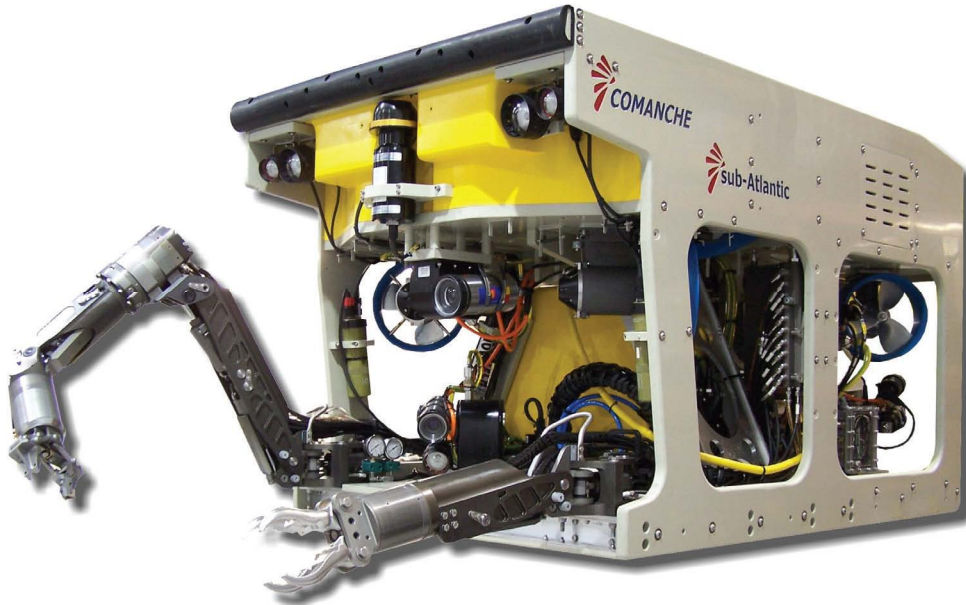


## COMANCHE ULTRA DEEP WATER WORK CLASS ROV Manufacturers General Specifications

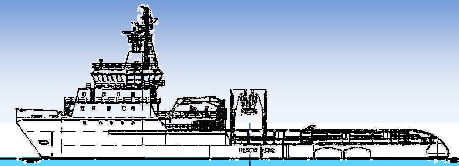


### Work Class Solutions - Observation Class Benefits

Comanche is the logical choice when seeking the ultimate 'all round' electric ROV. Offering a generous auxiliary hydraulic package for work class manipulation and tooling combined with an advanced and powerful control and diagnostics package for survey and other data collection missions, the Comanche offers high performance, high reliability and high adaptability combined with low capital & operational expenditure and reduced deck space - especially when compared to the alternatives. Comanche is currently at work globally in the Oil & Gas, Renewable Energy, Civil Engineering, Military, Scientific Research and Treasure Hunting sectors.

- 1 x 7, 2 x 5 Function Proportional Work Class Manipulators
- Comprehensive Work Class Tooling
- High Powered Dredging, Jetting, Pumping and Cutting capability
- 4 x Horizontal and 3 x Vertical 225lbf thrusters for tilt controlled lift capability
- 285 Kg Payload and diverse skid options
- 6000 meter depth rated Garage TMS (long excursion)
- 6000 meter depth rated ROV
- Multiple GigaByte Ethernet options
- Full Survey/Mapping/Metrology Suite options
- Reduced Deck Footprint





## COMANCHE ULTRA DEEP WATER WORK CLASS ROV Manufacturers General Specifications

Comanche has been developed for the following missions and tasks: Construction IRM – cleaning, cutting, NDT drill/rig /completion support & well intervention, e.g. AX/VX gasket change out, BOP shut down, fluid injection., hot stabbing, drilling and tapping. Additionally, survey including pre/post pipe/cable lay and touch-down monitoring, diver support, renewable energy, submarine/ maritime rescue, munitions search and recovery, scientific research and data/ sample collection plus numerous other missions.

