

## DIVING

TAMS diving department offers a full range of subsea services to support client projects and execute specific scopes that underpin integrated operations. Diving capabilities include both air and enriched air nitrox techniques ensuring safe diving to depths up to 50m. TAMS diving services are conducted in accordance with IMCA Guidelines, Australian Standards, a NOPSEMA accepted DSMS and industry best practice.

Our assets and resources include vessel integrated dive systems as well as containerised spreads which can be mobilised onto larger offshore barges and other platforms with a complement of recompression chamber/s and project specific tooling applicable to the scope. Systems are mobilised with comprehensive spares to ensure continuous operations and productivity are maintained.

Our diving personnel, from Superintendents and Supervisors to our divers are highly qualified and experienced in a wide range of diving related activities. Further, our regular dive crews are familiar with our equipment, systems and procedures and have long histories working together with our marine crews, helping to ensure safe and efficient integrated operations.





## SERVICES

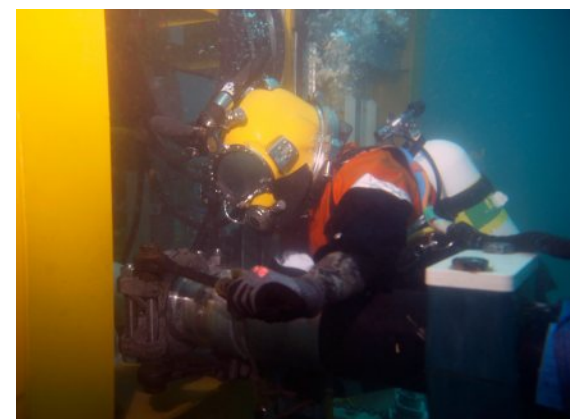
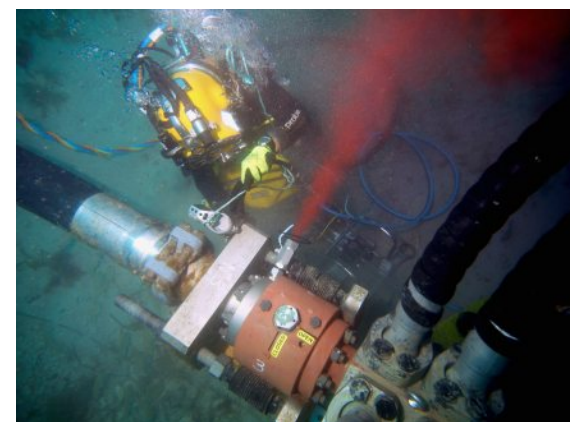
### OFFSHORE SOLUTIONS

TAMS capability to support offshore work scopes stems from a long history of engagement by resources and energy majors on the West Coast, more recently extending to the East coast and into Papua New Guinea, supported by local shore base facilities.

Experience on various projects over the past 20 years has given TAMS a sound competency to execute a wide range of scopes:

- Pipeline installation, inspection and maintenance,
- Pipeline stabilisation and freespan correction,
- Scour protection and concrete mattress installation,
- Geotechnical core drilling and rock pinning,
- SPM inspections and mooring chain tensioning,
- CALM buoy and PLEM installation, inspection and maintenance,
- Floating and subsea hose change-outs,
- Manifold status checks, maintenance and new tie-ins
- Flange pulling, alignment and bolt tensioning,
- SmartFlange and Morgrip installations,
- Metrology and spool tie-ins,
- Air-lift and eductor dredging, excavation and post-lay pipeline/cable burial,
- Outfall diffuser installations and maintenance,
- Various elements of subsea rigging, lifting, pulling, anchoring and dogging loads,
- Anomaly investigation and debris recovery,
- High pressure cleaning and abrasive grit blasting,
- Ultrathermic and non-exothermic cutting,
- Decommissioning works including diamond wire saw cutting and non-explosive blasting,
- Class inspections of vessels and installations, including asset inspections utilising the WSCAM methodology and CSWIP certified divers as required,
- Asset integrity inspection, including Cathodic Potential readings, Ultrasonic Thickness checks and Pulsed Eddy Current measurements,
- Welded, clamped and anode skid installations and status checks,
- Various concreting, grouting and epoxy resin scopes.

