

Specification for ROV

A Remotely Operated Vehicle, ROV, will be used to position sensors relative to a US Navy ship hull in a marine industrial environment. The ROV will carry a suite of sensors for inspection of hull and other underwater structures. ROV design must be modular in approach with all subsystems field replaceable by ship's force operators. The ROV and topside electronics will be deployed from a small RHIB (small boat 7-11m). The ROV must be protected by an open crash frame assembly. Environmental current conditions require thruster configuration capable of translation and rotation motions in 2.5 kt currents around underwater structures. NSWC will provide a computer based ROV control system for automated path planning and following. This control system will interface to the ROV controller through an analog signal or digital command string.

ROV Physical Configuration Specifications:

1. ROV electrical power: must be able to operate at full load (thrust and lights) from a 120 VAC / 30 Amp circuit.
2. Operating Depth – 330 ft.
3. ROV must weigh less than 100 lbs.
4. ROV must be capable of carrying a complete sensor suite including:
 - a. acoustic navigation transponder, Sonardyne Model "Mini ROVNAV".
 - b. Doppler Velocity Log, DVL.
 - c. High Frequency Sonar, Sound Metrics model "Didson – Split Body"
 - d. Additional Navigation Aids (altimeters, gyroscopes, rate sensors, and auxiliary video camera).
5. Thruster motors ratings of 1/3 horsepower or greater.
6. 4 thrusters minimum applied to: lateral (sway), fore-aft (surge), and turning (yaw) movement directions.
7. 1 thruster, minimum, applied to vertical (heave) movement direction.
8. ROV must provide lifting point (eye) for crane.

9. Provision must be made for quick addition and removal of trim ballast weights without the use of tools.

10. Floatation:

- a. Foam shall be closed-cell material.
- b. 15% of floatation buoyancy must be modularly removable to allow for trim of different sensor configurations.

11. Lighting:

- a. minimum 2 lights to provide minimum 500 watts equivalent.
- b. lights must be able to be dimmed at minimum 3 settings (off, low, med, high)
- c. lights must have user replaceable bulbs / element.

12. Camera:

- a. NTSC Underwater color video camera to be provided with ROV.
- b. Minimum of 0.1 lux faceplate sensitivity.
- c. Minimum of 450 horizontal TV lines.
- d. Maximum size – 4" diameter x 8" long.
- e. Wide angle lens – minimum of 80 degree view angle wet.

ROV Performance Specification:

1. Minimum thrust values:

- f. 100 lbs. in forward, aft, port, and starboard directions.
- g. 30 lbs. in vertical (up and down directions).

ROV Controller Specification:

1. System power-up time requirements in ROV controller:

- a. ROV thruster control, camera, and lights must be powered up and useable within 5 seconds of cold start and hot restart of system. This does not include GFI delays.
- b. Additional GFE computer control and navigation system interfaces are not included in the rise time requirement.

2. ROV to provide auto-heading and auto-depth functions.

3. Controller must accept input from GFE computer based navigation system.
 - a. Input will be analog ± 10 VDC or digital ascii string.
4. Daylight viewable display for u/w camera.
5. On-screen annotation capability.
6. Display to provide vehicle heading, depth, and vehicle system alarms.
7. Controller, display, and handboxes to be: ruggedized, weather-proof, splash-proof.
8. GFI incorporated into controller.

Tether Specifications:

1. Tether length - 600 ft.
2. Tether diameter - 0,80 inches maximum.
3. Neutrally buoyant or positively buoyant not to exceed + 0.5 ounces per foot.
4. Must contain spare conductors for sensor payload:
 - a. 3 twisted shielded pairs.
 - b. capable of supporting 100 base-T Ethernet and/or RS-485.
5. Tether terminations:
 - a. Subsea termination at underwater removable connector.
 - b. Topside connector to be water proof also.
6. A tether spool with Racal slip-rings.

System Spares:

1. An extensive set of topside and vehicle spares must be provided:
 - a. Spare 600 ft tether with end connectors installed
 - b. Two thruster assemblies with propellers, shafts, and seals installed
 - i. If there are different sized thruster motors or propellers then two spares for each size must be included.
 - c. Complete set of vehicle PC Boards
 - d. Complete set of vehicle sensors such as: rate, pressure/depth, compass, angle (pitch & roll).

