



ROPOS Upgrade

- new cage-less system with a self-contained launch & recover system
- mid-depth system (up to 2500 m)
- higher horsepower motor (40 hp)
- medium voltage (3000 V A C)
- reduced size & weight of tether
- fiber optic communications
- sea trials June 20
- caged-system still available (5000m)

Launch & Recovery

- via knuckle boom crane
- umbilical cable feeds through crane
- greatly simplifies launch & recovery
- through-the-frame lift (4000 lbs)
- can operate from more ships, with fewer crew, and with an increased operating weather window
- new smaller & lighter winch
- easier mobilizations

Telemetry & Navigation

- fiber-optics to the vehicle
- new telemetry system with more science channels
- fiber-optic gyro & doppler velocity log
- ultra-short baseline (USBL) acoustic navigation
- new vehicle frame and flotation
- increased payload, quieter hydraulics
- video & audio satellite link to shore

ROPOS Upgrade information bulletin

Foreword:

The ROPOS system has been upgraded significantly to better meet the existing and upcoming demands of the international scientific community. Three key areas have been targeted: Launch and recovery, data telemetry and navigation.

Mid-depth System:

With a change to a higher horsepower (40 hp) medium voltage (3000 VAC) motor and fibre optic communications, we significantly reduced the size and weight of the tether. This has allowed us to develop a new mid depth system. The target depth of this cage-less system is 2500 metres. This new system will include a self contained Launch and Recovery System (LARS).

Launch And Recovery System (LARS)

The LARS is a knuckle boom crane based system that has the umbilical cable feeding out through the end of the crane. This configuration has many advantages. It will allow greater flexibility in the system installation and deck configuration. It also greatly simplifies launch and recovery, as the vehicle is simply hauled up into the crane head and swung around and lowered to the deck. There will be no lines or cables, or clump weight to handle. We have also incorporated what is called through-the-frame lift (4000 lb.), so we can still precisely deploy packages to the seafloor; handy for NEPTUNE. We will also be able to recover large items from the seafloor. For this we have an armoured umbilical, similar to what we now use for our deep system.

This new configuration will allow us to operate from many more ships, particularly those that do not have a large A-frame. This system may be set up on the Thomas G. Thompson, or similar vessel, where we can side launch with only two or three people. This LARS will also increase our operating weather window, as we will be closer to the ships roll and pitch axis, and less subject to large ship movements. The new, smaller and lighter winch will ease our mobilisation, and with the LARS we will now be able to use a smaller class of vessel common in the oceanographic community. It will also significantly reduce our distant mobilisation and demobilisation cost and complexity.

Data Telemetry

We will now have fibre optics to the vehicle in all configurations. The new telemetry system supports more channels for scientific instruments, as well as allowing for better vehicle control. It also incorporates auto-switching redundant fibres for increased reliability.

Navigation

The navigation system has been significantly changed. The lack of quality long baseline hardware has always affected our success in this area. This new approach will have a state of the art fibre optic gyrocompass incorporated with our Doppler velocity log. This will tie in with a ship mounted Ultra Short BaseLine (USBL) system. The whole package will eliminate the need for time consuming LBL transponder deployment and calibration, as well as greatly reducing the dockside calibration of a USBL system. This system, integrated with our navigation software, will offer reliable precision navigation beyond 2500 metres depth.

Other improvements

We have improved many other aspects of the vehicle as well. These will all increase our ability to deliver better and more efficient service. They include

- New vehicle frame, developed to house the new motor, and better support science instruments
- New, higher floatation buoyancy pack which greatly increases payload
- Quieter hydraulic system for improved navigation and less interference with marine animals
- Fibres dedicated to future expansion, such as implementation of HDTV
- Better manipulator mounts to allow better dexterity and more efficient sampling
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Deep Caged System:

The caged system is our deep system, and was used for the majority of operations. With the new mid-depth configuration (above), we will now be able to reach 98% of our historical dive targets without using the cage. We will need this system to reach sites between 2500 and 5000 metres depth. Plans include upgrading this system, but this will now occur in 2006.

Satellite link to shore

The final piece of the improvement process will be the implementation of a live two-way satellite link with shore. The system includes real-time video and audio. This will allow shore based researchers participate in the offshore work without leaving their laboratories. This is particularly valuable when researchers are only involved with short duration sampling or surveying, or you only need an opinion or advice. It also allows potential unlimited observers to participate in a dive, expanding further one of the advantages of a tethered vehicle.