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Conceptualize, design, and deliver exceptional execution

MARITIME DOMAIN AWARENESS - UDA

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Presented by -
Vibhor Goel, Dy. General Manager

An ISO 9001 Certified Organisation

About- Maritime Domain Awareness

THE OBSERVATION

- **A critical element in battle is foreknowledge,** and it could **not be elicited from spirits, nor from gods, nor by analogy with past events, nor from calculations.** Foreknowledge could only be gathered **with advanced/specialized tools and by men who knew the enemy well.** A prior reading of the adversary and the theatre of battle could decisively shift the balance of fortune in war.

  - Sun Tzu

- Whoever controls the Indian Ocean, dominates Asia. This ocean is the key to the seven seas. **In the Twenty – First century, the destiny of the entire world will be decided on its waters.**

  - Alfred Mahan

About- Maritime Domain Awareness

- Maritime Domain Awareness (MDA) is the **effective understanding of anything associated with the global maritime domain that could impact the security, safety, economy or environment of the country.**

- MDA is a key component of maritime defense which is a modern word. It can be achieved by improving ability to **collect, fuse, analyze, display, and disseminate actionable information and intelligence** to the Navy.

- **Underwater domain awareness (UDA)** is another key aspect of maritime domain awareness which has gained a lot importance in recent times.

Pan India Solutions for UDA

UNDERWATER REMOTELY OPERATED VEHICLE (UWROV)

VideoRay ROV is portable and easily deployable which makes VideoRay a leader in underwater homeland security. These are durable and dynamic, which gives them the ability to work in rapid currents and to crawl along ship hulls and substitute for divers in hazardous underwater environments or aid divers during inspections. VideoRay ROVs have been used by Indian Navy (Directorate of Special Ops Diving, Directorate of Hydrography), Educational Institutes, Port Authorities.

Common Defense Applications

- Explosive ordnance disposal (EOD)
- Surveillance
- Mine countermeasures (MCM)
- Port security inspections
- Search and rescue/recovery
- Ship hull inspections

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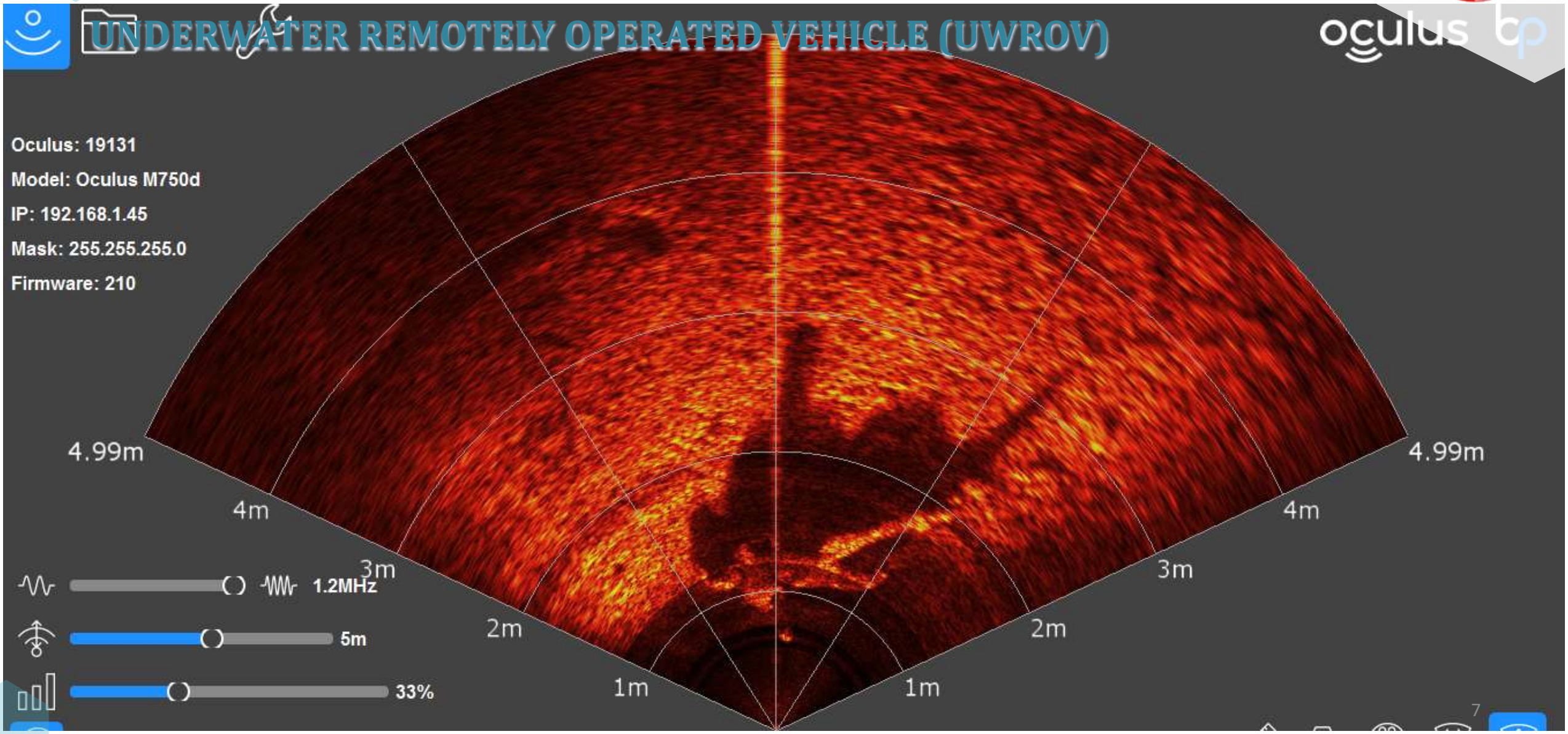

