

ROBOTIC (ROV)  
UNDERWATER INSPECTION  
AND SURVEY

We are extending our service to underwater inspection services. These services include water tank inspection, Tunnel inspections, underwater oil spill detection, FPSO inspection, anchor chain inspection, ship hull inspection, bathymetric surveys, water quality surveys, free span survey, Subsea Pipeline Inspection, Subsea Cable Inspection, Marine Outfall Survey, and underwater surveillance. Utilizing unmanned ROVs, we deliver precise and accurate outputs through 3D vision videos, sonar data, UTM, CP potential measurements, corrosion mapping, and 3D models.

We are committed to providing high-quality services to meet your needs and look forward to supporting your projects with our expanded capabilities.

## ROBOTIC (ROV) UNDERWATER INSPECTION AND SURVEY

- Underwater Inspection of Inside pipeline and flooded tunnels

- Underwater Inspection of seawater intake and outfalls

- Underwater Inspection of tanks and ship hulls

- Underwater inspection of offshore subsea structures

- Underwater inspection of Pipelines

01

Applications in Oil & Gas

02

Applications in Pipelines & Tunnels



## AGBIZZ IN COLLABORATION WITH EYEROV FOR THE UNDERWATER INSPECTION SERVICES...



# ROV

## Applications in Oil & Gas



## Offshore

- FPSO Inspection
- Jacket Inspection
- Anchor chain inspection
- Pipeline and Riser inspection
- Oil Spill Detection

## Onshore

- Water Tank Inspection
- Volumetric monitoring of Long lengths from a single inspection point
- 100% coverage of the tank's floor including weld areas
- Intake gate, pipelines
- Areas that lack manholes and where manually inspection are risky.

## Solutions Offered

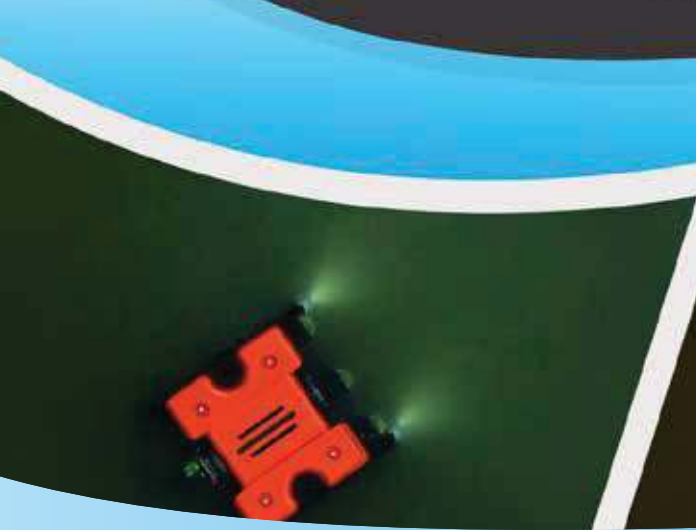
- Underwater HD Video Survey
- Defect/Corrosion mapping to the 3D CAD models
- CP Potential
- UTM
- Data Analytics
- Visual Inspection
- SONAR Imaging





# EyeROV

Providing Robotics and AI based solutions  
for Marine, Oil & Gas and Defense



ROBOTICS AND AI  
BASED UNDERWATER  
INSPECTION SOLUTIONS  
FOR OIL & GAS



# Company Snapshot

□ **Marine Robotics and AI Company** building unmanned robotics solutions for O&G, Defense and Marine sector

□ Incorporated in **2017** by IIT Alumni, Ex-Samsung & Ex-NIOT

□ Executed **80+ projects** and **50+ Clients**

□ Investments by **GAIL** and **V-Guard**, **Wonderla** founder

□ Winners of

- Dare to Dream 3.0, DRDO
- National Startup Award 2022, Startup India
- IDEX Defense Startup Challenge, Ministry of Defense

□ Team of **35+ Members**

□ Supported by **KSUM** and **Maker Village**



Receiving **National Startup Award 2022** from the Hon'ble Minister of Commerce & Industry



**Winner of Avinya startup challenge 2024** from the Hon'ble Minister of Petroleum and Natural Gas

## Products

#Indigenously developed

### ROV

#### TUNA

Remotely Operated Vehicle (ROV)



#### TROUT

Remotely Operated Vehicle (ROV)



### USV

#### i-BOAT ALPHA

Unmanned Surface Vehicle (USV)