An experienced and skilled dive workforce is available with relevant certification and competencies to service a wide range of work scopes, bringing a wealth of knowledge and a solution driven approach to all facets of planning, execution and







# SERVICES

## CONSTRUCTION

WELDING, ULTRATHERMIC CUTTING, SUCTION DREDGING, CAISSON INSTALLATION AND SEABED PREPARATION, GROUTING, HYDRAULIC TORQUE TENSIONING, CORE-LOCS

TAMS has gained extensive experience with all facets of marine construction including subsea works to support the installation of material loading facilities, breakwaters, berthing and stop dolphins, desalination intakes, tug pens, wharfs, jetties and dredging programs.

Ongoing projects for clients such as Citic Pacific (Cape Preston Port), Carnegie Wave Energy, York Civil (various bridge repairs and construction) and Fugro-TSM have ensured TAMS remain at the forefront of innovative construction techniques using industry leading safety management protocols.

TAMS diving division have been the primary dive support contractor to all onshore construction works associated with the Wheatstone project for clients including Bechtel, Besix Thiess JV, Dredging International, Kiewit Ertech JV and BAM Clough JV.

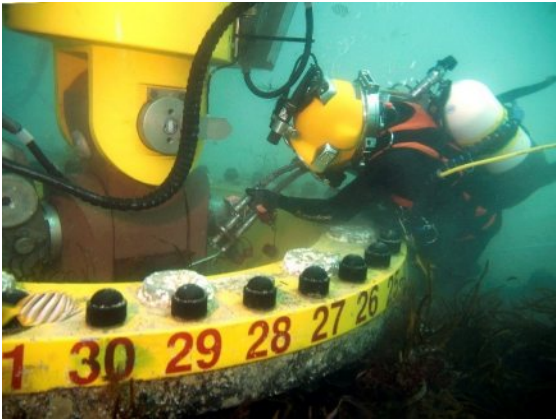
Where environmental baseline studies and monitoring programs are required, TAMS can support marine scientists with data collection by means of AWAC, ADCP and Wave Rider Buoy deployment and recovery, installation of telemetry monitoring buoys and ground gears, installation and maintenance of environmental day moorings, and installation/maintenance of turbidity curtains.

## MOORINGS AND NAVIGATION AIDS

DESIGN, INSTALLATION, INSPECTION AND MAINTENANCE OF ALL MOORING ARRANGEMENTS

TAMS conducts an annual mooring inspection and maintenance program for a broad client base spanning the West Australian Coastline. Integrated service offerings allows continuity of works through provision of support tugs and multi-cat work vessels from the initial inspection through to as-built reports once maintenance or upgrade works have been completed.

Recent innovation with a single point cyclone mooring design awarded TAMS several contracts to install 55 moorings with capacity up to 250 tonnes at Mangrove Passage (Onslow) to support the Gorgon and Wheatstone Marine Spreads for various clients including Saipem Leighton Consortium, BAM Clough, Besix Thiess JV, and Dredging International.







## SERVICES

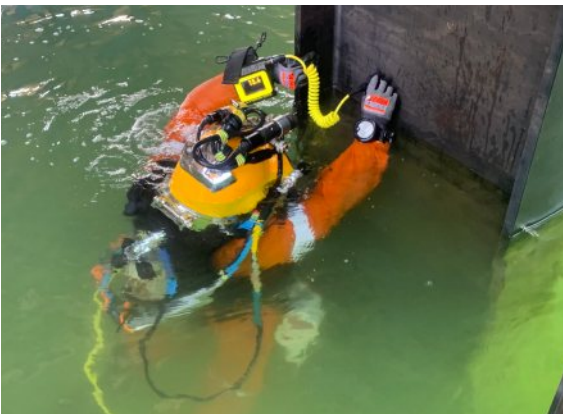
### INSPECTION SURVEYS (IWS/UWILD)

