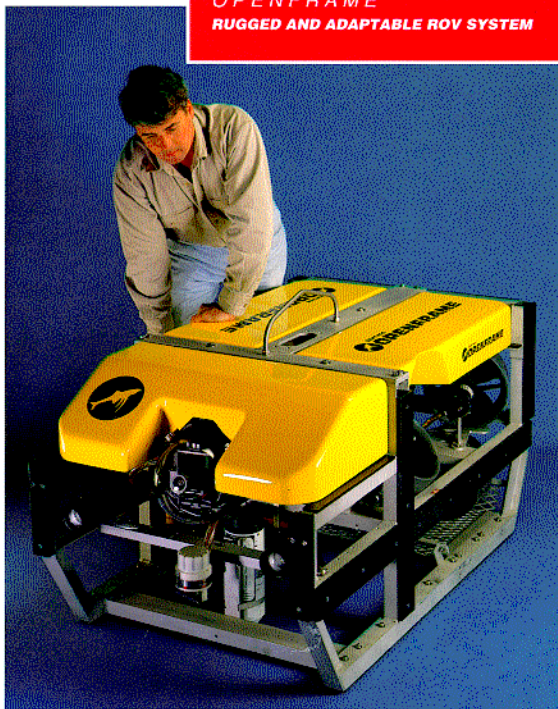


THE BENTHOS OPENFRAME is an all-purpose, remotely operated vehicle system designed for maximum performance, payload capacity, and adaptability in the field. The Openframe is moderately sized and priced as an alternative to heavy duty work vehicles, but is tough enough to meet the demands of offshore users.

Fitted with four horizontal thrusters and two vertical thrusters in a vertran configuration, the Openframe can achieve speeds of up to 3 knots on the surface, turn on its own axis, move laterally and vertically while maintaining heading, and hover motionless in light to moderate currents. A high resolution, low light, panning and tilting color camera transmits images to the surface and is complemented with a videographic pilot's display of depth, heading, altitude, and other digital information.

Rated to depth of 1000 feet (3000 feet optional), the Openframe can carry up to 100 in-water weight pounds of payload. The vehicle's skeletal construction and excellent stability allow a multitude of add-on possibilities, including articulator arms, a navigation system, scanning sonars, and C.P. probes.

Benthos also now offers a complete tether management (TMS) and launch and recovery system (LARS) designed specifically for the Openframe.



▶ **FEATURES**

- Open frame design
- 100 pounds of payload capacity
- Six high performance thrusters
- Depth rating to 1000 feet (3000' optional)
- Optional TMS and LARS

▶ **APPLICATIONS**

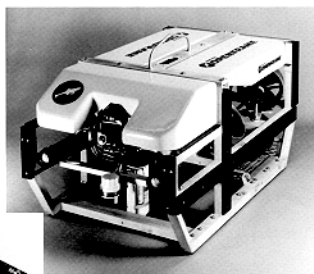
- Offshore surveys
- Pipeline inspections
- Search and salvage operations
- Platform inspections



BENTHOS

OPENERAME

▶ SYSTEMS COMPONENTS



◀ Handbox controller



▶ SPECIFICATIONS

Performance

Maneuverability:	Three axis translation and yaw rotation
Speed—horizontal:	Up to 3 knots
Speed—vertical:	Up to 3/4 knots (up and down vertical plane)
Speed—lateral:	Up to 3/4 knots (lateral left and right)
Depth (seawater):	304 meters (1000 feet) standard. Special depths optional
Stability:	Gravity stabilized in roll and pitch to maintain ± 5 degrees maximum inclination

