Design and Manufacture of Tiburon II Science ROV

Budgetry Price List for MBARI

Quote Ref.: EJ47 MBARI Tiburon II Price List
Date: 11 September 2006

Prices are ex-works, SMD Hydrovision, Newcastle, England.

Tiburon II ROV System is based on the SMD Hydrovision Quantum WROV System

Description	Qty	Price USD
1.0 4000m, 50SHP Tiburon II ROV comprising:	**1**	**1,345,034**
Tiburon II ROV		
4000 metre depth rated		
Maximum dimensions: L = 3.5m, W = 2m, H = 2m		
50 shaft horse power Curvetech power pack with 71cc/rev pump		
Propulsion and tooling hydraulic circuit components		
1 x Curvetech 8 way intelligent servo valve thruster control unit (TCU) for controlling:		
3 x Vertical Curvetech HTE 380-32 thrusters		
4 x Vectored Horizontal Curvetech HTE 380-32 thrusters		
1 x High flow tooling port (Rated to 77lpm/20usgpm at 210bar/3000psi supply)		
1 x Curvetech 10F iHCU. Any combination of solenoid/proportional (15lpm/4usgpm) valves		
1 x hydraulic reservoir with compensation and linear level sensor		
1 x HP and LP filters		
4 x 2.75l (0.73usg) hydraulic compensator with linear level sensors		
1 x MBARI variable ballast (up to 68kg/150lbs) system (incorporate into ROV)		free issued
Hydraulics plumbed primarily using hard piping (swagelok). Soft piping (JIC)		
1 x Umbilical termination box. (Use of existing termination box to be reviewed)		free issue?
1 x 6kW Instrument power transformer and switching junction box with secondary windings GFD		
1 x Auxiliary 8.5kW instrument power transformer and switching junction box with secondary windings GFD		
1 x Subsea compact control pod (4000msw depth rated)		
1 x Intelligent main sensor junction box		
1 x Intelligent auxiliary junction box (for connection of third party instrumentation and further additional sensors etc)		
1 x Intelligent lamp control junction box		
1 x set of underwater cables for ROV equipment (Existing Tiburon cables and connectors will be considered for utilisation)		free issue?
Existing MBARI single mode FO multiplexer utilised (assumed to be Prizm or Focal and suitable size for incorporation)		free issue
Tritech IGC Gyro Compass (Back up for octans 6000 FOG)		
Tritech IFG Fibre Optic Gyro (Backup for octans 6000 FOG)		
AUTOROV functions included (auto heading, depth, altitude, hold, step, home and track)		
Remote thrust trim functions		
1 tonne (2,000lbs) frame through lift capacity, bolted frame construction		
91kg (200lbs) front lift capacity		
273kg (600lbs) payload capacity in addition to tool sled and core instruments payload but including variable ballast system		
Multi-point variable lift points		
Existing MBARI vehicle release latch utilised (incorporate hydraulic interface for latch release function)		free issue
Manipulator mounting trays		
Buoyancy (4000msw) Low density 480kg/m^3 syntactic material to minimise in air weight		
Heavy Duty ROV protection frame		
Lead ballast (fitted in MBARI tooling sled)		not included
2.0 Tiburon II Core Instrumentation (All free issue equipment to be supplied with cables and mounting brackets)	**1**	**66,875**
Manipulators:		
Kraft Raptor 6F plus gripper	1	free issue
Installation and test	1	included
Schilling Titan II 6F plus gripper	1	free issue
Installation and test	1	included
Navigation:		
USBL Sonardyne 7970	1	free issue
Installation and test	1	included
Gyro Octans 6000 FOG	1	free issue
Installation and test	1	included
Sonar Simrad MS1000	1	free issue
Installation and test	1	included
ROV Homer	1	free issue
Installation and test	1	included
DVL RD Instruments workhorse navigator 1200	1	free issue
Installation and test	1	included
Depth sensor	1	free issue
Installation and test	1	included
Altimeter	1	free issue
Installation and test	1	included

