Transforming Hydro Infrastructure with EyeROV - SAGARA

Detailed Applications and Problem Statements for the Middle East & Asia Pacific

Introduction to EyeROV SAGARA

EyeROV SAGARA is a compact, battery-operated Remotely Operated Vehicle (ROV) designed for underwater inspections. Capable of diving up to 100 meters, it streams Full HD live video and can be operated by a two-person team. The system is modular, supporting optional attachments such as sonar, GPS integration, thickness gauges, and a manipulator arm. It is designed to reduce human risk, increase data quality, and simplify underwater operations across various sectors, particularly hydro infrastructure.

Hydro Infrastructure Landscape in the Middle East

The Middle East is a global hub for desalination and water treatment due to its arid climate. Over 70% of the world's desalination capacity is located in this region. Countries like Saudi Arabia, UAE, and Qatar heavily invest in coastal and offshore hydro assets. Extreme heat, salinity, and sand deposition create operational and maintenance challenges. Asset longevity and uninterrupted service are crucial, requiring advanced, non-invasive inspection technologies such as EyeROV SAGARA.

Hydro Infrastructure Landscape in Asia Pacific

Asia Pacific accounts for the largest number of hydropower installations globally, with countries like China, India, and Indonesia leading in capacity. Many dams were constructed before 1980 and require consistent structural health monitoring. Monsoon-induced sedimentation, flooding, and erosion pose risks to pipelines, turbines, and spillways. With varied geographies and large-scale irrigation systems, the region needs scalable and efficient inspection solutions.

Challenge: Inaccessible and Hazardous Inspection Zones

Many hydro infrastructure components such as intake wells, stilling basins, and culverts are located underwater or in confined spaces. Traditional inspections involve divers, which are costly, risky, and often limited by human endurance and visibility. EyeROV SAGARA allows remote access to such zones, significantly reducing inspection-related hazards and enabling higher frequency of assessments.

Challenge: Monitoring Structural Integrity

Dams, penstocks, spillways, and reservoir linings are prone to structural wear over time due to water pressure, seepage, and weathering. Regular assessment is crucial to detect early signs of cracks, joint failures, corrosion, and material degradation. EyeROV SAGARA enables close-up, high-resolution video documentation, offering engineers and decision-makers actionable insights.

Challenge: Sediment and Debris Accumulation

Sediment accumulation in reservoirs, canals, and tunnels reduces water holding capacity, flow efficiency, and turbine performance. Debris can block intake structures or damage turbines. Traditional sediment survey methods are labour-intensive and infrequent. With real-time visuals, EyeROV SAGARA enables efficient sediment mapping and targeted maintenance efforts.

Challenge: Asset Lifecycle Management

Without frequent visual data, asset managers struggle to plan preventive maintenance or lifecycle investments. EyeROV SAGARA provides digital inspection logs, videos, and measurements that can be archived for trend analysis and predictive maintenance planning. This reduces emergency repair costs and improves operational reliability.

Challenge: Regulatory and Compliance Reporting

Governments and regulatory bodies increasingly demand documentation of infrastructure inspections as part of ESG, ISO, and water safety compliance. EyeROV SAGARA provides HD visual evidence with timestamps and location tagging that supports audit trails and third-party validations.

Application: Dams and Reservoirs

EyeROV SAGARA is ideal for inspecting submerged parts of dams, such as toe drains, outlet structures, energy dissipation areas, and foundation walls. It can detect seepage paths, biological growth, cracks, and sediment deposits, enabling safe and frequent inspections without draining or diver deployment.

Application: Hydropower Stations

Turbine intake gates, draft tubes, trash racks, and underwater mechanical equipment can be visually inspected using EyeROV SAGARA. This allows plant operators to check for debris, leakage, and operational blockages without halting operations, ensuring maximum uptime.

Application: Pipelines and Aqueducts

EyeROV SAGARA can inspect underwater segments of irrigation canals, inter-basin transfer pipelines, and penstocks. It helps detect pipe misalignment, corrosion, joint leakage, and encroachments, helping prevent water loss and ensuring efficient distribution.

Application: Desalination and Coastal Infrastructure

Outfall and intake pipelines in marine environments are prone to marine growth, corrosion, and damage due to waves and shifting sediments. EyeROV SAGARA enables these critical assets to be monitored without exposing personnel to high-risk environments, ensuring compliance and reliability.

Application: Flood Management and Urban Drainage

Urban stormwater culverts, floodgates, and drainage tunnels often get clogged with silt and debris. Routine inspections using EyeROV SAGARA can help municipalities identify blockages, structural damage, and unauthorized discharges before monsoon or storm events.

Case Studies: Demonstrated Impact

In Asia, a hydropower utility deployed EyeROV SAGARA for inspections and reported a commendable reduction in annual maintenance costs in unplanned downtime. In the Middle East, EyeROV systems were employed in Storm water drain systems and thereby

reducing the inspection time and costs. A survey which might have taken 200+ hours (2 weeks) of full pipeline shutdown and few 100hrs of dewatering exercises and many hours of human entry in confined spaces(which is a major safety concern), was all reduced to just 3 hours of pipeline shutdown. The great news was that an EyeROV ROV survey revealed the pipe was in good condition with very low siltation and hence good for the next few seasons.

Comparative Advantage of EyeROV SAGARA

Compared to traditional diver-based methods, EyeROV SAGARA offers:
- Safety: No human exposure to underwater hazards
- Cost: Lower operational and insurance expenses
- Data: HD visuals with optional GPS tagging
- Portability: Deployed by 2 people from shore or boat
- Accessibility: Operates in confined and turbid environments

Future Outlook: Smart Hydro Infrastructure

As utilities move toward digital transformation, EyeROV SAGARA serves as a data acquisition platform for AI-powered anomaly detection, GIS mapping, and SCADA integration. It supports the creation of digital twins, enabling predictive maintenance and real-time monitoring of underwater assets.

Conclusion

EyeROV SAGARA empowers water infrastructure stakeholders with safe, efficient, and high-fidelity inspection capabilities. Its use across the Middle East and Asia Pacific contributes to enhanced resilience, sustainability, and operational excellence in the hydro sector.

"Out of sight" should never mean "out of mind" — especially when it comes to the underwater regions of our hydro infrastructure. EyeROV SAGARA dives deep where humans can't, surfacing insights that safeguard millions. As the Middle East and Asia Pacific scale their water ecosystems, SAGARA transforms how we inspect, protect, and perfect our most critical assets — making the invisible, actionable.

Way Forward

Next Steps

If you're managing or advising on hydro infrastructure projects across Asia Pacific or the Middle East, EyeROV SAGARA is ready to transform your underwater inspections. Let us show you how real-time underwater intelligence can change the way you maintain, plan and protect your water assets.

About EyeROV

EyeROV is India's one of the leading commercial underwater drone companies, building advanced marine robotics solutions for inspection, monitoring, and data acquisition. Our products have been deployed across power, oil & gas, disaster management, water & sewage, research & academics, hydro-infrastructure sectors with proven impact.

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