Payload Specification:

1. Sensors will be mounted on the ROV.
2. A drawing of the proposed sensor payload is attached. This sensor payload must be able to be rotated along the axis of the ROV (as shown in drawing).
 - a. The primary sensor / navigation aid is a high frequency sonar (Didson split body)
 - i. This sensor will look forward at 15 – 30 degrees.
 - b. An additional navigation / control aid is a Doppler Velocity Log.
 - i. The DVL must have an unobstructed view of the ship hull from orientations vertical and horizontal left & right.
3. A Sonardyne navigation transponder will be mounted on the top of the ROV.
 - a. Provision must be made for a cutout in the syntactic foam for the Mini ROVNAV remote transducer.

Delivery Schedule:

1. First two (2) ROVs to be delivered within 45 days of award.
2. Subsequent vehicles to be delivered within 90 days of award.

Basis for award:

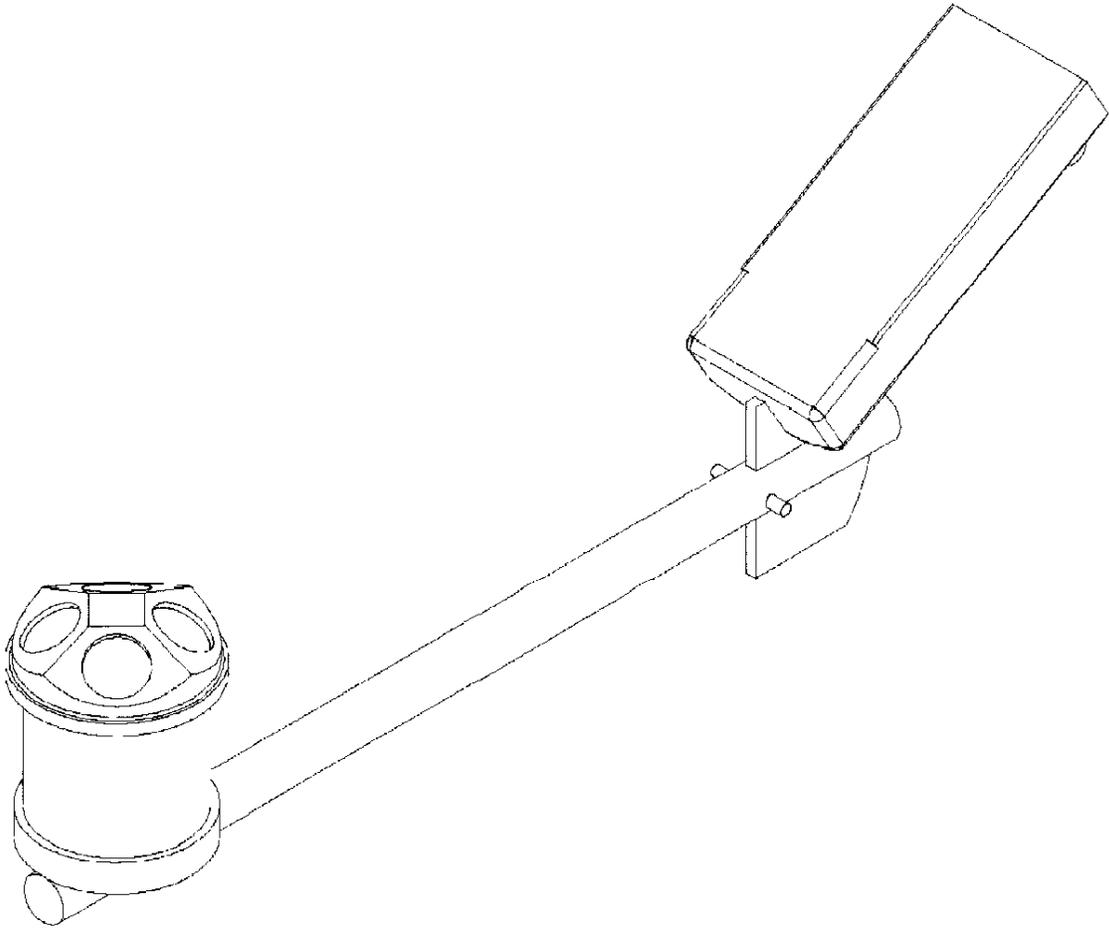
Award will be made to the company who's offer can meet all of the technical specifications and delivery requirements, and at the lowest overall cost.

Offers must be received by the offer due date to be considered for award.

