



Building Block Remote Operated Vehicles



ROV design philosophy has always focused on the operational and cost-effective advantages of modularisation. A new design from Australia has taken this idea one step further.

Last year, Total Marine Technology's Nomad ROV carried out its inaugural contract. This was for drilling work for Inpex Petroleum. Since then they have worked for AEC and Woodside with repeat work for Inpex and just recently winning the tree installation for Woodside's Echo/Yodel field, two more vehicles have been built and the ROV operator is looking for further work in Asia.

The novel aspect of the ROV is the design philosophy. Like many ROV systems, it is designed using a modular pack that enables the vehicle to be configured quickly to differing work scopes. The difference between this and other designs is how deep this philosophy goes.

Historically the ROV itself has been seen as the lowest common denominator with specialist tooling adapted to fit on an as needed basis. In principle, the approach taken by Total Marine Technology is the same as a component hi-fi system, according to its President Tom Pado, who saw the potential right away when his partner Paul Collie explained to him his new component approach. The amplifier provides a focal point for the other components however; the user defines the options, eg. DVD player, CD player, tuner, tape deck, etc. This limits system obsolescence

and enables the operator to build on a firm foundation while maintaining technical relevance in the market place.



Nomad 5 Christening

In the same way, it is just the control and hydraulic power pack that is recognised as the focal point of the Nomad ROV system. To this, an arrangement of thrusters, manipulators, tracks and clump weight ancillary packs can be added as determined by the job scope.

These packs are interlocked using a system that allows them to be stacked in multiple configurations and can



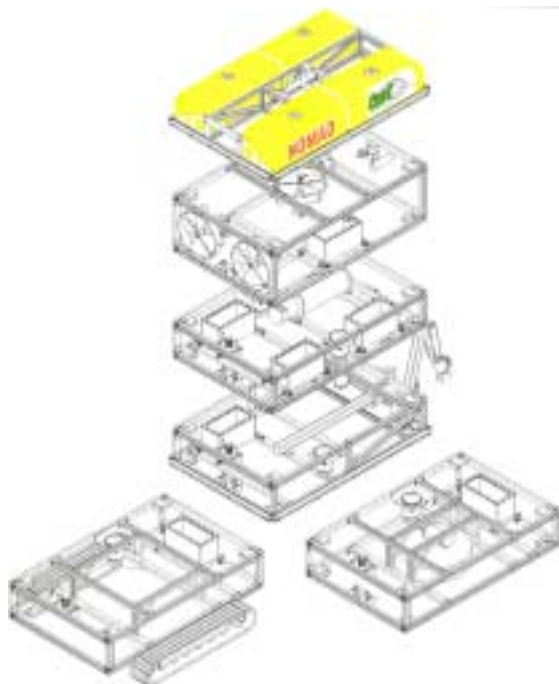


Nomad 6

be changed over in twenty minutes or less. Hydraulic power is reticulated via a geometrically fixed hot stab system common to all packs and a single electrical connector.

The basic vehicle has a depth rating of 1500m. It has a length of 2.5m and a width of 1.6m. Its height and weight however, depends on the type of operation it is customised to carry out. In the free-swimming mode, the vehicle is 2m high and the weight is 2200kg. In drill support mode, the height is 2.4m and the weight is 2800kg. The vehicle in crawler mode is 2.5m in height and the weight is 3200kg.

The vehicle is composed of three essential packs, the buoyancy, thruster and power packs. The basic vehicle is equipped with two axial thrusters, one lateral



thruster and one vertical thruster. This can produce a thrust of 800 – 1800 kg forward, astern port/starboard and vertical up/down. There is the facility to add or subtract buoyancy as required.

The recording equipment includes up to eight cameras. One is a colour high-resolution zoom; one is a low light and the remainder are high resolution colour. Illumination is provided by lights totaling up to 5000 Watts. The images are recorded on two video recorders and the ROV movement is assisted by a Mesotech/Tritech/Imaginex sonar system.

The vehicle has been designed around a variety of projects including drill support, construction support, cable laying, jetting, pipeline inspection, salvage, pipelay support, platform inspection and cleaning. In order to carry out these specific tasks, a number of optional packs may be added as

appropriate. These include such things as a tooling pack which would incorporate manipulators and grabbers, a clump weight pack for drilling support mode, a track pack for cable survey and cable laying and a jetting pack for cable burial.