APPROVED CONTRACTORS TO CLASS SURVEY, INCLUDING ABS, BV, GL/DNV & LLOYDS REGISTER,

All TAMS air and Enriched Air Nitrox spreads have hat mounted video/light systems for topside monitoring and recording to USB. High quality stills cameras are additionally available to capture high resolution images of anomalies and points of concern.

TAMS employ divers accredited with CSWIP 3.1 and 3.2 inspection tickets and have substantial experience with Ultrasonic Thickness, Cathodic Potential and Coating Thickness meters.

TAMS continue to undertake inspection scopes to assess and characterise the condition of various marine assets and infrastructure against prescribed rating scales, employing the Wharf Structures Condition Assessment Manual (WSCAM) methodology as developed and endorsed by Ports Australia. This approach enables a robust baseline to be established allowing defects to be easily quantified against measurable component classifications and scatter diagrams etc. The process allows for continuity between subsequent inspections and maintenance regimes, and minimises subjective assessment by divers.



### DRILLING

DRILL AND BLAST, GEOTECHNICAL CORE SAMPLING AND ROCK BOLTING

TAMS capability extends from lightweight rock pin drills through to track mounted drill rigs with capacity to drill and blast (including explosives ordinance) or recover core samples to depths in excess of 20m below seabed. Recent innovation utilised galvanised split set rock pins to stabilise a dual 4" high pressure pipeline installation and effect freespan corrections at low cost and high efficiency in a highly exposed nearshore site.



Marinised HQ3 and PQ3 drill rigs enable geotechnical core sampling in challenging environments where Jack-Up Barges or other plant is unable to effectively access borehole locations. The tracked HQ3 rig is ideal for campaigns which include an intertidal element and has seen the success of several recent projects across the West Australian coast.







## SERVICES

### PIPELINES AND SUBMARINE CABLES

INSTALLATION, MAINTENANCE, SEABED STABILISATION AND FREESPAN CORRECTION

Previous projects have included HDPE pipeline installations from 50-500mm and concrete weight coated steel outfall pipelines to 1.5m diameter. The Alkimos outfall pipeline (most noteworthy) required 18,000 m3 of offshore drill and blast excavation via more than 4000 cased holes. The pipeline was pulled from shore via a 400 tonne linear winch on TAMS construction barge to the 3.2km dilution point offshore.

TAMS diving division has been involved with the installation of several control umbilicals for subsea pump and plant systems as well as fibre optic and coaxial cable runs for various clients including numerous subsea communications companies, Department of Defense and Carnegie Wave Energy.

Recent and upcoming projects with SA Power and TasNetworks include installation of submarine power cables to Kangaroo Island and Bruny Island.



### MARINE SALVAGE AND ASSET RECOVERY

TAMS offer a range of salvage vessels and equipment to enable prompt recovery of recreational and commercial vessels as well as other marine assets. As an integrated company, TAMS can offer support vessels, work tugs and barges to assist with recovery and towage of larger casualties.

Inspection reports accompanied by CCTV footage are supplied to support insurance claims.

TAMS have years of experience in harbour, cargo and equipment salvage as well as wreck removal.

Salvage operations conducted always seek to minimise disturbance to the marine environment with the use of hydrocarbon recovery systems and oil spill booms.







## SERVICES

### Pile Protection & Rehabilitation

TAMS have extensive experience with installation of various pile protection products, including new lines such as STOPAQ, AIWC, Quakewrap and PileJax. TAMS personnel have been trained and certified as approved installation contractors to Denso and various other suppliers.

Projects have required installation of these systems in a range of environments, from creeks and sheltered ports to open waters on exposed marine assets.