### AUV

#### VAJRA (Coming Soon)

Autonomous Underwater Vehicle



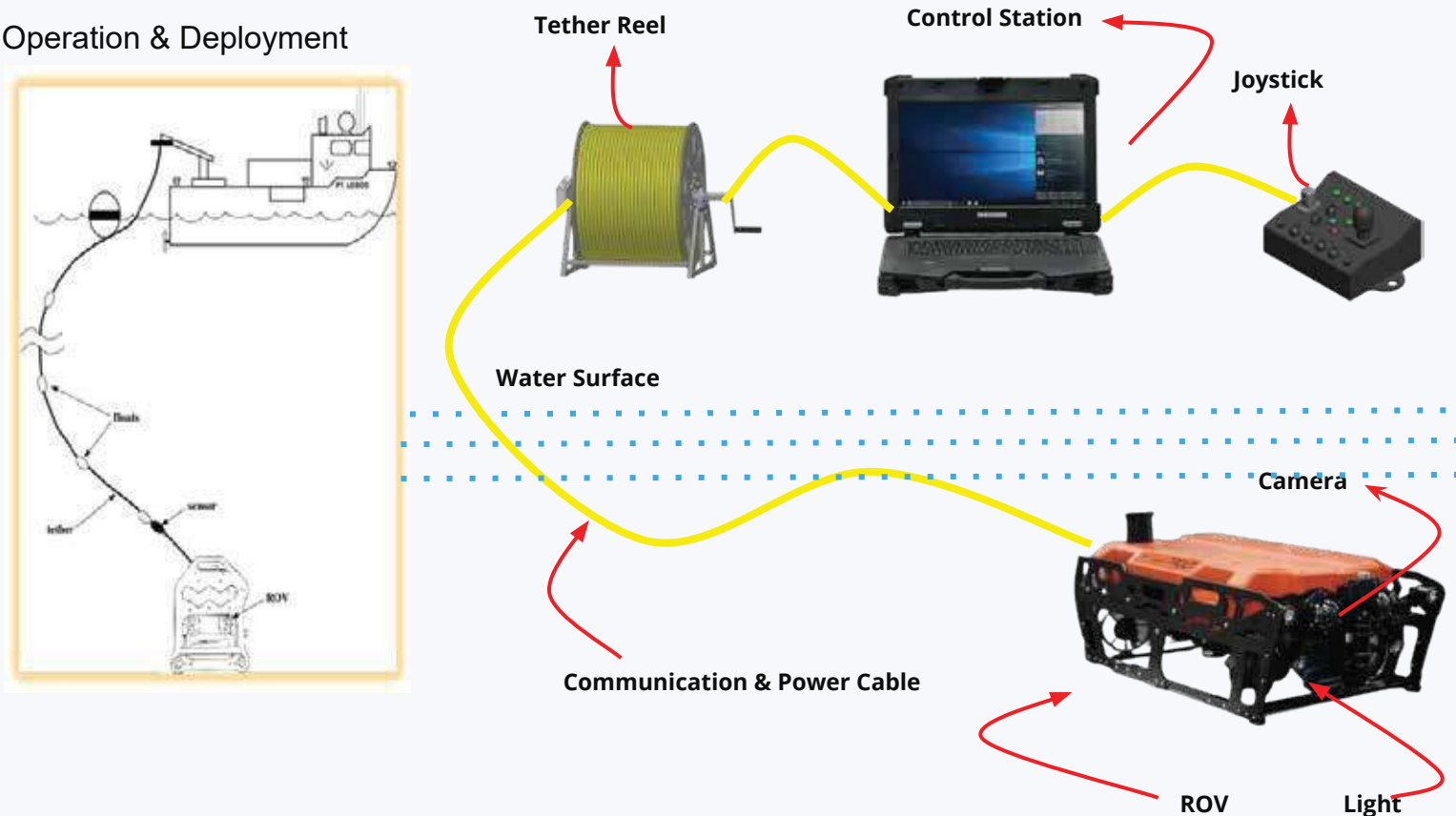
**5+ Patents**





# ROV System Deployment Overview

## Operation & Deployment



## Existing Products



Product	TUNA	TROUT	iBoat ALPHA
Depth / Range	200m	300m	Range upto 10km
Operating Environment	Sea State 2, 2 kts currents	Sea State 2, 2-3 kts currents	Sea State 2, 4 kts currents
Payloads	2Kg (in water) Full Array	4Kg (in water) Full Array	20 Kg (in air) Full Array



- 1 Design Patent
- 3 Provisional Patent
- 2 International Publications

#Indigenous



# Payloads / Sensors



Laser Scaler  
Inhouse Developed



Turbid Water Module  
- Inhouse Developed



CP Probe



Thickness Gauge



Side Scan Sonar



Imaging SONAR



Tunnel Profiling SONAR



External Camera



USBL



Manipulator Hand



Cavi-blaster Jet  
Cleaner

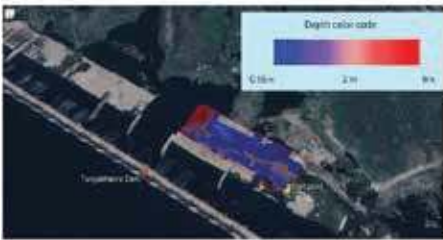


Cleaning Brush

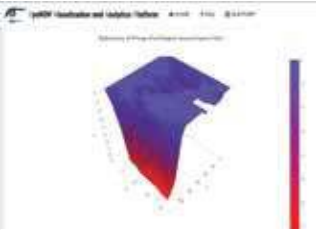
## Data Processing & Reporting :

**EVAP** - EyeROV Visualization & Analytics Platform

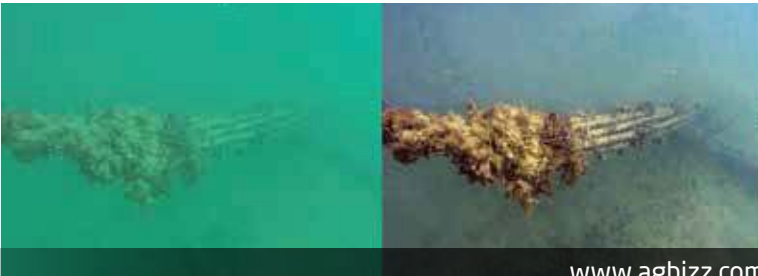
- Digital Reporting
- Automatic Detection of defects powered by AI/ML
- Analytics Report based on criticality
- Enhancement of images in hazy/turbid waters