Pan India Solutions for UDA

TELEDYNE GLIDERS - AUTONOMOUS UNDERWATER VEHICLE

Teledyne Slocum glider is buoyancy driven to enable long range and duration remote water column observation for academic, military, and commercial applications. It can be deployed and recovered from any size vessel and after deployment it can easily be controlled from anywhere in the world through the use of web based piloting tools.

The buoyancy propulsion drive provides months of performance at sea and the optional thruster provides up to 2 knots of horizontal speed.

Marine Acoustic monitoring :

- 24/7 monitoring in any sea state (Endurance up to 9 months)
- Long-term monitoring over wide areas
- Deploy from any size vessel
- Customized detections and processing
- Detections sent by satellite in near real-time
- Data recorded on 6 TB of SD memory

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AUTONOMOUS UNDERWATER VEHICLE – GLIDERS

INCOIS gliders to track changes in ocean eco-system

First two such gliders were deployed off Chennai coast for trial runs to monitor seas round the year

V. GEETANATH
HYDERABAD

Indian National Centre for Ocean Information Services (INCOIS) has successfully tested the first deep sea long range 'Slocum' gliders under the recently launched Deep Ocean Mission to monitor the seas round the year and for an accurate assessment of impact of climate change on coastal waters.

The first two such Slocum gliders were deployed off the Chennai coast for the trial runs. The gliders are named after Joshua Slocum, said to be the first man to sail across the world. These gliders are pre-programmed to move to specific locations and depths to move both horizontally and vertically.

Gliders along with tide gauges fitted with GPS sensors will give a rounded data to understand the oceanic ecosystem better because the movements of the sea along with the atmospheric systems control monsoons, cyclonic storms and wave surges besides tsunamis. • ARRANGEMENT

Data transmission

"Modern bio-geo chemical sensors are attached to these gliders to measure the sea temperatures, pressure, salinity, chlorophyll and other such parameters in a controlled manner. Data can be transmitted in real time and more exhaustive information stored can be obtained after a few months on retrieval," explained INCOIS director T. Srinivasa Kumar, in an exclusive interaction.

The Centre has given its nod to the five-year ₹4,000 crore Deep Ocean Mission to assess climate change, sea warming, impact on coastal regions and the marine ecosystem. "We will be working with our sister organisations like the Indian Institute of Tropical Meteorology, Pune, National Institute of Ocean Technology, Chennai, Nation Centre for Coastal Research, Chennai, National Centre for Earth System Sciences, Thiruvananthapuram, and others for ocean exploration to harness its vast resources," he explained.