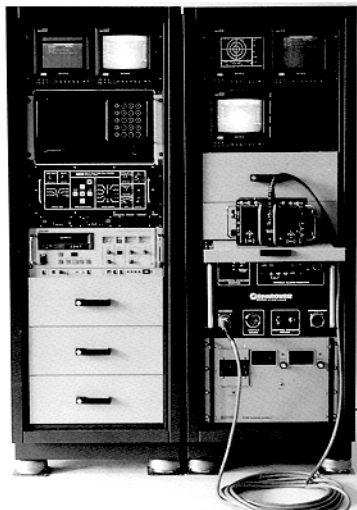
Instrumentation and Operator Displays

Integrated Viewing System:

Camera:	High resolution pan/tilt color video camera with 3 axis joystick control
Lens:	Automatic iris, 3.5 mm/1.8
Field of View:	95 degree horizontal, 68-75 vertical
Resolution:	460 lines at 5 lux (.5 footcandles) typical
Lights:	Two quartz Halogen lights (150 watts each). additional lights available ± 45 degrees from center position. Pan/tilt position readout on pilot's TV monitor.
Pan/Tilt Mechanism:	
Pan/Tilt Rate:	45 degrees per second
Heading/Azimuth:	Fluxgate compass sensor, 2 degree accuracy typical

Videographic Pilot's Display

Depth:	Three digit display with inverted analog bar graph
Heading:	Digital display with compass rose display
Altitude:	Three digit display with bar graph
TV Pan/Tilt:	Pan and tilt angles digitally displayed in \pm degrees
Date and Time:	Month, day, year, hours, minutes, seconds
Cable Turns:	Up to ± 99 turns displayed
Two Spare Displays:	0-5 V digitally displayed, analog inputs. The display can be optionally configured to meet virtually any requirement.



▲ Typical control console configuration (shown with options)

Propulsion and Control

Longitudinal:	Four horizontal thrusters
Vertical/Lateral:	Two thrusters at vehicle center in "vertran" configuration
Controls:	One 3-axis proportional joystick for lateral and longitudinal movement, and one single axis controller for vertical movement in walk-around handbox, splashproof and rugged
Special features:	Auto depth control servoed from pressure transducer. Auto altitude servoed from altitude sonar (optional). Auto heading servoed from flux gate sensor and rate sensor (optional).

Thruster Specifications

Horizontal:	1/2 horsepower, four phase, rare earth, brushless DC motors, oil-filled, pressure compensate
Vertical/Lateral:	1/2 horsepower each
Static Thrust:	54.5 kg (120 pounds) with four horizontal thrusters, 22.6 (50 pounds) vertical, 22.6 kg (50 pounds) lateral

Tether Cable

Length:	304 meters (1000 feet) standard, longer lengths optional
Diameter:	1.9 cm (.75 inches)
Weight in water	-.9 kg (-2 pounds) per 304 meters
Strength:	590 kg (1300 pounds)
Construction:	Outer flotation jacket over abrasion jacket of TPR over Kevlar member

Power and Support Requirements

Power Requirements:	
Voltage:	220 VAC, 3-phase, 220 VAC 1-phase, 380 or 440 VAC, 3-phase (optional)
Kilowatts:	5.5 to 9 Kw depending on options
Frequency:	47-63 Hz
Support Requirements:	
Crew:	Minimum—two persons (pilot and technician); typical—three persons (pilot and technicians)
Platform:	Crafts of opportunity—including ships, boats, helicopters, or vehicles (beachfront)

Physical Characteristics

Vehicle Dimensions:	Maximum—142 cm (56 inches) length x 84 cm (33 inches) width x 71 cm (28 inches) height
Vehicles Weight:	226 kg (500 pounds) in air

Options

Positioning/Navigation System; Scanning Sonar System; Extended Umbilical Cable; Articulator Tool Systems; Tether Management System (TMS); Launch and Recovery System (LARS); Video Cameras (Synchronization Standards, Monochrome Video, Low Light Video, Manual Iris); Extra Sensors and Displays; Photo Camera/Strobe Package; Altimeter/Auto Altitude; Auto Heading Facility; Extra Underwater Lights

Specifications subject to change without notice.
1-94



▲ Optional Tether Management and Launch & Recovery Systems