Rehabilitation efforts on timber, concrete and steel piles has often required installation of additional strengthening elements including cementitious & epoxy fill material, carbon fibre reinforcement, FRP outerglass shields and welded patches to achieve design specification.

Detailed pile inspection utilising WSCAM methodology is being increasingly adopted, as well as Pulsed Eddy Current measurements using specialised tooling and surface recording equipment.

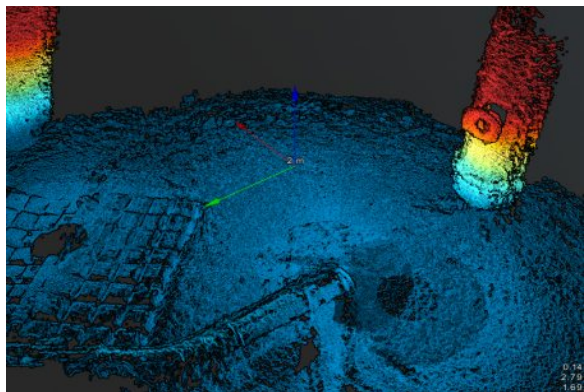


### Scour Protection

TAMS have installed, inspected and maintained various scour protection arrangements around marine infrastructure across Australia. Concrete mattress installation with high levels of positional accuracy are achieved by integrating diver placement together with USBL transponders to record accurate as-built data.

Several current scopes in Port Hedland are being conducted to remediate rock batters where tug and bulk carrier prop-wash has undermined existing batters creating ledges which create a risk of collapse during low tides.

TAMS can successfully execute installation scopes from various crane barges in the fleet, incorporating support vessels, dive and survey constituents to provide a completely integrated service offering.







## SERVICES

### CONTAMINATED AND RESERVOIR DIVING

TAMS owns and operates a surface supplied air diving system specifically designed for use in fresh water reservoirs and other hygienically sensitive environments.

The system is designed and maintained to the following standards;

- AS22991:2015 Occupational Diving Standard
- IMCA DO18 The Initial and Periodic Examination, Testing and Certification of Diving Plant and Equipment
- Workplace Health and Safety Regulation - Underwater Diving Work
- ISO AS/NZS 4801:2001 Occupational Health and Safety Management
- ISO 9001:2008 Quality Management
- ISO 14001:2004 Environmental Management

The critical components of the Reservoir diving system include;

- Dry suits
- KM37 Diving Hard Helmet
- Fibroline twisted umbilicals
- Suitable grade extraction hose
- Chlorine shower

TAMS purchased the reservoir and potable water specific dive equipment in July 2017 to further establish the company as the premium dive services provider and further enhance our capabilities.

All equipment is maintained to the most stringent industry standard and is regularly inspected for conformity.

When not in use, the system is stored in a controlled environment mitigating the risk of contamination and damage. Onsite the umbilicals are stored in a specific palletised environment and the hard helmets have designated storage bins.







## SERVICES

### NON-EXPLOSIVE BLASTING

#### Background:

TAMS have historically been involved with the removal of high spots, piled structures and scour ledges in shipping channels, turning basins and tug pens across various Australian Ports and Harbours.

Mobilisation costs associated with large plant and equipment such as backacter dredge barges are relatively high. Additionally, delays from environmental permit approvals associated with conventional explosives are often lengthy.

TAMS have responded by procuring and testing an innovative system which utilises high pressure gas release to fracture consolidated sediments such as rocky outcrops, oversize boulders and scour ledges.

#### TAMS Cardox System:

TAMS own a comprehensive Cardox system which allows trained operators to charge and detonate a range of tube formats dependent on the specific substrate that requires blasting.

The system is housed in a compact 8 ft container which supports the necessary cleaning station, re-filling equipment and CO<sub>2</sub> charging system.