"We are planning to have eight such gliders in two years, and each can be run for six months. Initially, we want to take them 1,000 km off the Chennai coast with the help of Ocean Research Vehicle 'Sagar Nidi' and launch. We are also planning to pick them up before the monsoon," chipped in head of Ocean Observations and Data Management Group E. Pattabhi Rama Rao.

While the trial runs had just five dives up to 15 metres deep, these gliders are also capable of going underwater up to 1,000 metres deep and move about eight centimetres per second. Gliders along with tide gauges fitted with GPS sensors will give a rounded data to understand the oceanic ecosystem better because the movements of the sea along with the atmospheric systems control the monsoons, cyclonic storms, wave surges besides tsunamis, pointed out Mr. Srinivasa Kumar.

Oceans are carbon sinks and data being collected could help us understand the 'coupling' of atmospheric and ocean systems for a more accurate climate forecasting, he averred. This apart, INCOIS is also sourcing data from about 300 Argo floats placed every 300 km around the coastline reading the surface and undercurrents along with temperature and salinity.

These are placed 2,000 metres deep and keep floating to the surface every 10 days with data transmitted every five days. The plan is to launch 50 such floats every year as they have a life span of four years, added Mr. Rama Rao.

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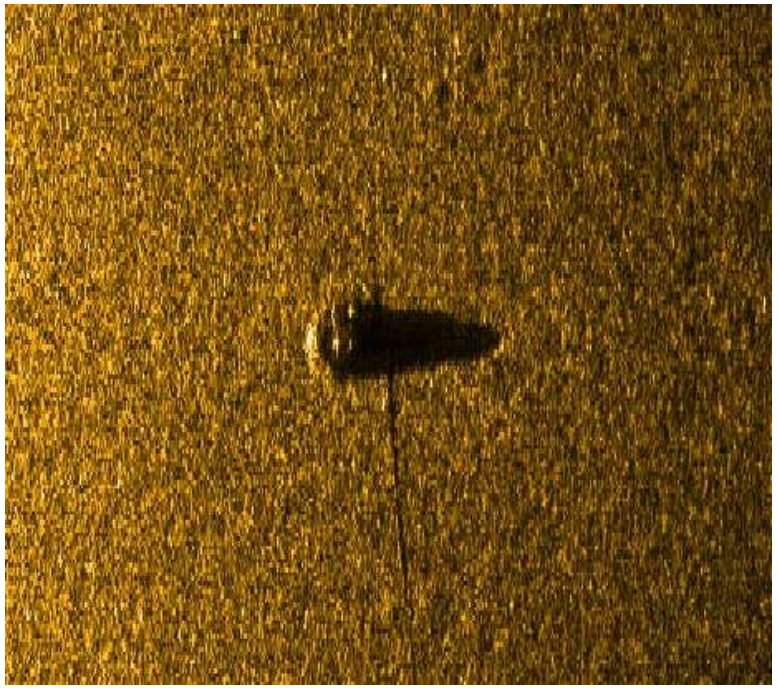
TELEDYNE GAIVA - AUTONOMOUS UNDERWATER VEHICLES (AUV'S)

Key Features:

- Greatest depth rating in its class - rated to 1000m
- Compact, optimized for overnight shipping
- Modular construction, maximum flexibility
- High-accuracy survey-grade INS navigation with USBL and LBL aiding
- Chart-based graphical user interface



Benefits:

- 2-man portable/deployable
- Operations from vessels of opportunity
- Wide array of additional sensors available
- No installation or calibration of peripherals required
- Over the horizon communications through Iridium

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SIDE SCAN SONAR

Key Features:

- High performance multi-beam side scan sonar
- High Speed, 5 or more independent samples on 1m target to 10 knots
- High resolution imagery from 2 to 10 knots
- Co-registered wide swath bathymetry (to more than 10x altitude)

Applications:

- MCM Operations
- Underwater object detection
- Bathymetry

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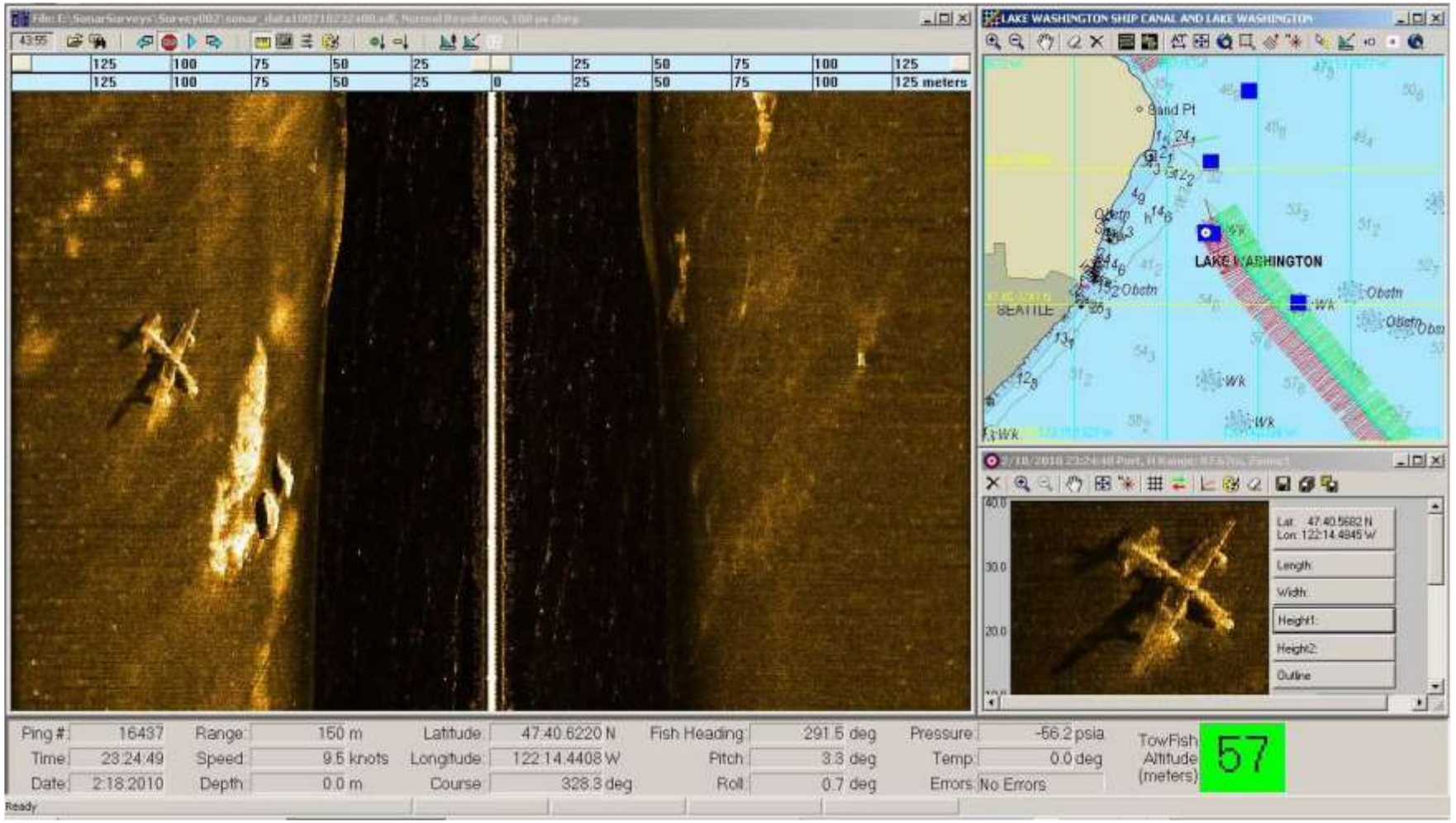
SIDE SCAN SONAR



Pan India Solutions For UDA

INTEGRATED UNDERWATER MONITORING SOLUTION/STATION

Our bottom-mounted platforms with Hydrohones and ADCPs help client to understand and manage the impacts of underwater radiated noise (URN) on marine life. These cabled observatories measure acoustic signatures and, with tailored onboard processing, deliver actionable results.

Applications:

- Marine noise detection, classification and localization
- Vessel/ambient noise measurement
- Harbour measurement & monitoring
- Persistent surveillance for defence and security
- Environmental impact assessment
- Environmental/ocean monitoring

Thank You!

"Looking forward to privilege of working together for achieving best results in our work."