### Comanche System Specification

Length	2100 mm
Width	1300 mm
Height	1250 mm
Buoyancy Depth Rating	6000 m
Weight in Air	1400 Kg
Payload	285 Kg
Power	35 kW
Thrusters Horizontal (4)	250 mmØ
Thrusters Vertical (3)	250 mmØ
Forward Thrust	260 Kgf
Lateral Thrust	260 Kgf
Vertical Thrust	225 Kgf
Optimum Speed	3.0 Kts
Optimum Speed	1.5 m/s

### Control System and Features

- Hands Free Navigation & Station Keeping
- Hand Control Unit & Graphical User Interface
- Power Management & Protection
- System Condition Monitoring & Diagnostics

### Telemetry

- Single Mode Fiber

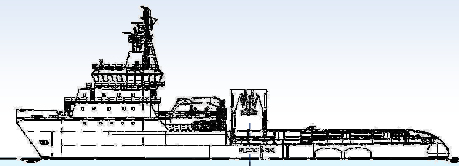
### Standard System Equipment

- Electronics Pod Control, Plus Multiplexer & Single Mode Telemetry
- Low Mass 35kW / 3000V / 400Hz Transformer, Capacitor, HV Fuse & Thruster Power Box
- Pan & Tilt Unit
- High Torque Tilt Unit
- 6000m Rated 285 Kg Payload Buoyancy
- Space for Mounting User Equipment
- Aluminum Frame Supporting Internal & External User Equipment & Live Boat Launch & Recovery

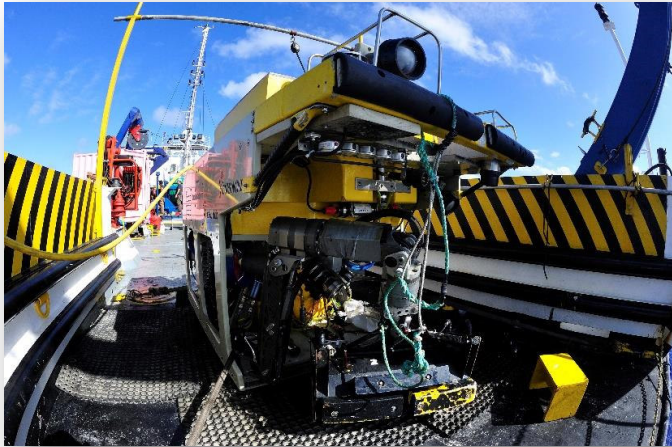
### Operational Equipment

- Survey Expansion Electronics Pod
- Industry standard:
  - Manipulators & Cutters
  - Dredge Systems
  - Cameras & Lights
  - Live Download Digital Stills
  - Obstacle Avoidance Sonars
  - Motion & Navigation Reference Sensors
  - Geophysical & Bathymetric Survey Sensors
  - Non Destructive Test Sensors
  - Cleaning Jets & Brushes
  - Pipe and Cable Tracking & Inspection Systems
  - Drill Support & Well Intervention





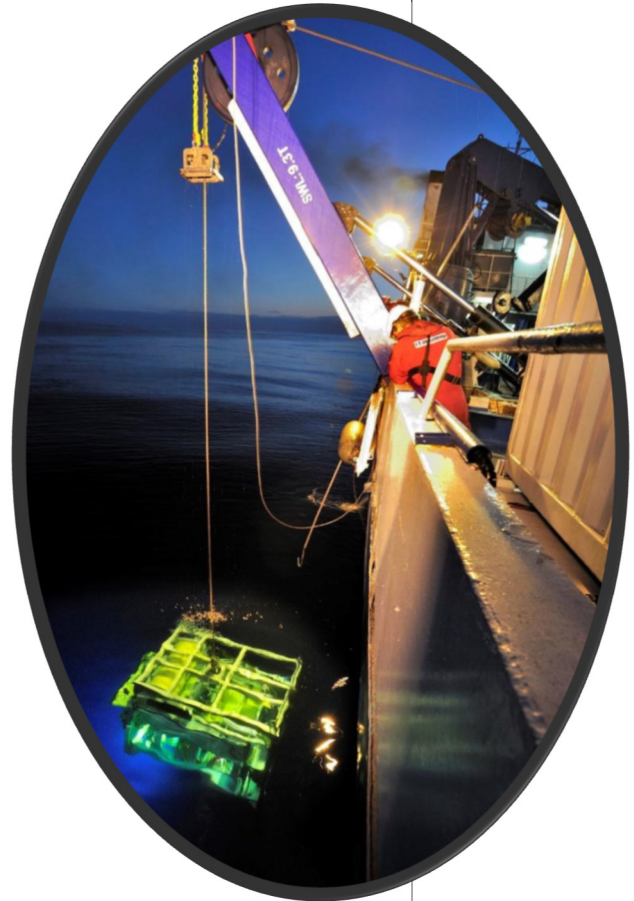
## COMANCHE ULTRA DEEP WATER WORK CLASS ROV Specific Vehicle Design