Original/Raw Data



Enhanced



# EyeROV Applications for O&G



FPSO Inspection



Jacket Inspection



Decommissioning Survey



Anchor Chain Survey

## EyeROV Applications for Oil & Gas Sector



Pipeline Inspection

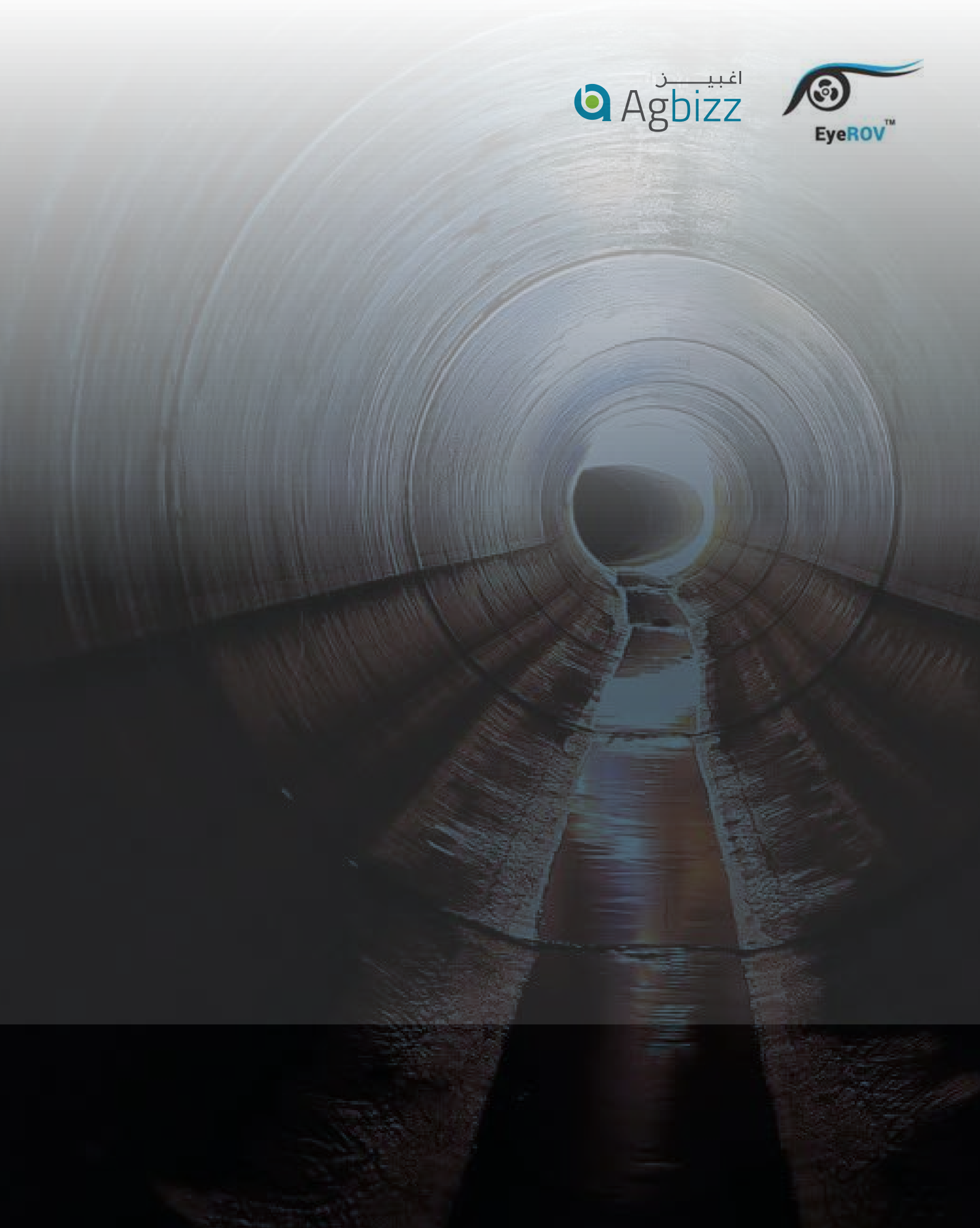


Riser Inspection



RIGS





## Services Offered

**Internal Inspection (Visual) of Pipelines and Tunnels:** Visual inspections to identify structural issues, blockages, and wear in pipelines (Diameter above 600mm) and tunnels.

**Sonar Profiling:** Using sonar technology to create detailed profiles and detect anomalies in pipelines and tunnels.

**Leak Detection:** Employing sensors to detect leaks or potential leak areas within pipelines.

**Corrosion and Wear Assessment:** Inspecting and measuring corrosion and wear to prevent failures in pipelines and tunnels.

**Sediment and Blockage Identification:** Identifying and mapping sediment buildup or blockages to facilitate targeted cleaning.

**Structural Integrity Analysis:** Assessing the structural integrity of tunnel linings and support structures for cracks or weaknesses.



# EyeROV TUNA

## Product Description

The EyeROV TUNA PRO is a modular ROV (Remotely Operated Vehicle) platform with high performance onboard computers and an intuitive control console for critical infrastructure inspections and surveillance operations etc...