The process of re-using tubes minimises waste and allows for transport of the entire system and all constituents as non-dangerous goods. Additionally, no shot-firers ticket is required for freight, storage, charging or firing of the tubes. Additional benefits of the technology are summarised below:

- No shotfirers ticket required
- No dangerous goods incorporated, so able to freight and store all associated elements anywhere in Australia
- No environmental approvals or statutory permits required
- More cost effective than conventional explosives for smaller scale scopes, due to aforementioned points
- Minimal noise, vibration and shock waves generated (reports from site monitoring are available on request)
- Divers can remain in the water during blasting and vessels can remain on station above the work site
- Ability to blast in close proximity to sensitive infrastructure, environment or public spaces.

Note: TAMS currently have 8 formally trained and VOC'd operators







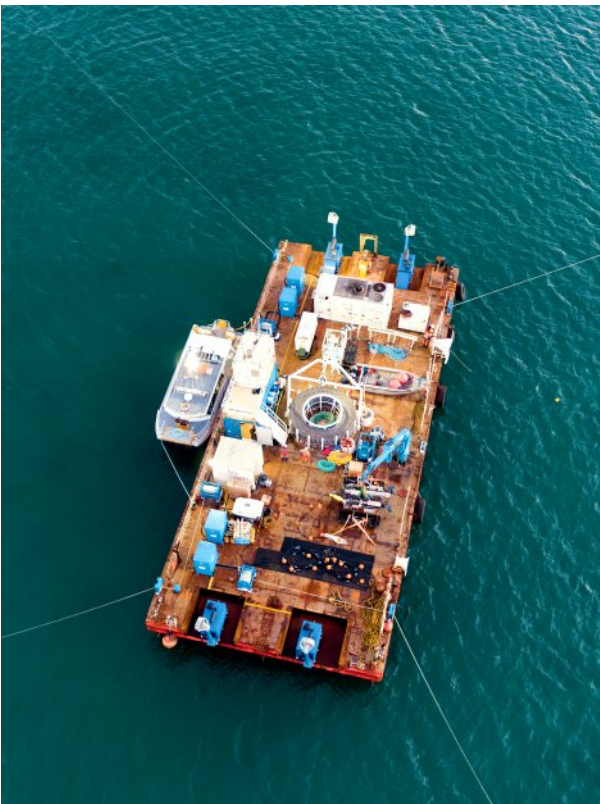
## SERVICES

### SUBMARINE POWER AND FIBRE OPTIC CABLE INSTALLATIONS

TAMS have been involved in several power cable and fibre optic cable installations around Australia. Recent works at in South Australia required replacement of a 16km 10,000 kVA / 33,000 Volt cable between the mainland and Kangaroo Island, including the two shore crossings through vastly contrasting substrates.

Several fibre optic installations and shore crossings have been completed, including Perth's City Beach approach from TAMS barge mobilised with an innovative DP thruster system. Additionally the 4600km Australia/Singapore cable node was taken ashore through a crossing at Christmas Island.

Post lay burial is often achieved by use of air-lifts in deeper water or eductor dredge in shallow shore crossing applications. The use of bespoke mobile gantries allows the cables to be lifted and protectorshell installed as required by the specification. Rock trenching is achieved by a combination of Cardox non-explosive blasting and rock breakers.







# ASSETS

## Daughtercraft and Coastal Dive Support Vessels

### AMS 1

A versatile dive support vessel with a 2 diver air / EAN system and 2 x 31cfm ABAC compressors. A stern mounted hydraulic A-Frame and winch assist diver operations. At 10m LOA and 3.0m beam the AMS 1 is trailerable, thus allowing rapid mobilisations and it can transit at +25knots.

### AMS 3

A dive support catamaran, set up to support 2 air / EAN divers. With a 10m LOA, a beam of 5.0m and a draft of only 0.25m provides a stable platform. Additionally, a 2.5T HIAB, 3T tugger winch and approx 13m<sup>2</sup> of deckspace make it well suited to light dive support works.