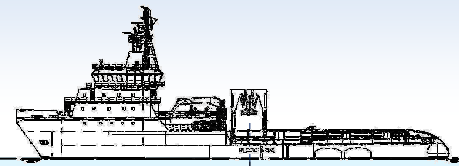


This ROV is specially designed to carry out ultra deep water missions. This ROV is equipped with a dedicated deep water Launch and Recovery System (LARS) that utilizes a 9 ton capacity A-frame mounted to the deck in line with a high speed All Oceans winch spooling 6,000 meters of electro-optical umbilical through the A-

frame sheave. At the subsea end of the umbilical an ultra deep water garage type Tether Management System (TMS) carries up to 200 meters of neutral flying tether. This allows the ROV to float unaffected by the wave motion of the ship above.

The Comanche is propelled by 7 brushless DC thrusters delivering a horizontal thrust of 260 kgf. It carries 2 heavy duty anthropomorphic manipulators allowing for dexterous subsea manipulation. It includes a complementary tool-set giving this state of the art machine the ability to observe, measure, mark, jet, excavate, cut, sample, collect, salvage and pretty much any other task imagined by our customers.





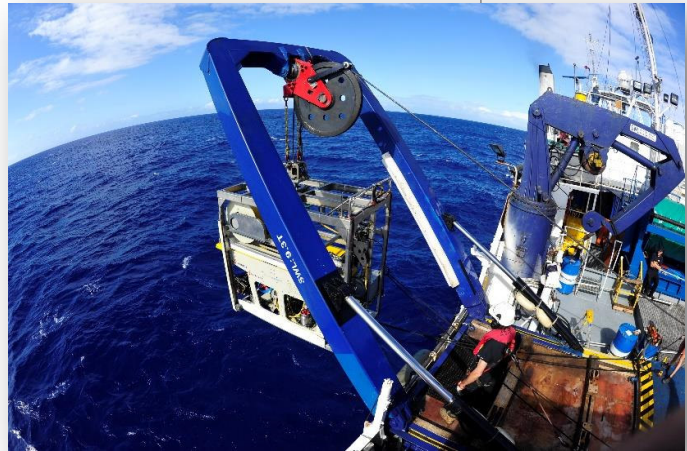
### COMANCHE ULTRA DEEP WATER WORK CLASS ROV Specific Vehicle Details

#### Launch and Recovery System

A-Frame 9.3 Metric Tons Capacity  
 Winch All Oceans, 60m/min  
 Umbilical 6km opto-electrical  
 TMS Extendable Side Entry Garage  
 Tether length 200 meters

#### Navigation

Positioning Posidonia Long range USBL  
 Navigation DVL aided INS  
 Resolution 0.3% slant range



#### Lights

HMI standard: SeaArc  
 HMI LED: Sealite 3R Matrix (18,000 lumens)  
 Dimmable halogens DSPL  
 Dimmable LEDs DSPL

#### Sensors

Navigation  
 INS: PHINS 6000  
 DVL: Navquest 600  
 Compass: Tritech TCM2  
 Depth Sensor: Digiquartz  
 Altimeter: Tritech PA500  
 Beacon: IXBlue MT861

#### Imaging

Insite Atlas Video  
 Kongsberg EO14-366  
 Didson Acoustic Camera  
 Tritech Super Seaking Sonar

#### Manipulators

Orion 7 function	Orion 4 function	Hydrolek 5 function
Max reach: 1.48m	Max reach: 1m	Max reach: 0.94m
Max lift (nominal): 250 kg	Max lift (full reach): 136kg	Max lift (full reach): 80kg

