



# Aquaculture

## Unmanned Underwater Services



Infrastructure Type	Offshore/inshore fish farming, seaweed farming, shrimp farming, seashells farming
Client Category	B2I, B2B, research
Client / Industry Type	Aquaculture, Research Institutes/University
Services	Underwater inspection, aquaculture infrastructure inspection, water quality,
UST Technology	UUV (ROV)

This service consists of providing high quality underwater video capability for many different aquaculture sectors from corporate to research institutes enabling them to have “*Eyes in the Water*” ; whether to assess the condition of the netting, or the animal / vegetable health, monitoring feeding or doing water quality checks, or observing the environment around the farming area.

The added advantage of using underwater drone are: preventing maintenance of the infrastructure with visual inspection, quality control, status of the culture environment and infrastructure, small intervention operations that are usually done by physical intervention by human labour, can be done without humans entering into the tank/pond and disturbing its environment. Underwater drones do not replace human intervention, but optimise it; by avoiding exposing humans to unwanted risks, inclement weather with no disturbance to the animals and environment. Easy to operate, with minimal training, aquaculture staff can easily operate drones. With low maintenance and affordable cost, underwater drones can significantly enhance aquaculture productivity. Underwater drone allows fast inspection by targeting the area of interest at any given time.

### Offshore / inshore aquaculture intervention

- **General inspections:** This is what we define as “*Eyes in the Water*”; it is a simple operation using an entry level category underwater ROV with enhanced video and photography. This operation allows viewing of the underwater environment, the seaweed lines and stakes, the condition of the animal and weeds, spots anomalies and dead plants/fish. *Eyes in the Water* can be used to do a preliminary investigation to inform decision maker on other specific investigation and/or specific interventions needed, assessing beforehand the risk and the environment where specific response ought to be carried by either underwater drones or humans, thus saving time and money.
- **Fishnet / cage inspection:** Underwater inspection of fishnets is critical in fish farming. Underwater drone allows the inspection of the nets condition inside, as well as outside at any given moment in time. Whether it is a routine inspection to assess the net condition, to evaluate if needs to be cleaned, assess any damage that maybe caused by bad weather, or checking any predator intrusion and/or wild fauna being trapped in the net itself, (requiring immediate assistance, to free the animal), underwater drones allow the aquaculture staff to make informed decisions and take appropriate and timely steps.
- **Water Quality control:** Underwater drone can be equipped with water quality devices for logging parameters such as DO (Dissolved Oxygen), Ammonia (NH<sub>3</sub>), pH, Turbidity, Temperature at different depths, Conductivity, etc.... according to the type of multisensory used which can measure up to 8 parameters at once and record these for (future) reference.
- **Recovering:** One of the concerns in aquaculture, particularly in fish farming is the presence of dead fish in the nets which can biologically pollute the water or be an indicator of animal health concerns. Equipped with special robotic arm or fishnet the dead fish can be easily recovered and brought to the surface by an underwater drone.





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## Inshore aquaculture (tanks, ponds)

- **Infrastructures:** For inshore aquaculture, the maintenance and preventive maintenance of the infrastructure is paramount. Drones with enhanced video capability allows real time inspection of the differnet apparatus used for water circulation, inlet, outlet, grids, sensors, alge and deposit formations inside the tank/pond. The use of underwater drones is used here as preventattive maintenace and to avoid humans entering into the tank/pond and disturbing the culture environment.

## Aquaculture Products and Specifications

UUV-Aquatic Drones models' examples (models, products and photos shown are strictly indicative & non-binding)

### ROV Models

Model	DSS U100SD
ROV Type/Use	Eyes in the Water
Speed	1.5 m/s
Endurance	4 hours
Depth	100 meters
Camera	4K, 12MP, MV4, JPEG
Live Stream	Yes
Navigation Control	Smart device
Navigation Type	Multidirectional
Navigation Automation	Motion lock, depth lock, 360°
Power	Lithium Ion Battery
Plug in Accessories	None
Safety	ROV breaking point 80 kg



Model	DSS U200SD
ROV Type/Use	Multi Pass
Speed	2 m/s
Endurance	6 hours (depending on conditions and plug-in)
Depth	150 meters
Camera	Sony CMOS 1/2.3" 160°, 4K, 30fps, 12MP, MV4, JPEG
Live Stream	Yes
Navigation Control	Smart device
Navigation Type	Multidirectional
Navigation Automation	Motion lock, depth lock
Power	Lithium Ion Battery
Plug in Accessories	Robotic Arm (7 kg), Sonar, Hydrophone, Others as available
Safety	ROV breaking point 300 kg



Notice: Drone Solution Services Pte Ltd reserves the right to change, amend, and/or cancel any part of its Aquatic Business Services at any time, without prior notice. The models shown in this factsheet are indicative of Drone Solutions UAS/USV/ROV offering; accordingly, client requirement may result in different models being offered. Images and pictures strictly non-binding.