### TUNA Remotely Operated Vehicle (ROV)



### APPLICATIONS



### SPECIFICATION

Dimension	500 x 400 x 500 mm
Weight	25 kg (Air)
Low Light Camera	1080p HD video
Tether	2 km
Depth	Upto 300 m
Endurance	2-3 Hrs (On Battery), External Power-Unlimited





3

## EyeROV TROUT - Key Features

- Dimensions : 890 mm x 510 mm x 390mm
- Weight : < 40 kg (excluding payloads)
- Buoyancy : slightly positive
- Payload : up to 4 kg
- Speed : > 3 kts (in still waters)
- Endurance : unlimited on external power
- Propulsion : 7 ducted BLDC thrusters
- Connectivity : 400m neutrally buoyant tether
- Power : 3600W at 400VDC
- Payloads : Manipulator Arm (3 function)
  - : Wide Angle Camera with Tilt
  - : 4K 10x Optical Zoom Camera
  - : 4x1500 lumen Dimmable Lights
  - : Multibeam Imaging Sonar
  - : DVL, USBL, GPS & Auto Navigation
  - : Ultrasonic Thickness Gauge
  - : IMU, Depth & Temperature



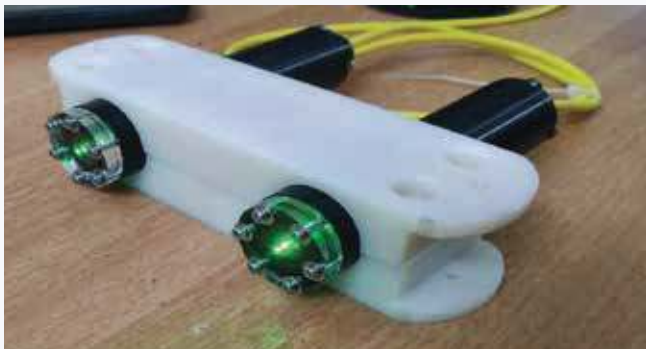
# Challenges in Tunnel/Pipeline Inspection



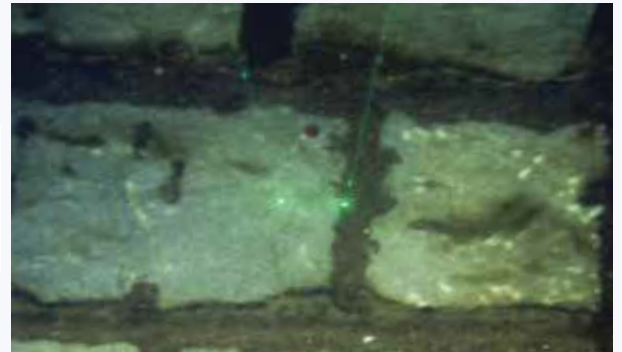
- **Emptying** the pipeline for inspection is very tedious and difficult
- Conventional diver based inspection is **time consuming, difficult and dangerous**
- Lack of **data analytics** and **user friendly reports** in conventional method



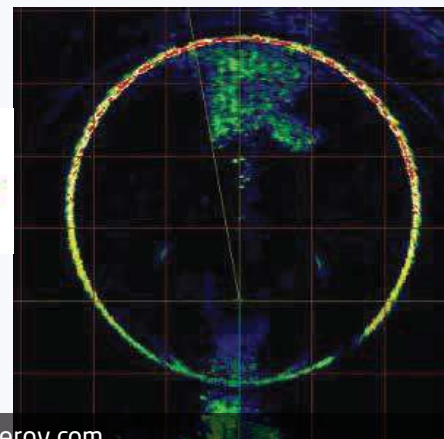
## Payload For Pipelines or Tunnel Inspection



