

# Stingray

## REMOTELY OPERATED VEHICLE

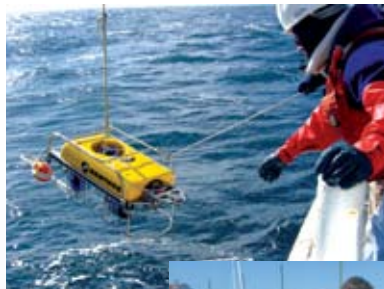
# Powerful, rugged, reliable

The *Stingray* Remotely Operated Vehicle is Teledyne Benthos' solution to the ever-changing needs of inspection class ROV customers. *Stingray* is designed to be easily configured for numerous tasks. In addition to a large selection of tools and device options, *Stingray* is capable of easily interfacing with other user-provided devices via multiple RS-232, RS-485, analog, and digital interfaces. The *Stingray* vehicle has two built-in slide rails, designed for the easy installation of additional buoyancy, tools, cameras, lights, sensors, frames and/or any other device that the job requires. *Stingray* comes standard with three optional connectors and one additional camera connector. These standard connectors make future device upgrades simple.



### Easy Deployment

*Stingray* is truly a one-man deployable inspection class ROV. With an in-air weight of 70 lbs (31.75 kg), it can easily be deployed and recovered by one person from any stable platform. Benthos offers an optional lightweight portable launch and recovery system for use on solid platforms like piers. This portable launching system is made of aluminum and is designed to safely deploy and recover the *Stingray* ROV. The system also folds flat for easy transport and storage.



### APPLICATIONS

- Mine countermeasures
- In-situ biological studies and sampling
- Port and harbor security tasks
- Ship hull inspections
- Dam and tunnel inspections
- Under-ice surveys and operations
- Interior and exterior pipe inspections
- Inspection of nuclear reactor facilities
- FPSO mooring chain inspections
- Salvage operations
- Offshore structure surveys
- Inspection of water tanks and systems
- Search and rescue (SAR) operations
- Police evidence search and recovery operations
- Real-time monitoring of marine construction operations
- Artificial reef monitoring operations



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# Remotely Operated Vehicle System

## STANDARD FEATURES

- Auto heading and depth/altitude
- High-resolution color 18X zoom camera
- 3 camera capable, 2 live simultaneous, 1 switchable
- Camera tilt home feature
- Full 180°, multi-use tilt bar
- Heading, rate gyro, pressure, and pitch and roll sensors
- 2 built-in slide rails
- Rugged one-piece stainless steel chassis
- 4 powerful, reliable, magnetically coupled DC brushless thrusters
- Lightweight and water resistant hand control box
- Multiple I/O's (RS-232, analog, and digital)
- 3 connectors for options
- Equipped with 1 optional camera connector for easy installation of 2nd live video camera



A complete Stingray system includes the ROV, hand control box, topside control console and shipping case. A variety of optional tools and accessories are available. Pictured with optional display and Tether Management System.



A Stingray ROV system was used to retrieve a 4,000 lb bottom-moored data collection platform.



The Stingray was outfitted with a hooking mechanism to attach a line for the top bail of the platform which was then hauled to the surface.

## Optional Tools & Devices

- Low light black and white camera
- Wide angle, high-resolution color camera
- Fiber optic communications link
- Short baseline acoustic navigation system
- Articulator tool system
- Portable launch and recovery system
- Portable Tether Management System
- Vehicle garage
- HID light system
- Scanning sonar system
- Laser scaling system
- Pan and tilt bubble camera
- Altimeter
- CP probe
- Heavy lift, remote lift bag system
- Side and rear looking cameras
- Ultra bright LED lights
- Digital video recording system
- Virtual reality training software
- Several display sizes and types



Articulator arm.



Scanning sonar.

## Specifications

### Performance

Maneuverability:	3-axis translation and yaw rotation
Horizontal speed:	Greater than 3 knots on surface with a short tether deployed, depending on payload
Vertical speed:	0.75–1 knot up or down
Lateral speed:	0.75–1 knot left or right
Operating depth:	350 m (1150 ft) of seawater
Stability:	Gravity stabilized in roll and pitch to maintain a $\pm 5^\circ$ maximum inclination
Payload:	2.5 kg (5.5 lb) in-water weight with removal of all ballast; additional buoyancy modules are available for an additional payload capability

### Physical Characteristics

Size:	46 cm (18.0 in) high 46 cm (18.0 in) wide 99 cm (39.0 in) long
Weight:	32 kg (70 lb) for standard 2-horizontal thruster configuration, excluding ballast and installed options
Slide rails:	Two built-in slide rails for easy installation of additional tools, sensors, thrusters, cameras, lights, etc. These rails run the entire length of each side of the <i>Stingray ROV</i> .