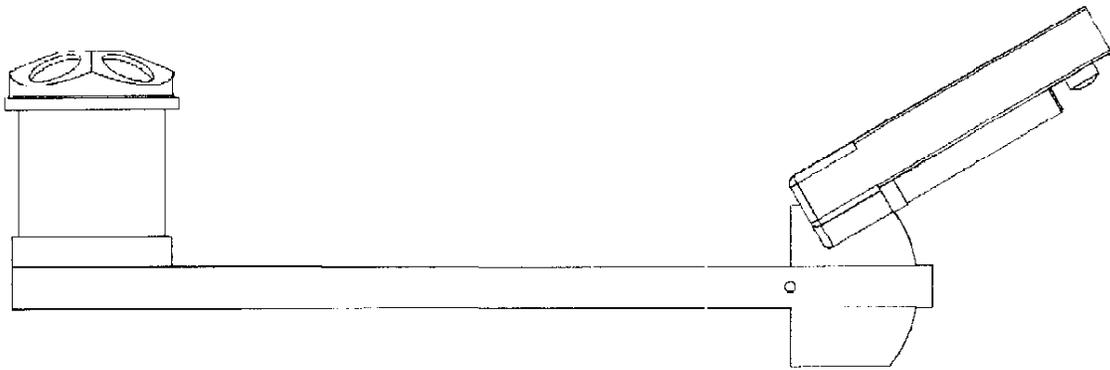
Additional Information:

The Government reserves the right to request a demonstration of potential ROV offerors technology.

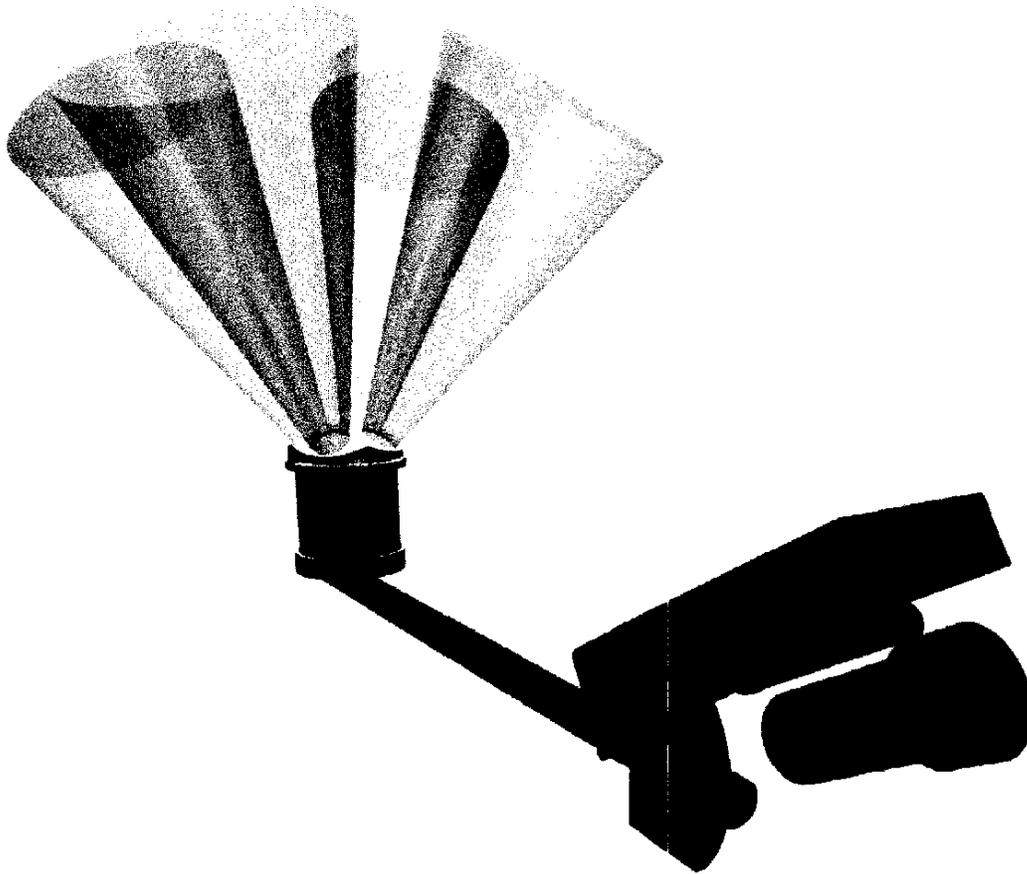
ROV Specification Sensor Payload
Drawings



Orth. View



Side View



Notes: These views are examples only. It is expected that the DVL and DIDSON sonar head rotate together, however a solid mounting arm need not be employed. The details are left up to the contractor. The DIDSON must have a fixed grazing angle alterable between 0 and 30 degrees from horizontal (30 deg is shown). The DVL and DIDSON must be able to rotate plus and minus 90 degrees, to ensure proper aiming beneath and at either side of a hull.