Laser Scalar



Profiling SONAR

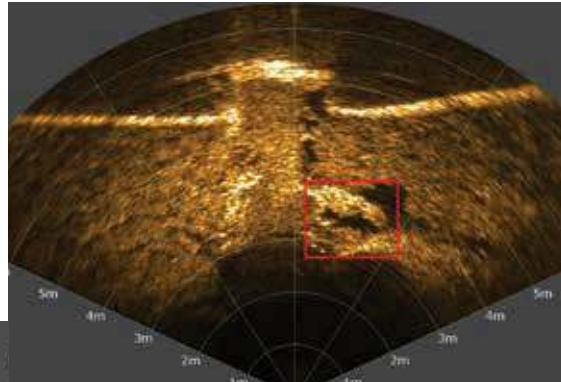




# Payload For Pipelines or Tunnel Inspection

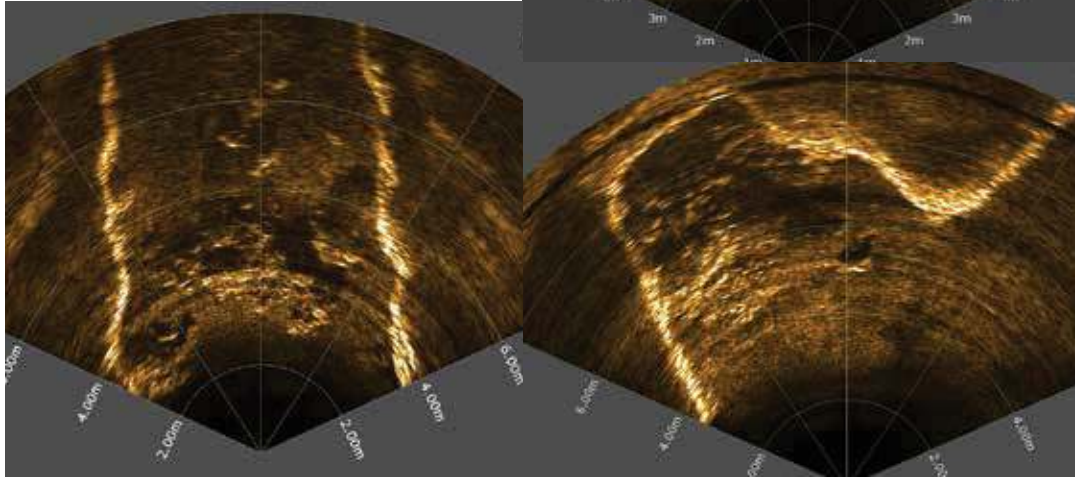


Forward looking multibeam  
SONAR



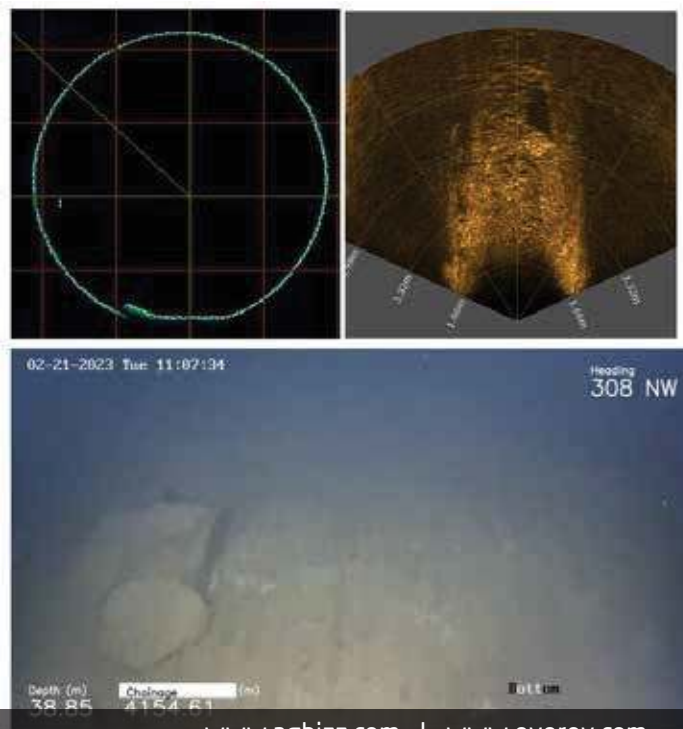
-Used for  
identification  
and navigation  
in murky waters

-Used to create  
2d or 3d  
topographical  
models  
underwater



## Collected Data from Tunnel Survey

Simultaneous feed from the imaging SONAR, Profiling SONAR and camera

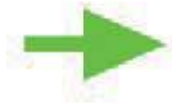


# GVI - General Visual Inspection

- Qualitative visual information about the integrity and health of your tank infrastructure, EyeROV TUNA assists in inspecting the tank floor, internals, wall, or roof.



Multiple  
Cameras and  
lighting



## Payload capabilities



Ability to measure coatings and material thickness simultaneously while maintaining the ability to locate pits, flaws and defects in the material

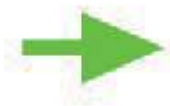
Ultrasonic Material Thickness Gauge [Link](#)

### Key Specs:

Depth Rating	: 300m
Measurement Accuracy	0.01mm (0.001")
Resolution	0.01mm (0.001")
Measurement Range	
Pulse Echo (PE)	0.63 - 508mm (0.025 - 19.999")
Echo Echo Thru Paint™ (EE)	2.54 - 102mm (0.100 - 4.000")
Echo Echo Verify (EEV)	1.00 - 152mm (0.040 - 6.000")
Pulse Echo Coating Thickness (PECT)	0.63 - 508mm (0.025 - 19.999")
Pulse Echo Coating Thickness (PECT)	0.01 - 2.54mm (0.001 - 0.100")



# Payload capabilities



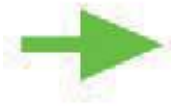
Hydraulically driven cleaning system suitable for cleaning marine growth

Key Specs:

Pump System	
Pressure Pump	Udor GSC34/15
Pump Material / Type	SS / Triplex plunger
Flow Rate	10 gpm / 38 Lpm
Nozzle Pressure	3,000 psi / 207 Bar
Hose Diameter	1/2"

CaviBlaster [Link](#)

# Payload capabilities



- To provide accurate depths of fatigue cracks found in offshore welded structures using underwater MPI
- Reliable crack detection and sizing (length and depth)
- Capable of inspecting corroded surfaces, or through non-conducting coatings several millimetres thick

ACFM probe [Link](#)

Key Specs

- Probe Cable Length: 5-50m
- Serial Communications: 5-30m
- Operating Temperature: -20°C to +40°C
- Maximum Operating Depth: 300 m

# Payload capabilities



UPV(Ultra Sonic Pulse Velocity)[Link](#)