Viewing:			
Cameras:			
HDTV camera		1	free issue
Installation and test		1	included
Pilots camera		1	free issue
Installation and test		1	included
Digital still camera		1	free issue
Installation and test		1	included
Digital still camera strobe		1	free issue
Installation and test		1	included
Internal pan & tilt camera		1	free issue
Installation and test		1	included
Auxiliary camera		4	free issue
Installation and test		4	included
Pan & Tilts:			
ROS PT-10 FB		2	free issue
Installation and test		2	included
ROS PT-25 FB		2	free issue
Installation and test		2	included
Lighting:			
DSPL 400W SeaArc 2 HMI/MSR lamps		6	free issue
Installation and test		6	included
Incandescent lamps 250W		4	free issue
Installation and test		4	included
Science Tools:			
CTD & associated instruments Type TBA		1	free issue
Installation and test		1	included
ToolSleds:			
MBARI tool sleds		1	MBARI
Installation and test		1	MBARI
3.0	**Tiburon II Surface Control Equipment**	**1**	**342,760**
ROV Control Room		1	existing
Equipment supplied to be suitable for installation in existing control room and 19" control cabinets			
SMDH DVECS Control System		1	included
DVECS PC computer systems for:			
Pilot ROV control and information system (configurable)			
Observer ROV control and information system (configurable)			
Video Matrix switching PC 16 x 16 RGB and NTSC Interface			
Software controlled video overlay system with RGB and NTSC interface			
8 x flat screen 19" TFT monitors constructing "video wall" arrangement			
2 x Touchscreen computers for menu navigation and ROV auxilliary function control			
Hardwire controls (such as trim sliders, P&T control etc)			
Keyboard and drawer			
High bandwidth ultrafast ethernet distributed communication			
User configurable output data for logging			
User configurable input data for GUI display			
Existing MBARI single mode FO multiplexer utilised (assumed to be Prizm or Focal with capacity for communications specified)			free issue
Additional SM fibre cables, ethernet and serial RS232/RS485 data channels for additional ROV equipment			
Pilots control desk c/w ROV joysticks etc			
Observer's control desk			
Manipulator control desk to be reviewed			
Blank desk			
Control			included
SMDH AUTOROV functions including heading, depth, altitude, hold, step, home, track			
Auto route under development			
Review of auto functions, sensors and depth of operation required			
User access to control software for further development????			
Existing MBARI surface auxiliary equipment		1	free issue
Temporary installation and test for FAT		1	included
Power Distribution Unit (PDU) and HV Transformers (HVTU)		1	included
Suitable for powering 50hp ROV system			
Manufactured to IMCA (AODC) guidelines			
480v, 3 phase, 60Hz vessel supply			
Separate 'clean' single phase instrument power and 'noisy' 3 phase HPU incoming power supplies			
New 20kVA power converter to provide 'clean' supply (rotary or solid state)			
Review use of high frequency supply for ROV instrument power			
PDU & HVTU cabinets for fitting in existing control room			
Remote panel for 19" control console			
Safety Interlocks			
Voltage, current and frequency meters			
Circuit breakers, overloads and fuses			
Soft start with bypass contactor for HPU power			
2 x primary and secondary tapped step up transformers (nominal 3000v, 3phase) for ROV instrument and HPU power			
2 x umbilical power line insulation monitors (Bender) for ROV instrument and HPU power			

4.0	**Launch and Recovery Equipment comprising:**		**1**	**430,456**
	Launch & recovery system		1	existing
	Umbilical winch		1	existing
	Slip ring (suitability to be verified)			
	SWA Umbilical Cable (17.3mm/0.68" diameter)		5000m	included
	Length 5000m			
	5 x 3000v Power Cables			
	6 x SM Fibre Optic cables			
	Spooled under tension			not included
	Termination in Winch Rotary JB			not included
	Mechanical and electrical termination at ROV			not included
	Steel Drum/Delivery in UK			included
	ROV umbilical mechanical termination unit			included
	Note: Practicality of umbilical configuration for testing in UK to be reviewed			
	Umbilical Deck Cable		30m	included
	Length 30m			
	5 x 3000v Power Cables			
	6 x SM fibre optic cables			
	Terminated in Winch Stationary JB			not included
	Terminated in ROV control room umbilical JB			not included
5.0	**Equipment Final Assembly, Test, FAT and Documentation**		**1**	**77,673**
6.0	**Project Management and Administration**		**1**	**79,800**
	TOTAL BUDGET LIST PRICE FOR TIBURON II ROV SYSTEM	**USD**	**1**	**2,342,598**
6.0	**Tiburon II Spares. (Budget Price for Typical Spares Package)**		**1**	**237,500**
	Tiburon II ROV Spares (covering equipment supplied by SMDH)		1	included
	TOTAL BUDGET LIST PRICE FOR TIBURON II ROV SYSTEM including SPARES	**USD**	**1**	**2,580,098**

Documentation for each ROV system — included
- ROV System Manuals (Covering equipment supplied by SMDH)
- comprising of:
  - Operating Manual (3 sets hard, 3 set soft format)
  - Technical Manual (3 sets hard, 3 set soft format)
  - Drawing Manual (3 sets hard, 3 set soft format)
  - Software Manual (3 sets hard, 3 set soft format)
- Third Party Equipment Manuals
- Manufacture Certification Package

System familiarisation for customer technicians working alongside SMDH personnel on final stages of build/test — free of charge
- Client covers own costs

Advanced classroom and simulator training at SMDH in Newcastle, England — **USD 1 32,300**
- Limited to 6 persons per course
- Course length 1 week
- Client covers own costs

Senior engineer day rate for mobilisation, commissioning, trials and operations — **1500USD/day (offshore)** **1400USD/day (onshore)**

Handling, Packing, Insurance and Freight (guideline price) — excluded

Validity of Quotation — 60 days

Payment Schedule — Deposit and secure stage payments

Manufacture Schedule (Delivery subject to availability of manufacture capacity) — 28 weeks