In Nature Robotics Ltd.

# *AMOS* - Aquatic Mini Observation System

AMOS is a solar-powered robotic boat that can perform water quality measurements at pre-defined GPS locations. Data is stored onboard and can be transmitted via wireless serial link or cellular-based Internet connection.

## AMOS Advantages

Solar powered: can run indefinitely in bright sunlight, when sun is greater than 40 degrees above the horizon.
Lightweight: 13 kg, can be carried by single person.
Low draught, capable of operating in as little as 2 cm water depth.
Airboat design does not get caught in seaweed or other vegetation.
Low-cost parts make replacement / repair easy and affordable.
Raspberry Pi-based central computer is simple to program and widely documented.
Open-source software and hardware makes customization easier.
Wide variety of connectivity options, including WiFi, Bluetooth, cellular, and wireless serial.
PC, Android, and iOS apps are available for interfacing with and controlling AMOS. Custom software development is available.



## Applications

AMOS is well-suited to a wide variety of hydrological applications. It comes with a small sensor probe for measuring water temperature. Other sensors can be added for measuring pH, dissolved oxygen, turbidity, chlorophyll, algae, blue green algae, conductivity, salinity, and ammonium concentration. Onboard diagnostic capabilities include a waterproof camera module (up to 3280 x 2464 resolution), LiDAR object detection, inertial measurement unit including triaxial accelerometers, magnetometers, and gyroscopes, atmospheric pressure sensor, humidity & temperature sensors for both electronics enclosures, battery voltage and current monitoring, leak detection sensors, and GPS receiver board.

**Specifications**

Weight: 13 kg (without sensor payload).

Maximum forward speed: 6 km /h (3.2 kts)

Battery (Rechargeable lithium-ion battery pack, 12 V, 10 AH)

Data storage: 32 Gbytes micro SD card

Communications: WiFi, cellular, Bluetooth (Bluetooth Low Energy), proprietary wireless serial link.

Camera (up to 3280 x 2464 resolution)

LiDAR capable of detecting objects up to 40 m away. Software can be set for object avoidance.

Alarms: email or text alarms available for leak and / or low battery detection. Alarm customization available upon request.

Analog Inputs: 4 16-bit (expandable to 16), 6 12-bit

Digital I/O: 10 available digital input / output pins (3.3V level)

Operating System: Raspian GNU/Linux 9 (Stretch)

Solar panel maximum power rating: 100 W

Maximum runtime without sunlight on 10 AH battery: 1 hour (longer runtimes available using larger batteries).



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