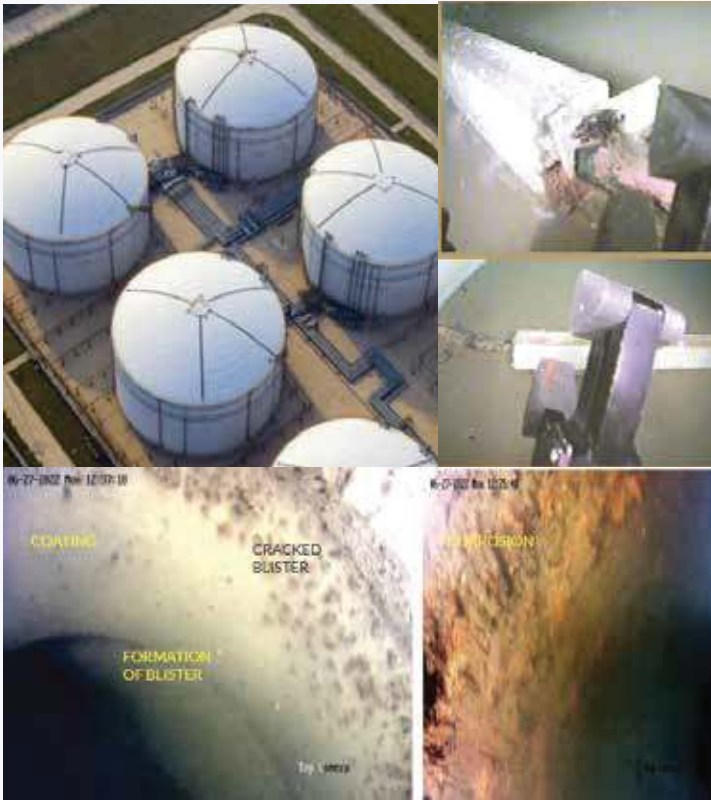


To evaluate the underwater concrete structures for defects/flaws

Pulse Duration	Selectable,1 to 65000μS
Transmitter Pulse Repetition	> 20 measurement/second

## ROV Applications

- Internal visual inspection of Submerged Hydro - Mechanical Systems without Dewatering with limited shutdown, Water Intake Structures,Pipelines and Outfall Structure Studies, Submerged Pumps and Flooded Pipes,storage tanks
- Detection of Corrosion, blisters, leaks,sediment build up and identification of risky areas(A quick way to locate corrosion)
- Weld Scan and Thickness measurements
- Testing Cathodic Protection systems

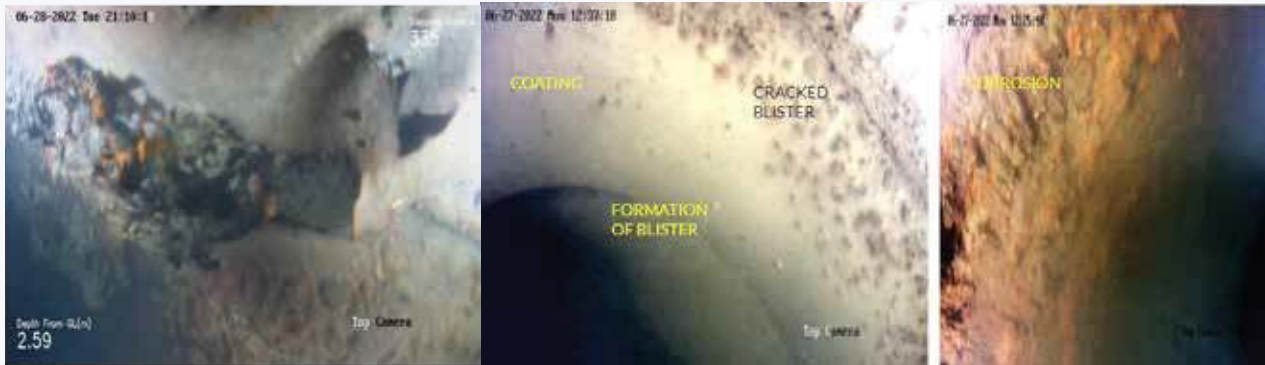




# ROV Applications-Water Tanks

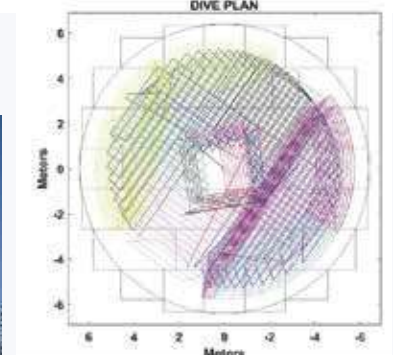
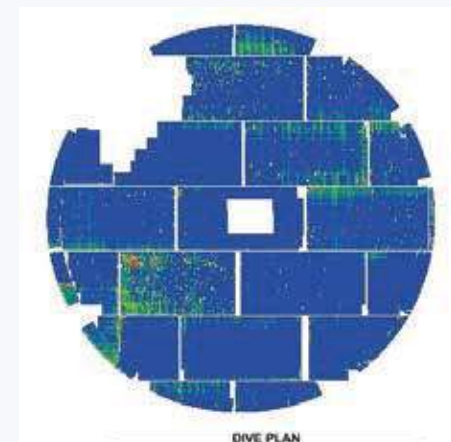


- General Visual Inspection of the inner portions of the water tank
- Measurement of wall thickness ,cracking, leaking etc
- Corrosion detection and testing tank interior cathodic protection system( condition of the coating,condition of anodes, etc)
- Overall live monitoring of the tank with real time videos



## ROV based Capabilities and Advantages

- Internal visual inspection of tank floor, walls etc.
- Floor mapping
- Detection of Corrosion, blisters, leaks, identification of risky areas(A quick way to locate corrosion)
- Thickness measurements using UT Probes of internal walls, bottom survey etc.
- Provide full coverage including welding areas
- Live streaming and analysis of defects



