

Exploring The Deepest Depths: A Novel Light-Tethered Hybrid ROV for Global Science in Extreme Environments

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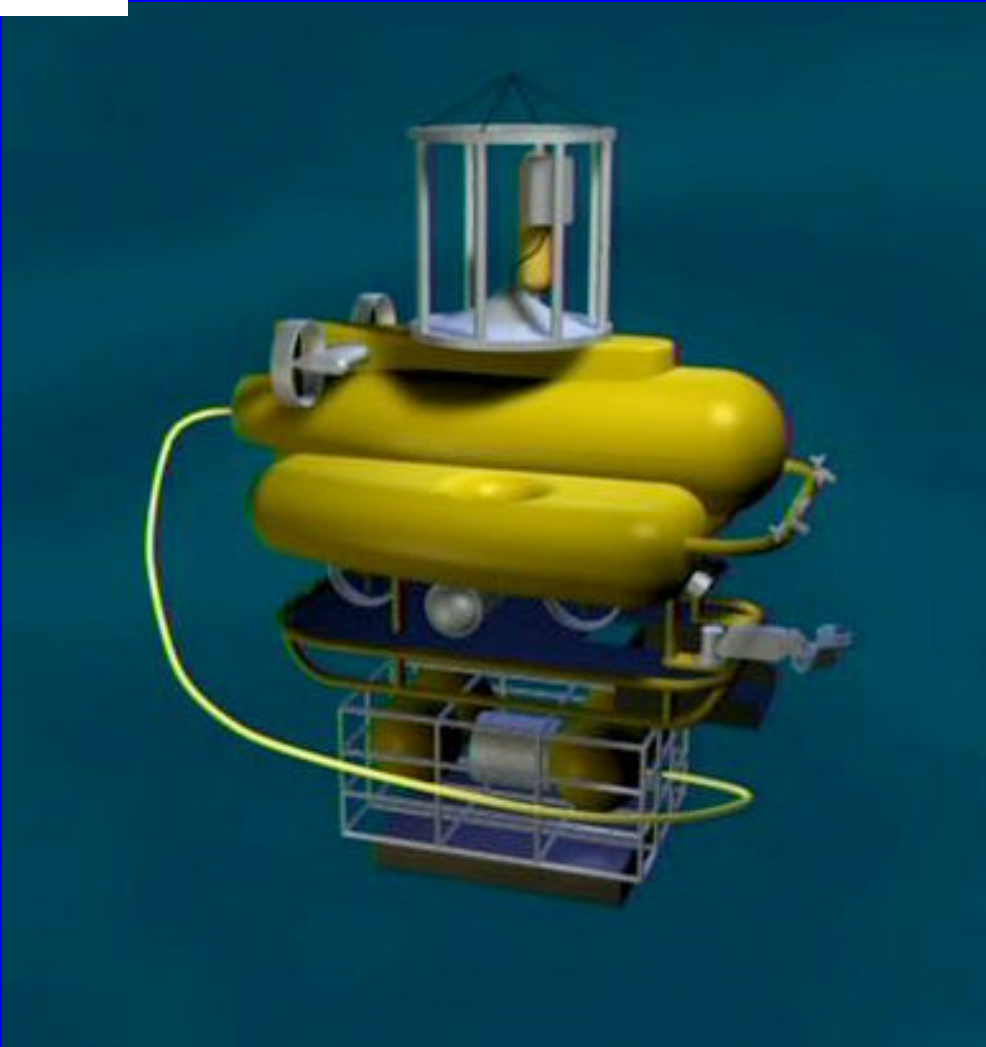
HROV Operations

- Event Response
- Under Ice Operations
- Margins
- Marginal Environments
- Public Outreach



11,000m Hybrid ROV

Woods Hole Oceanographic Institution



L×W×H	3m x 2m x 2m
Air Weight	2100 kg
Payload	25 kg
Battery	Rechargeable Lithium Ion. 8 kWh in main pressure housing, 6kWh in tool package housing
Speed	3 knots (1.5 m/s), 2 knots (1.0 m/s) with work package
Arm	Electric, 5 DOF, 20kg lift at 1m
Thrusters	2 aft, 2 vertical, 1 lateral
Lights	Variable output LED array, strobes.
Sonar	Scanning sonar, multibeam
Sensors	Magnetometer, CTD

