within them, are available individually, or as part of a package tailored to the client's needs.

The unique strength of MetOcean Engineers lies in our outstanding expertise across all the above business activities. We pay particular attention to providing information and advice in a form which is easy to use and comprehend, avoiding the problems associated with subsequent application or interpretation.

Our capabilities are founded on a large and diverse range of oceanographic and meteorological instrumentation, sophisticated computing facilities and an extensive suite



Inset above: Rugged Barrow Island shoreline (photo courtesy WAPET).

Right: Mangrove ecosystem (photo courtesy Woodside Energy Ltd).

Opposite: Gas Flare (photo courtesy Woodside Energy Ltd).





of well-proven software. We place special emphasis on the quality control and preservation of data.

Our staff of over 40 people are of high calibre, with skills ranging across ocean and environmental engineering, electronics, computing and mathematics, numerical modelling, data analyses, technical reporting and project management. Our low staff turnover rate ensures that a very strong experience base is retained within the company.

Where necessary, we supplement our skills via well-established liaison with peripheral coastal engineering and environmental consultancies.

Since the mid-1970s, our company's business has evolved to serve the demanding needs of the expanding offshore oil and gas industry, and the mining industry.

Our client base includes most major international oil companies and Australian mining companies, associated engineering and shipping companies, and many government authorities and research institutions.

Our commitment to industry has been demonstrated by our readiness to undertake substantial work programmes prior to commitment from industry.

Commensurate with industry requirements, MetOcean Engineers has in place a Quality Management System and an active Occupational Health and Safety policy.

Through investment in MetOcean Engineers consultancy services, our clients consistently enjoy substantial returns through reduced costs, increased utilisation of facilities and improved levels of safety.

Oceanographic Measurements

MetOcean Engineers design and implement meteorological and oceanographic measurement programmes which provide reliable information on winds, waves, tides, currents and seawater properties.

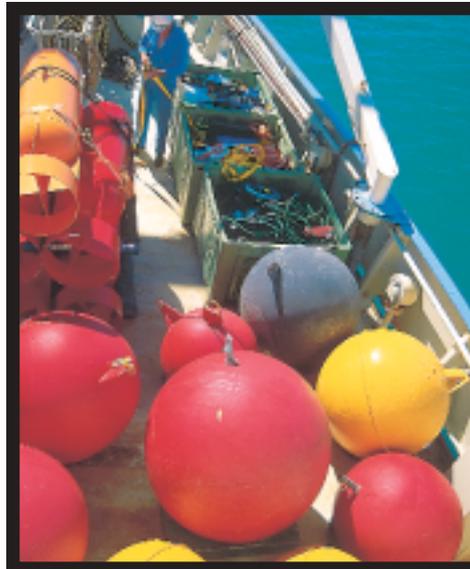
Oceanographic measurements are the foundation of our business. Measurements are used to corroborate theory, identify and quantify physical processes, and to calibrate/verify numerical models of atmospheric forcing and ocean response. Resulting information can then be applied to operational planning or facility design.

Over more than 30 years of operation – in geographic settings ranging from the Antarctic to tropical waters, and from deep ocean to coastal waters – we have evolved mooring design and fabrication techniques which minimise the probability of mooring failure and optimise instrument performance.

We maintain a large inventory of sophisticated field instrumentation, including acoustic releases, tide gauges, ADCPs, current meters, temperature loggers, CTDs, wave buoys and buoy-mounted meteorological stations.

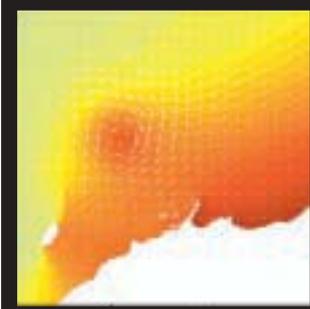
MetOcean Engineers has developed reliable data processing and analysis techniques which maximise the utilisation of recorded data. Quality assurance is imperative, and is maintained via fully traceable documentation covering:

- mooring design;
- instrument preparation;
- instrument calibration; and
- data processing, checking and editing procedures.



(photo courtesy WAPET)

MetOcean Engineers
record of success is based
on extensive experience,
a thorough understanding
of client requirements and
attention to quality.



Inset above: Tropical cyclone Orson storm surge simulation.

Left: Mooring hardware on RV Franklin.

Opposite: Installation of the Wandoo B Concrete Gravity Base platform (photo courtesy MEPA).

All quality documentation is retained along with archived data, to ensure the integrity of data in any future application. Safety is recognised as a prerequisite in any successful offshore operation, and Safety Plans are prepared prior to each field operation.