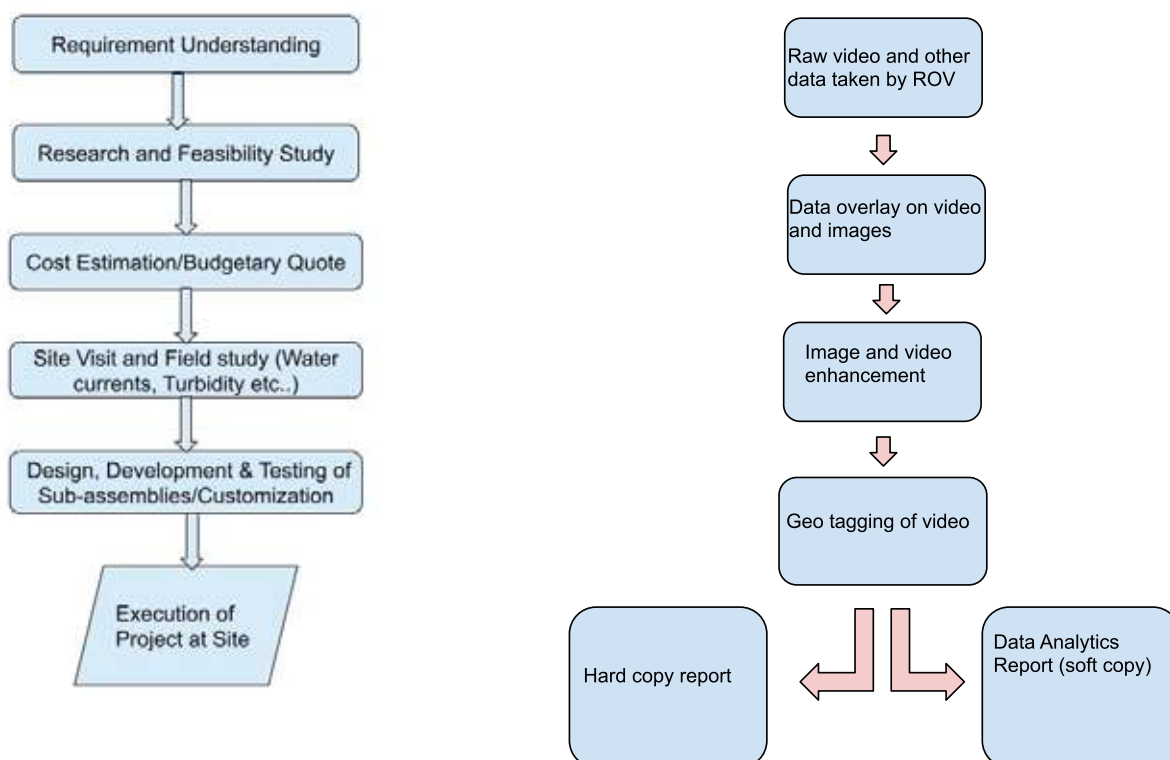


# ROV based Capabilities and Advantages

- Inspecting Tank shells to assess the shell wall thickness is with a remote-access UT crawler
- UT Crawler for detection for small pits and inclusions.
- Inspection of AST(Above ground storage tanks) or UST(Underground Storage water tanks )(of any size)
- Inspection without emptying (cost saving)
- Continuous/consistent data recording
- User friendly reports
- Digital reporting and analytics report based on criticality

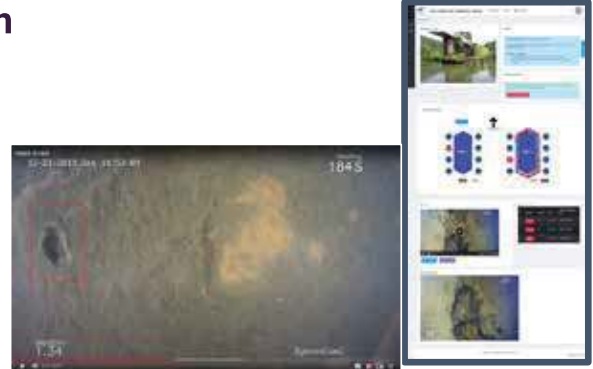


## ROV Inspection Execution Plan

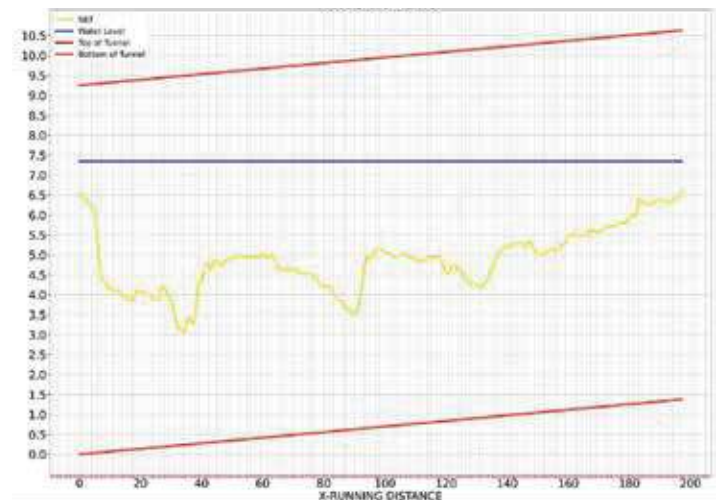
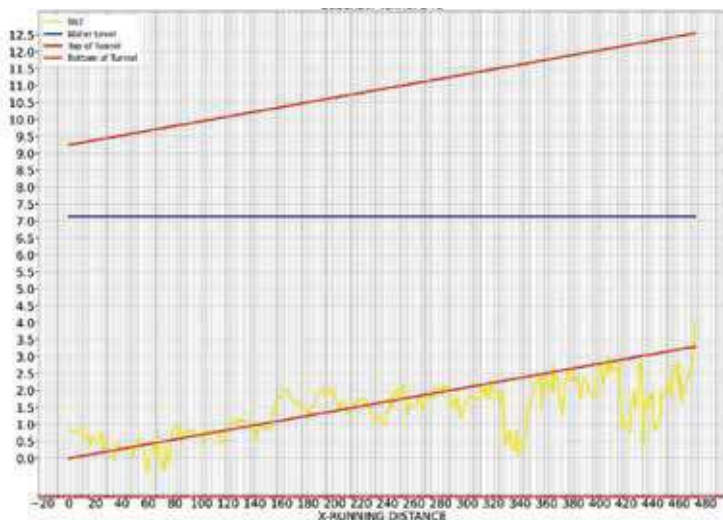


