

# Introducing The SonicWorks™ BEE

## ***A Radical New Concept in ROV Design***

The SonicWorks “Bee” is the next generation in underwater robotic vehicles. High performance characteristics and high precision positioning and control combine to make the Bee ideal for the most demanding inspection and intervention tasks.

The Bee is unique in its ability to operate at any attitude, conforming to the shape and slope of the surface to be inspected. The vehicle thrust control system actively controls the attitude and position of the vehicle to precisely fly operator-directed or totally automated course lines. Scanning operations may be pre-programmed and flown for comprehensive inspections with no holes.

The Bee produces a very high thrust to mass/drag ratio to enable stable vehicle operations in currents of up to six knots. Four articulated thruster assemblies combine to produce up to 300 lbs. of thrust in any direction, resulting in a “Total Degree of Freedom” vehicle. In addition, a unique tether system is designed for low drag and high strength, allowing for unrestricted vehicle movement.



The Bee’s structure is composed of carbon composite materials and engineering plastics, with less than 1 square inch of exposed stainless steel and titanium. The hull and fittings are designed for low maintenance and high reliability in any environment. The Bee has a displacement of 70 lbs. and a 24 lb. payload capacity.

The outstanding control and thrust capabilities of the Bee give the vehicle unsurpassed ability to apply a variety of tools in powerful ways. The thrust capability can enhance the operation of a gripper by applying up to 300 lbs of force at any angle or even rotationally. The vehicle stability system allows for the precision application of water jetting.

### ***Features:***

- *Articulated Thrust - 300 lbs.*
- *Operate at Any Attitude*
- *Handles Currents up to Six Knots*
- *24 lb. Payload Capacity*
- *High Strength, Low Drag Tether*
- *Strong, Lightweight Carbon Fiber Composite Construction*

### ***“Inspector Bee” Package***

- *SonicWorks Acoustic Positioning and Navigation System (APNS) for precision tracking*
- *Robotic Control System (RCS) for computer-enhanced vehicle stability and control*
- *Hull Contouring System*

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## "Inspector Bee" *Package* Specifications

### Physical

Dimensions: 28.5 in. (72.4 cm) H x 28.5 in. (72.4 cm) W  
x 31.5 in. (80 cm) L  
Weight: 70 lbs. (32 kg) in air  
Ballast: 24 lbs. (11 kg)  
Construction: Carbon Fiber Composite and Engineering  
Plastics  
Depth: 1000 ft (300 m)  
Max Speed: > 10 kts

### Thrusters

Four Independently Controlled Articulated Thrust Units  
providing 300 lbs. total thrust in any direction or rotationally for total vehicle  
stability and control.

### Stability

Active Hydraulic Thrust Steering Actuators for smooth, responsive  
control and fine position keeping capability

### Tether

Custom Polyurethane Jacketed Cable with Kevlar Strength Member  
1000 ft (300 m) standard length

### Power

Input: 100 - 400 VAC 4.5 KW  
Accessory Power: 5 - 80 VDC 200 W

### Camera System

High Resolution Low Light Color Camera and LED Lighting System  
B & W Hull-Mounted Maneuvering Cameras

### Positioning System

SonicWorks APNS Acoustic Positioning and Navigation System provides  
Centimeter-Accurate positioning and tracking.

Operator Annotation automatically records position, time, video marker,  
sequence, and user-input data.

### Robotic Control System

SonicWorks RCS Robotic Control System provides computer assisted stabilization  
and control of the Bee in any direction in up to six knots of current.

Enhanced Operation Modes:

Station Keeping - RCS automatically maintains vehicle position with  
the push of a button

Undocking Control - RCS maintains position while allowing pilot to  
step vehicle towards target manually

Fly-by-Wire - RCS automatically compensates for vehicle  
characteristics and water currents

Fully Automated Scanning - RCS follows preprogrammed flight path

### Hull Contouring System

Laser / Optical / Sonic Alignment maintains precise angle and distance from hull for consistent  
application of NDT probes

Works with APNS and RCS to enable Fully Automated Scanning Operations

### Optional Equipment

Manipulator Arm, Sonar, Altimeter, NDT Probes and Arrays, Specialty Camera Systems

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