GREENSEA
Creative Unmanned Technologies

CASE STUDY

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE

ROV Ventana Experiences Unprecedented Control After Upgrade

GREENSEA technology helps research platform answer growing requirements demands

Ventana is the Monterey Bay Aquarium Research Institute's (MBARI) workhorse for deep-water exploration. The vehicle has logged more time subsea than any other research ROV in the world, recording more than 3,000 dives during its tenure. Diving to depths of 1,700 meters, Ventana has contributed to extended expeditions from the Santa Barbara Basin to Oregon, and countless sites in between.

THE CHALLENGE

Operational requirements and the demand for tasks have gotten increasingly complex over Ventana's 28 years. In 2014, MBARI found it needed a long-term solution to support its prized research vehicle. The institute was also interested in upgrading the vehicle with enhanced capabilities.

"Last summer we did a 10-centimeter resolution acoustic map of the seafloor and took stereo images of it, two meters off the sea floor, over a hundred meters square area," explained Craig Dawe, MBARI's Technical Support Manager and Ventana's Chief Pilot. "To do that took quite a bit of effort on our programmer's part."

Dawe's team wanted a system with command and control integrated directly into the vehicle. **The goal: Increase Ventana's efficiency and data quality while lightening the workload of her pilots and developers.**

THE GREENSEA SOLUTION

After getting positive reviews of Greensea from principals involved in past integrations, MBARI commissioned a complete control system upgrade from the Vermont technology company. Greensea delivered a software platform that supports advanced automation and control for Ventana, as well as an easy-to-use workspace for pilot interaction.

"To do it with the waypoint tracking that's integrated into the Greensea system is pretty simple… You just enter your end points and your start points and away you go, as opposed to having someone write a whole bunch of control code and integrate the DVL. It was a big effort every time we did it, so having it integrated is a big deal for us."

PAYLOAD CONTROL PACKAGE

Ventana is equipped with an extensive suite of instruments, cameras, and sensors. The full payload – from the main camera pan-and-tilt to the collection carousel – is supported by Greensea's technology.

NAVIGATION INSTRUMENTATION

- Altimeter: Kongsberg 1007D, 100 meter range
- Depth Sensor: Paroscientific 8B2000
- Octans Fiber Optic Gyro (FOG) motion sensor with six degrees of freedom in custom 2000m titanium housing
- RDI Workhouse Doppler Velocity Log (DVL) with system integrated stationkeeping and video mosaicing

LIGHTS

- 6 DSPL HMI lamps, 400 watts, upgraded in house
- 2x DSPL L.E.D. Lamps 250 watts

SONAR

- Mesotech MS1000, 675 kHz high resolution head or 330 kHz standard head
- USBL (Ship to ROV Beacon), Sonardyne Ranger software tested in 1000m water with 500m HD range.
- USBL (ROV to Beacon): Sonardyne Homer Pro
- 4000 m capable, 400m range line of sight (LOS)

CAMERA SYSTEMS

- One Ikegama HD camera with HA10X5.2 Fujinon Zoom Lens
- Six Insight Orion zoom cameras with integrated pilot control
- VARS Video Capture System (direct from RGB Sony Feed), HDSPI capable
- Sony digital Betacam (D1), and Panasonic AJ-HD2000 high definition recorder (D5)
- Dynair 30 X 30 Video Switch (ROV control room)
- Focal 903 digital multiplexer, 21 RS232 serial, 5 RS485 serial, 4 Subsea USB

Greensea Control and Navigation Features

CHART PLOTTING

MISSION PLANNING

ALARM MANAGEMENT

DIAGNOSTICS

STATION KEEPING

DYNAMIC POSITIONING

NETWORKED DATA DISTRIBUTION

DATA LOGGING

SENSOR FUSION

FILTERED NAVIGATION SOLUTION

AUTOPILOTS

TASK AUTOMATION

MISSION EXECUTION

VENTANA PILOTS

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