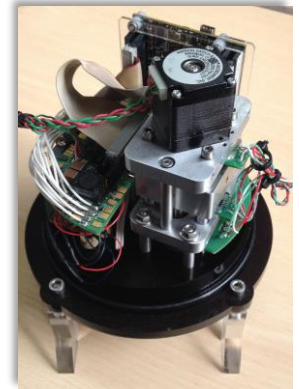


Lab-on-Chip pH sensor

Technology description

The lab-on-chip pH sensor is an autonomous submersible sensor for in situ spectrophotometric pH measurements, based on microfluidic lab on a chip technology. The system is highly configurable (up to five reference corrected measurements per hour) and has low power consumption (1.8 W). It measures (without the housing, reagents and power supply) approximately 130 mm (diameter) by 130 mm (length). The on-chip light absorption cell (10 mm) is fabricated from tinted poly -methylmethacrylate (PMMA) to exclude background light resulting in a high-sensitivity system with a precision of 0.002 pH units and accuracy of better than 0.004 pH units.



Environments and platforms where technology has been demonstrated

Laboratory, estuaries, CTD casts, coastal & deep moorings, remote-operated vehicles, autonomous underwater vehicles

Analytical performance

The sensor is under continual development but has been demonstrated to the following specifications

Sample rate:	8 minutes
Calibration method:	Self referencing
Precision:	0.002 pH units
Accuracy:	0.004 pH units
Sample volume:	400 μ L per measurement
Deployment depth:	to 6000 m

Power and communications requirements

Voltage range:	10 V to 16 V
Power consumption:	1.8 W
Current draw (12 V):	155 mA average, 385 mA maximum
Output interface :	RS232, RS485, USB
Connector type :	IE55 6-way or SubConn MCIL8M

Dimensions and weight

Dimensions:	17 cm long, 15 cm diameter (without reagent housing) 56 cm high, 20 cm diameter (sensor with reagent housing)
Weight in air:	3.6 kg (without reagent housing) 6 kg (sensor with reagent housing)
Weight in water:	0.85 kg



Key publications

- Rérolle, V.M.C., Achterberg, E.P., Ribas-Ribas, M., Kitidis, V., Brown, I., Bakker, D.C.E., Lee, G.A., Mowlem, M.C., High Resolution pH Measurements Using a Lab-on-Chip Sensor in Surface Waters of Northwest European Shelf Seas. *Sensors* 18, 2622, 2018
- Rérolle, V.M.C., Floquet, C.F.A., Harris, A.J.K., Mowlem, M.C., Bellerby, R.R.G.J., Achterberg, E.P., Development of a colorimetric microfluidic pH sensor for autonomous seawater measurements. *Analytica Chimica Acta* 786, 124–131, 2013