# USP - How are we different ?

1. **Ability to operate upto 10Km (on single stretch)**
2. **Ability to generate 3D profile and 2D sonar data**
3. **Highly experienced Operations team** which can execute **sophisticated underwater inspections jobs** (80+ Projects, 1000+ Underwater Hours)
4. **Advanced AI based Data Analytics and Visualization Platform** powered by Computer Vision and Machine Learning algorithms



## Pipe/Tunnel Siltation Profile







## Case Study 30 June, 2022

### UDUPI POWER CORPORATION LIMITED



Client



#### Location

Udupi, Karnataka



#### No of Days

4 Days



Detailed Report: [Link](#)



#### Scope of work

- Internal Inspection of 1000mm and 700mm dia ACW MS Discharge pipeline of about 700m length.
- To identify and measure defects/anomalies/coating conditions using a Remotely Operated Underwater vehicle



#### Equipment used

- ROV EyeROV Tuna with cameras for accessing critical points from different angles, Profiling sonar.
- Additional Resources such as Generator, Man Power, Tether, Electronic Hardware were used.



#### Result

- Employed Image Processing tool such as EVAP (our Inhouse Enhancing Tool) for enhancing RAW Images.
- Consolidated findings in Hard and Soft Copy Reports and transferred to Relevant Authorities.

## Case Study 15 February, 2023

### MULSHI DAM - DAWADI TUNNEL ROV INSPECTION



Client



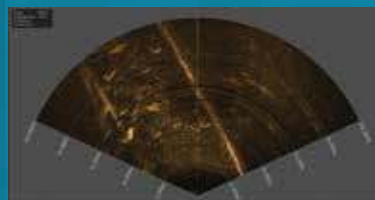
#### Location

Pune, Maharashtra



#### No of Days

11 Days



Detailed Report: [Link](#)



#### Scope of work

- To conduct underwater survey of Tunnel interiors.
- Provide tunnel interior photography, profile of the entire tunnel and tunnel 3d model.



#### Equipment used

- ROV EyeROV Tuna with high definition camera and profiling sonar and imaging sonar.
- Special OFC cable for coverage of 2km



#### Result

- Profile of the entire tunnel was captured.
- Employed Image Processing tool such as EVAP (our Inhouse Enhancing Tool) for enhancing RAW Images.
- Consolidated findings in Hard and Soft Copy Reports were made



## Case Study 12 November, 2020

### BPCL Pipeline Inspection



#### Client



#### Location

Kochi, Kerala



#### No of Days

1 Day



Detailed Report: [Link](#)



#### Scope of work

- Internal Inspection of 40" internally cement lined water pipeline
- Distance 400m



#### Equipment used

- ROV EyeROV Tuna integrated with Components such as Generator, onboard control station, Tether, Electronic Hardware were also used.
- Employed Image Processing tools such as EVAP (our Inhouse Enhancing Tool) for enhancing RAW Images.



#### Result

- Employed Image Processing tool such as EVAP
- Overlaying of Videos
- Consolidated findings in Hard and Soft Copy Reports and transferred to Relevant Authorities.

## Case Study 28 October, 2021

### SPM PLEM INSPECTION-BPCL



#### Client



#### Location

Kochi, Kerala



#### No of Days

2 Days



#### Scope of work

- Assess the condition of SPM, Flexible Riser Hoses, PLEM assembly for excess Marine growth, corruptions and defects



#### Equipment used

- ROV EyeROV Tuna with cameras for accessing critical points from different angles, Additional Resources such as Generator, Man Power, Tether, Electronic Hardware were used.



#### Result

- Employed Image Processing tool such as EVAP (our Inhouse Enhancing Tool) for enhancing RAW Images.
- Consolidated findings in Hard and Soft Copy Reports and transferred to Relevant Authorities.



# Traction & Clients



Inspection of Single point Mooring platform, Kochi



Mulshi Dam - Dawadi Tunnel Inspection



Inspection of Port Berth structures, DP World



Inspection of Bridge Structures, Railways



Inspection of container ship hull, ICTT

## Key Metrics

- **50+** Clients
- **80+** Project Completed
- Operating in **3 Countries India - & GCC Countries**



## Awards and Achievements



Technology Startup of the Year 2021 by Technology Development Board, Govt of India



Signed MoU with BPCL - Project Ankur



Winner of Dare to Dream 3.0, receiving the award from the Hon'ble Minister of Defence



Winner of IIGP 2018 DST, Govt of India



Represented at International Hardware Cup Finals 2017, Pittsburg, USA



Idex Defense India Startup Challenge



Dare to Dream 3.0



# APPLICATION AREAS



## Remotely Operated Vehicle (ROV)



Maritime Industry



Oil and Gas



Ports



Bridges



Defense



Research Organisations



Search and Rescue



Dams



## Unmanned Surface Vehicle (USV)



Bathymetry Survey



Security & Surveillance



Hydrographic Surveys



Water Quality Monitoring



Ports & Wharfs



Offshore oil spillage monitoring

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