

**Form & Function ~ Power & Performance**



*Excellent maneuverability  
and power, with  
substantial payload,  
for severe operating  
conditions to a working  
depth of 2,000 ft. (600 m.)*



**Key Features**

- Excellent maneuverability: 4 vectored and 2 vertical thrusters
- Maximum working depth: 2,000 ft. (600 m.)
- Power: forward thrust of 170 lb. (77 kg.)
- Substantial payload: with bottom-mounted skid 70 lb. (32 kg.); standard 50 lb. (23 kg.)
- High quality resolution color camera: 18:1 zoom,  $\pm 90^\circ$  from horizontal
- Adjustable high intensity lighting: 2 x 250 watt quartz-halogen lamps (standard), expandable to 1,000 watts
- Navigation: rate-gyro stabilized fluxgate compass, electronic depth sensor, auto-pilot for heading and depth
- On screen display: real-time video data for heading, depth, turns count, programmable sensor data
- Rugged and maintenance free modular chassis, with adjustable buoyancy
- Options: multiple sonars, specialized cameras, tracking systems, altimeter, fiber-optic telemetry, manipulators, cable reels, other tools and sensors



## **SWORDFISH Specifications**

Maximum working depth:	600 m	2,000 ft
Vehicle length:	1,700 mm	67 in
Vehicle height:	640 mm	25 in
Vehicle width:	870 mm	34 in
Vehicle weight:	205 kg	450 lb
Thrust Forward:	77 kg	170 lb
Thrust Lateral:	32 kg	70 lb
Thrust Vertical:	32 kg	70 lb
Payload: standard	23 kg	50 lb
with bottom-mounted skid	32 kg	70 lb

**Chassis:** A modular chassis manufactured from polypropylene. This extremely rugged material is maintenance free, self-supporting in water and non-corroding—providing the vehicle with an energy absorbing protective framework. Ancillary equipment are easily mounted on the frames and bottom panel.

**Propulsion:** Hard-wired 240 VDC high power motors. Each thruster is individually controlled from the surface, which provides the added advantage of simple control circuitry. The **SWORDFISH** employs a unique DOE-designed, fail-safe and oil-filled shaft seal arrangement; with highly visible diagnostic tell-tales for added safety. Highly efficient nozzles shroud the propellers for enhanced thruster performance.

**Vehicle electronics:** **SWORDFISH** is hard-wired with dedicated conductors in the umbilical for the various vehicle functions, plus spare conductors for the clients use. The advantages of a hard-wired system are simplicity and ease of maintenance, with sub-sea electronics kept to a minimum.

**Camera unit:** DOE 18:1 color zoom camera unit.  
 Depth rating: 3,300 ft. (1,000 m)  
 Resolution: 470 lines of TV.  
 Sensitivity: 1 Lux @ f1.4.  
 Viewing angle: 7°-58°.  
 Length: 254 mm (10 in), Diameter: 100 mm (4 in)  
 Weight in water: 0.4 kg (0.8 lb), in air: 1.8 kg (4 lb)  
 Built-in video switch for 2nd camera (option up to 4)

**Camera tilt platform:** DOE electrically driven worm drive tilt actuator provides a smooth tilt speed. Operational arc: ±90° from horizontal with adjustable stop switches.

**Lighting:** 2x250 watt Quartz-halogen lamp units. The control is On/Low/Medium/Full, expandable to 1,000 watts.

**Control console:** LCD depth display, audio feedback from sub-sea microphone, meters, audible water leak alarm, separate pilot box on 50 ft. lead.

**On screen display:** This is a continuously up-dated video display, which provides the operator with the heading, depth, turns count, elapsed time and water leak alarm information, allowing the vehicle to be operated safely in all conditions. It may also be programmed to display sensor data on the screen. There are 24 free text pages available to the operator via the keyboard; additional digital and analog I/O channels and vehicle data may be exported to the navigational or survey computer.

**Navigation:** Rate gyro stabilized fluxgate compass unit. Accuracy: ± 3°. Update rate: 100 mS.  
 Electronic depth sensor: Accuracy: 1% of fsd.

**Auto-pilot:** Selectable automatic pilot for heading & depth

**Power requirements:** Input 100-250 VAC, 50/60 Hz, 6 kVA. User power available — instrumentation 24 VDC @ 6 A, auxiliary power 80 VDC @ 0.6 A

**Umbilical cable:** A supple, rugged cable, designed for harsh ocean environment - neutrally buoyant in fresh water.

### **Options:**

- Sonar systems
- Tracking systems
- Specialized cameras
- Altimeter
- Fiber-optic telemetry
- Various manipulators, with optional line cutter
- Different lengths of umbilical cable
- Cable reels (manual or powered)
- Additional tools and sensors
- Spares kits
- Technical training