Control Room

The tool pack is essentially an aluminium frame with a camlock connection at each corner and hydraulic quick connect for rapid connection and disconnection. All electrical and hydraulic manifolds are fitted on the pack, which allows for one electrical and one hydraulic connection to the power pack.

The pack incorporates two 8-function manipulators and one 2 function grabber featuring a manually



Arm Pack

rotating head. There is an option of a further 5-function manipulator. The manipulators are used for

tasks such as valve override, flowline connection guide, guide wire installation, cutting and various other tools that are required for subsea work. The grabber is used to grab hold of a structure to allow the vehicle to hold position. It may also be used to handle tooling.

The manipulators are capable of lifting 330 lbs at a 10ft reach. The level of automation inherent in this system also enables the unit to perform safely with one operator (once in the water). To date this system has incurred zero down time.



Nomad at PGB

The clump weight pack is also an aluminium frame with a camlock connection. It also has a single electro-hydraulic connection to the power pack. The pack is fitted with a hydraulic winch that is used to lower and raise the clump weight. Then, the lift umbilical is slacked off from the surface. Ultimately, by operating the clump winch, the vehicle can control its height in reference to the seabed. The winch has a 8000kg line pull and the drum capacity on the winch is 50m. The clump weight is 500kg.

Within its aluminium frame, the track pack is used for cable surveying or cable laying. The tracks allow it to walk on the seabed. The tracks are 0.32m wide and centres are spaced 2m apart. The track moves at a speed of 0.5m/sec.

The control van/workshop is 6.1m in length and 2.4m in width. It has a height of 2.75m and a weight of 5000kg.



Foam Pack



Thruster Pack



Hydraulic & Electronic Control Pack



Nomad 6 Launch

Patents are pending for the modular concept and the clump weight concept.

SPECIFICATIONS

Specifications:

Depth Rating1000 / 2200 / 3500 metres
Length..... 2.5 metres
Width..... 1.6 metres
Height (Freeswim Mode) 2.0 metres
Weight (Freeswim Mode)..... 2200 kgs
Height (Drill Support Mode) 2.4 Metres
Weight (Drill Support Mode)..... 2800 kgs
Height (Crawler Mode)..... 2.5 metres
Weight (Crawler Mode) 3200 kgs
Payload..... 1000 kgs
Frame Lift 3500 kgs

Propulsion:

Forward..... 800 to 1800 kgf
Astern..... 800 to 1800 kgf
Port/Starboard..... 800 to 1800 kgf
Vertical Up/Down..... 800 to 1800 kgf

Recording Equipment:

Lights 5000 Watts (available)
Camera 1..... Colour High Res. Zoom
Camera 2..... Low Light, Video
Cameras 3 to 8Colour High Res. Video
Sonar System..... Mesotech/Tritech/Imaginex
Video x 2..... High Definition Recorder

Tooling:

Manipulator x 28 Function (TMT)
Grabber.....2 Function (TMT)
Water Jetting (cable burial)..... TMT Design

Clump Weight:

Winch (line pull)..... 8000 kgs
Winch (drum capacity)..... 50 metres
Clump Weight 500 kgs

Tracks:

Track Centres 2.0 metres
Track Width 0.32 metres
Track Speed0.5 metres/second

Options:

Manipulator 5 Function (TMT)

Control Van/Workshop:

Length 6.1 metres
Width 2.4 metres
Height..... 2.75 metres
Weight..... 5000 kgs
Zone OneStandard

Umbilical Winch:

Umbilical Diameter..... 0.04 metres
Drum Capacity 1200 /2400 / 3700 metres
Length 3.0 metres
Width 2.5 metres
Height..... 2.2 metres
Weight..... 9000 kgs /14000 kgs / 17000 kgs

Hydraulic Packs:

25 Horse Power
75 Horse Power
150 Horse Power
200 Horse Power
400 Horse Power

Launch & Recovery Systems: (Options)

Sliding Door Fixed A-Frame
Over the Side Hydraulic A-Frame
Davit System
Fixed Rig Gantry

Total Marine Technology reserve the right to change the specifications at anytime without notification

Engineering, Tooling & Fabrication for all ROV Projects

Available Tooling:

Hydraulic Torque Tools, Hot Stab Connectors, Wire, Rope & Guide Post Cutters, Hydraulic Cleaning Brushes, Valve Override Tools, AX Ring & Dredging Tools

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