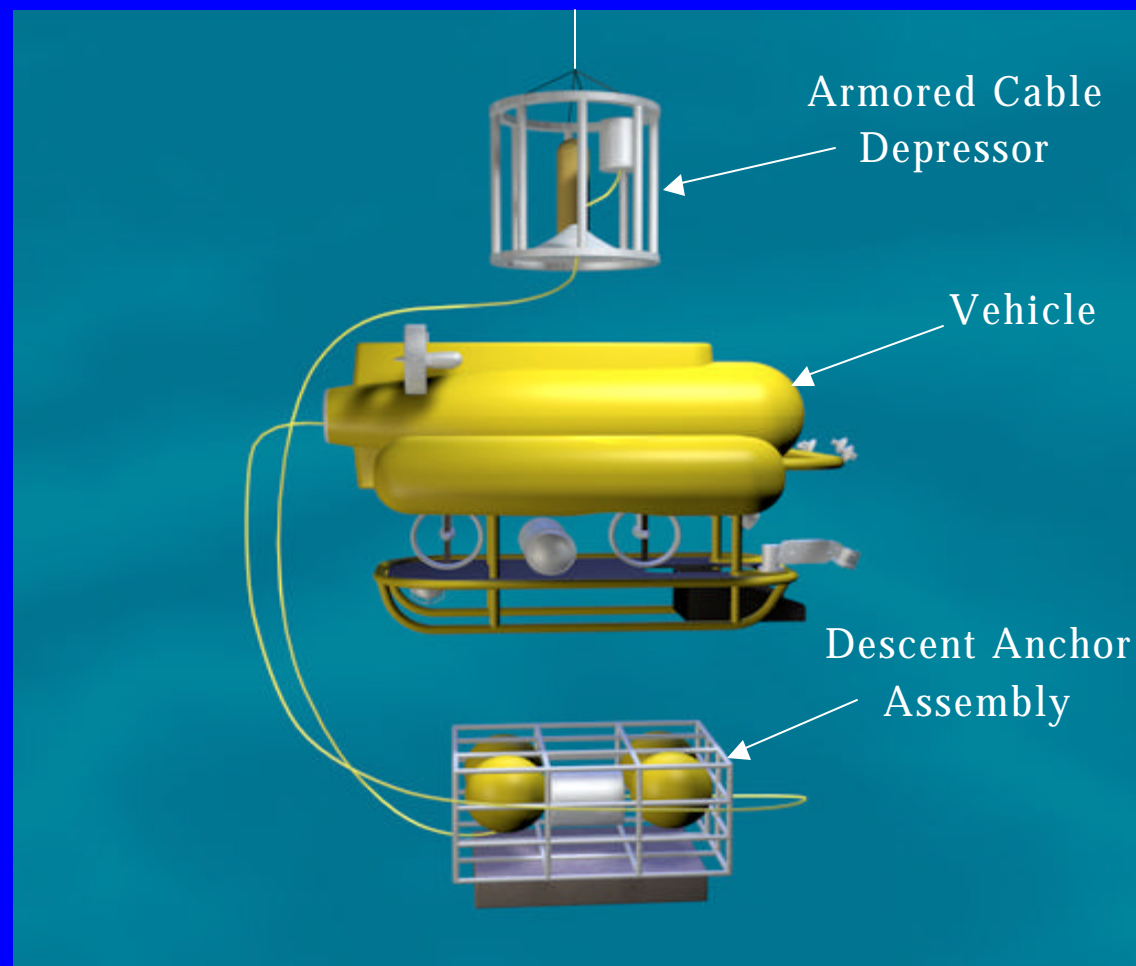


HROV Sampling Capabilities

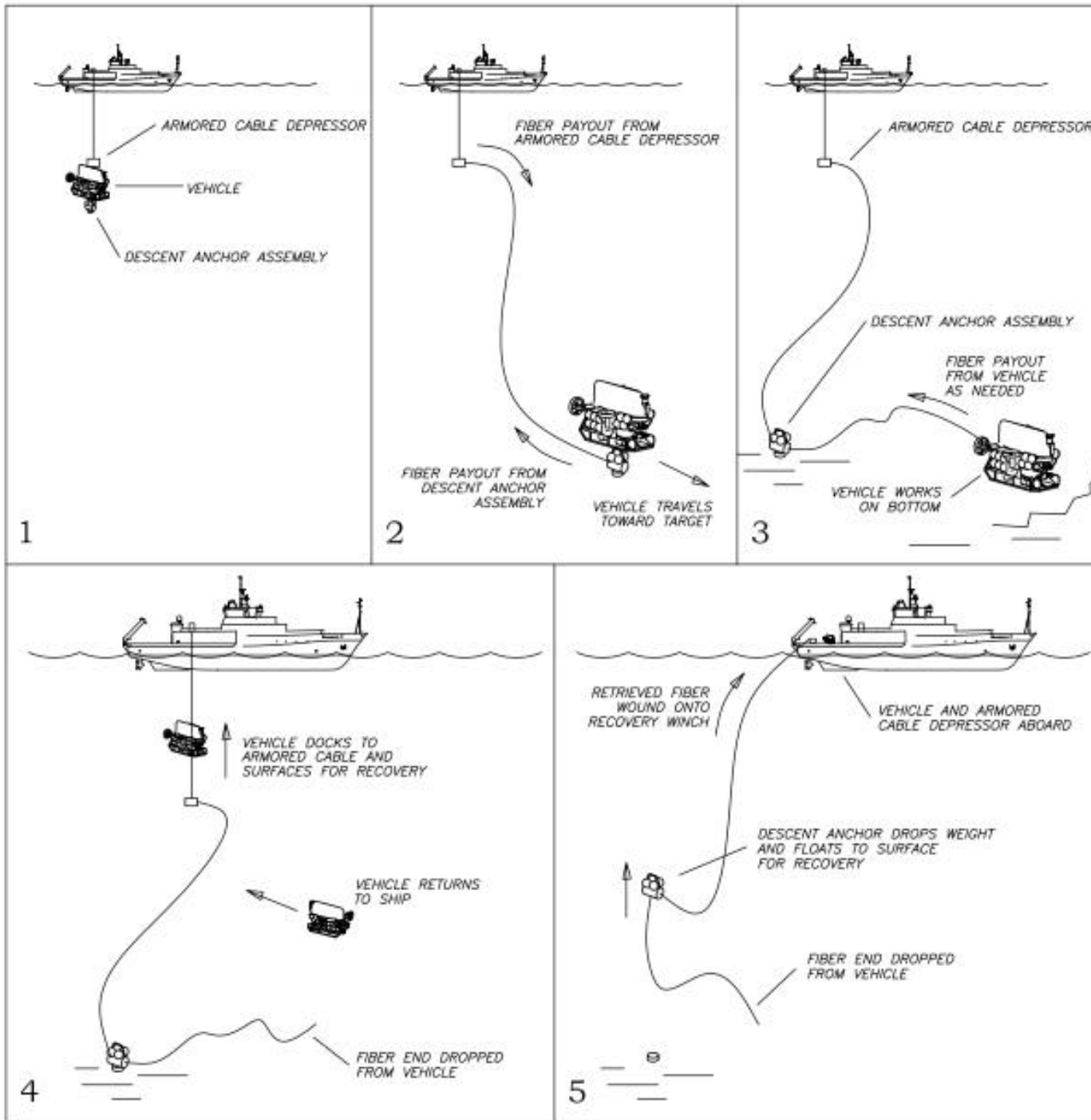
- Push coring
- Heat-flow probe – e.g. the Alvin probe.
- Geotechnical/Geochemical sensors –pore pressure in sediments
- Rock sampling/drilling
- Biological sampling – small suction samplers, nets and “bio boxes”
- Water sampling



Hybrid for 11,000-Meter Operation



HROV configuration





HROV Project Status and Plans - 2004

- Development of syntactic floatation material.
- Initial design of housings underway.
- Developed a plan for the analysis, design and testing of the micro fiber payout system with SPAWAR. Examining potential candidate microfibers in detail.
- Developing conceptual plan for power storage batteries
- Developing specifications for sensors (e.g. sonar) and identifying potential vendors
- Form oversight committee
- Optical analysis and initial design specification of LED based lighting.
- Generating detailed Project Plan with milestones.
- Conceptual outline of the vehicle control software underway
- Developing initial specifications for electric manipulator



HROV Project Plans (continued)

2005

- Complete final testing on syntactic floatation material
- Complete proof pressure testing and cyclic testing of 10-inch ceramic floatation spheres and main electronics housings.
- Initial testing of microfiber payout canisters.
- Prototyping of battery assemblies.
- Monitor/received purchased components.
- Fabrication and operational testing of LED lighting assemblies.
- Development/testing of the control system using the JHI test bed

2006 – System Testing

2007 – HROV ready for service