### CARNAC

A project / diving support vessel with a 2-diver air / EAN system installed onboard. The 15m<sup>2</sup> deck space and 1.5T A-Frame installed on the stern offer versatility for project work.

### INTERTIDAL

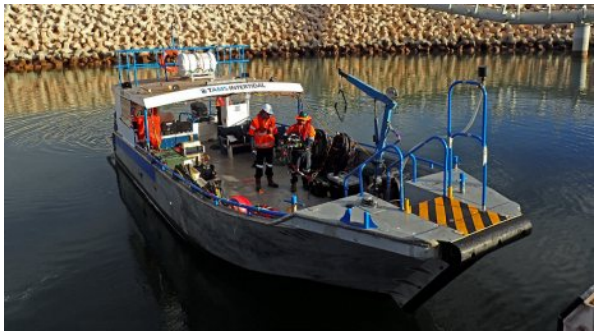
Primarily stationed in the Pilbara, this open deck, beamy vessel provides an ideal platform to support diving operations where low draft access is a consideration. A flyaway dive spread available in Onslow can be promptly mobilised to facilitate rapid or emergency response scopes.

### AMS 8 and AMS 14

Dive support vessels with a 2-diver Air / EAN system installed onboard. These trailered vessels offer versatility for remote scopes or project work at an economic rate.

### TAMS ANNEMARIE, AMS BOSS (Multicats)

TAMS can offer several other workboat options to provide a platform for mobile dive spreads and facilitate delivery of subsea operations covering a range of work scopes as covered on preceding and following pages, and further referenced in case studies available via TAMS website.







## ASSETS

### Coastal Dive Support Vessels and Associated Equipment

#### DEEPSTAR

A versatile live-aboard dive support vessel with a 2-diver air / EAN system. A stern mounted hydraulic A-frame and winch assist various diving operations, including crocodile cage launch and recovery, salvage and asset recovery, navigation aid installation, mooring operations, ADCP/AWAC/WRB deployment, inspection and recovery. With a 17.3m LOA and 5.4m beam, the DEEPSTAR is well suited to a range of coastal deployments, including remote location operations over extended periods.

#### LONESTAR

Primarily stationed on the East coast, though capable of road mobilisation around Australia, the LONESTAR is well suited to project diving support with an IMCA compliant 2-diver air system integrated onboard. A forward deck crane offers capability to support various project work scopes and sufficient deck space forward of the wheelhouse provides ample room for project related plant and equipment. At less than 0.5m draft when fully laden (@ 2 tonnes), she is ideally suited for shallow water access scopes.

#### NUGINISTAR

A dive support catamaran, set up with a 2-diver air spread, ideally suited to rapid response work scopes across the East Coast, primarily based between Cairns and Gladstone but easily mobilised to other project sites. With transfer fendering fore and aft, she is an ideal option for support works where crew transfers are also required. Additionally, a side mount pole can be installed at short notice to facilitate various hydrographic and geophysical survey scopes, including multi-beam bathymetry, seismic refraction, marine magnetics, side scan sonar, habitat mapping and 3D survey via scanning sonar and LIDAR technologies.