### Thrusters

Horizontal:	Two 1/2 hp magnetically coupled brushless DC motors; four optional
Vertical:	One 1/2 hp magnetically coupled brushless DC motor
Lateral:	One 1/2 hp magnetically coupled brushless DC motor
Forward static thrust:	10.4 kg (23 lb) per thruster
Reverse static thrust:	5.9 kg (13 lb) per thruster
Propeller:	Nylon
Nozzle:	Nylon Kort

### Viewing System

Camera:	High-resolution 18X zoom color video, NTSC or PAL; up to 2 additional cameras optional
Lens:	3.24–38.9 mm (12:1 zoom), f1.8–2.7 with auto iris
Focus:	Remote, macro to infinity
Horizontal field of view:	2.2°–5.3° in water
Resolution:	470 lines
Sensitivity:	1 lux @ 50 IRE
Lights:	Two 150 watt quartz halogen, variable intensity, mounted to tilt bar so that they track with the camera; two additional lights optional
Tilt mechanism:	Up to 90° up from horizontal, 90° down from horizontal, built-in slip clutch. User definable tilt home feature
Tilt rate:	10°/sec

### Sensors

Pitch/Roll:	$\pm 20^\circ$ , $\pm 0.2^\circ$ with 0.2° resolution
Heading:	0–360°, $\pm 1^\circ$ with 1° resolution
Depth:	$\pm 1^\circ$ of operating depth
Angular rate sensor:	Yaw rate gyroscope, $\pm 150^\circ$ /sec

### Surface Control Unit & Vehicle Power Supply

#### Physical Characteristics

Size:	37.1 cm (14.6 in) high 56.2 cm (22.1 in) wide 56.0 cm (22.0 in) long
Weight:	15 kg (33 lb)

#### Electrical Specifications

Input power requirements:	100–120 VAC or 200–240 VAC, 47–63 Hz, single phase, 2500 W, 5000 VA maximum, depending on installed options. Adjustable current limiting for use with small generators
Output power to vehicle:	150-300 VDC at 8 amps, isolated, regulated at vehicle (optional 12 amp output)

#### Controls and Indicators

Front panel displays:	Hours Power supply voltage Power supply current
Front panel indicators:	Vehicle power 12 VDC power Over temperature alarm Ground fault alarm Water leak alarm Sensor fault alarm Communications loss alarm Audio alarm Power supply constant voltage mode Power supply constant current mode Power supply over voltage shutdown Power supply standby Power supply over temperature Power supply AC fault
Front panel controls:	System power switch Ground fault bypass switch Alarm silence switch Graphics overlay on/off switch Power supply on/off switches
Front panel fuses:	AC (2) 12 VDC
Video overlay displays:	Depth, digital with analog bar graph Heading, digital with compass rose Altitude, digital with bar graph (optional) Date in month, day and year Time in hours and seconds Cable turns, up to 99 turns

Specifications continued

# STINGRAY— Remotely Operated Vehicle



## Specifications *continued*

<b>Input/output connections:</b>	Ethernet (factory or advanced users only) GPS RS-232 (available for future use) Video out A and B Handbox Tether Sonar Power supply AC in from power supply AC out (for optional video display and recorder system) Power supply AC in
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### Tether

<b>Length:</b>	Customer specified
<b>Diameter:</b>	1.65 cm (0.65 in)
<b>Weight in fresh water:</b>	Neutral
<b>Weight in air:</b>	65 kg/305 m (143 lb/1000 ft) nominal
<b>Breaking strength:</b>	900 kg (2000 lb) nominal
<b>Peak tension load:</b>	164 kg (360 lb) maximum
<b>Minimum bend radius:</b>	20 cm (8 in)
<b>Construction:</b>	Outer yellow foam polyurethane flotation jacket over Kevlar braid
<b>Conductors:</b>	(2) 75 ohm coax, (4) 18 AWG, and (2) 26 AWG twisted shielded pair
<b>Maximum length:</b>	600 m (1968.5 ft)

## HANDBOX

The handbox connects to the surface control unit with the handbox extension cable and is used to control all of the *Stingray's* functions. It is packaged in a rugged, cast aluminum housing with drop protectors and includes a comfortable padded neck strap.



*Stingray topside control console and hand control box.*

### Physical Characteristics

<b>Size:</b>	14.0 cm (5.5 in) high 22.2 cm (8.8 in) wide 15.9 cm (6.3 in) long
<b>Weight</b>	1.7 kg (3.7 lb)
<b>Extension cable length:</b>	15.2 m (50 ft)

### Controls and Indicators

<b>Indicators:</b>	Vehicle power GFI/leak/temperature alarms Auto heading/depth/optional altitude
<b>Controls:</b>	Horizontal joystick (3-axis) Vertical joystick (1-axis) Vertical trim control Range trim control Vehicle power switch Tilt down/up switch Tilt return home button Pan right/left switch (w/optional pan and tilt) Camera select A/B switch Zoom in/out switch Focus auto/manual Lights/brightness switch Depth/altitude select switch Auto heading/depth/altitude button Optional manipulator: manipulator functions— open/grip jaw, rotate wrist, arm swing in/out



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