Coastal & Ocean Engineering

With vast resources and experience, and a strong commitment to state-of-the-art practices, MetOcean Engineers applies leading-edge technology and expertise in the provision of coastal and ocean engineering criteria so necessary for the design, installation and operation of all types of maritime facilities.

MetOcean Engineers breadth of oceanographic capability allows us to integrate all facets of measurements, numerical modelling, data sourcing and analysis to provide metocean

criteria which strike a balance between cost and safety, whilst ensuring efficient and reliable performance of marine facilities. MetOcean Engineers sets industry standards for the determination of engineering criteria for every kind of marine operation, including:

- frontier drilling;
- production facilities (platforms, FPSOs, TLPs);
- pipelines and subsea completions;
- port and harbour facilities;
- offshore installations; and
- ocean tows.

MetOcean Engineers are specialists in the understanding of complex phenomena such as internal waves, solitons and bathymetric enhancement of currents. We routinely use a range of sophisticated wind, wave, current and storm surge models, and are particularly adept in their application to tropical cyclones.



Through our extensive experience in development of engineering criteria we have evolved a unique suite of statistical analyses and data presentation tools. These allow us to tailor output to match the requirements of the hydrodynamic design, vessel response or shoreline response packages used by our clients' engineering consultants.

Metocean Monitoring System

MetOcean Engineers has been designing, manufacturing and installing land-based and offshore environmental monitoring systems since 1978. Our custom-designed systems provide real-time measurement of operational conditions on offshore exploration and production facilities such as platforms, FPSOs, SBMs and drilling rigs, as well as onshore facilities such as LNG plants, berthing facilities, harbours and mine sites.

Parameters measured include wind, waves, currents, tides and mooring tensions, in addition to vessel and structural motions. Typically, the results are used to assist on-site decision making and to provide ongoing corroboration of design estimates.

Each monitoring system is designed around our generic software and hardware packages – Remote Environmental Monitoring System (REMS) or the 'Measure' suite of software. Both are 32-bit packages which run under Windows 2000/XP or NT and can be easily adapted to meet the specific input/output requirements of each client. Ongoing hardware and software support is provided by our experienced staff.

Our systems also incorporate sophisticated real-time data telemetry techniques for data verification in remote areas. The data transmission is by radio, satellite or telephone lines and can be fully integrated with the client's existing LAN/WAN network system.



MetOcean Engineers has the skills, resources and experience to deliver metocean criteria needed for any coastal or ocean engineering activity in any location world-wide.

(photo courtesy ESA)

Environmental Consultancy

Environmental protection is recognised by industry and regulatory authorities as being of prime importance in any resource development project.

MetOcean Engineers can provide assistance in the areas of:

- effluent dispersion in the marine environment;
- sediment discharge, resuspension and dispersion;
- shoreline and habitat response to changing current regimes, sea levels or wave action; and
- atmospheric dispersion and noise levels.

MetOcean Engineers has the necessary experience and expertise to design measurement programmes, conduct modelling studies and provide statistical analyses and presentations to enable the successful interpretation of all environmental information.



Inset above: North Rankin A platform (photo courtesy Woodside Energy Ltd).



Right: LNG carrier at the Burrup Dolphin Berth (photo courtesy Woodside Energy Ltd).

Left: The "Cossack Pioneer" FPSO and Riser (photo courtesy Woodside Energy Ltd).

Data Management

MetOcean Engineers has developed a sophisticated system for the management and preservation of a most valuable resource – your data.

Strict attention to well-documented data handling and quality control procedures ensures data accuracy and reliability, and auditability at all levels of data processing, editing, analysis, presentation and archiving.

We have recently adopted netCDF (a self-describing file format) to streamline data management and transfer procedures. An impressive array of data analysis and presentation tools has been developed using an optimal mix of open-source and custom-built software.

MetOcean Engineers meticulous approach to data quality assurance and preservation has resulted in the accumulation of an invaluable resource of reliable oceanographic and meteorological data.



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Setting the Standards in

Oceanographic Measurements

Meteorological Measurements

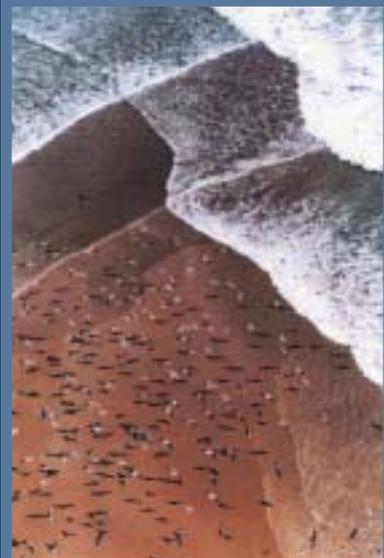
Data Analysis

Numerical Simulation

Metocean Design Criteria

Real Time Monitoring

Data Management



(photo courtesy WAPET)