## ASSETS

### Dive Systems

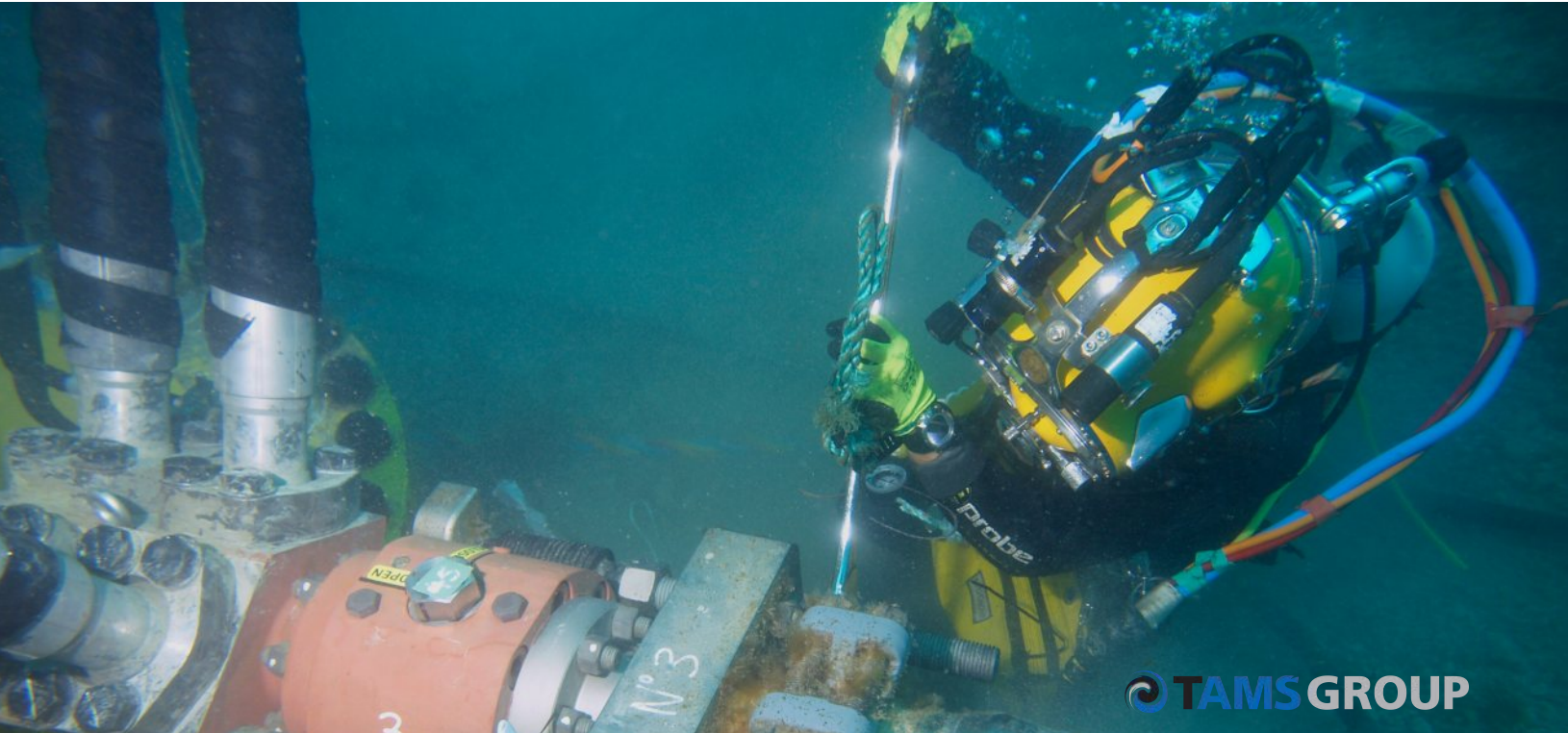
TAMS focus is based on providing versatile dive spreads that are fully compliant to client requirements (IMCA and/or Australian Standards) and widely available as integrated systems on vessels or standalone mobile units that can be easily deployed to site.

Together with nationally available dive personnel, the combination allows for mobilisation to almost any site, and the ability for rapid response works.

Containerised and freestanding chambers are strategically positioned around the country and available to accompany dive spreads as required.

### Flyaway Systems

TAMS hold multiple dive spreads at various shorebases and sites around Australia and PNG that are stand alone units suitable for air or enriched air nitrox diving. These spreads include 2 or 3 diver panels with complete spreads to facilitate a range of dive scopes. Plant and equipment is additionally available to complement various project campaigns and can be readily mobilised from TAMS primary shorebase facilities.



**TAMSGROUP**