

Digital Environmental Monitoring for Sustainable Hydropower

Digital Environmental Probe

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Environmental monitoring Challenges



- Unreliable measurements with state-of-the-art probes
- High maintenance
- Risk of false measurements
- Risk of not detecting false measurements
- Often logging is not coupled with power operation
- Fragmented monitoring

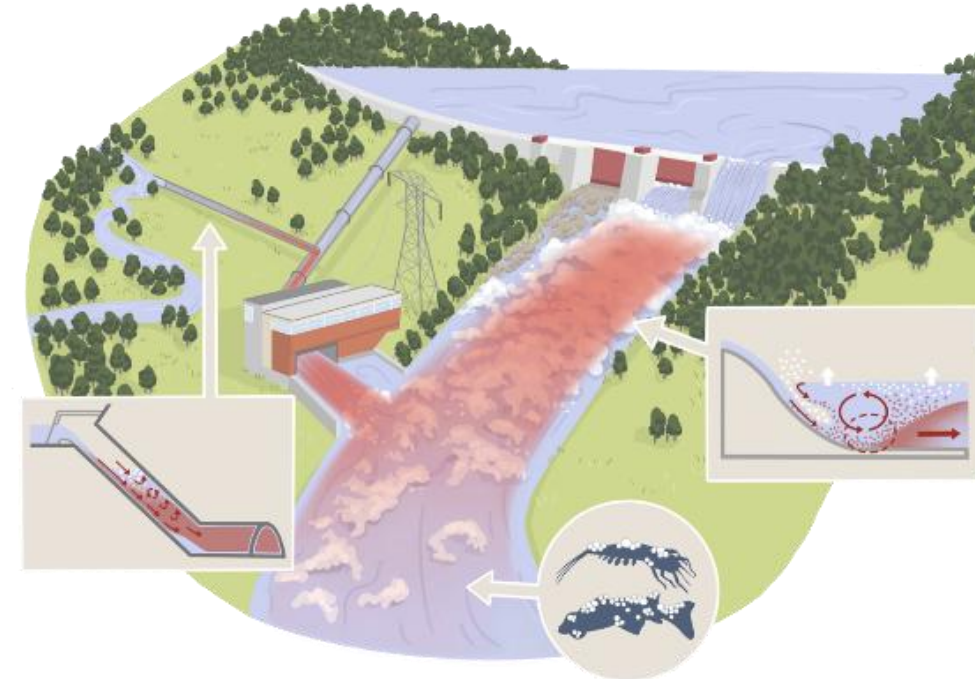


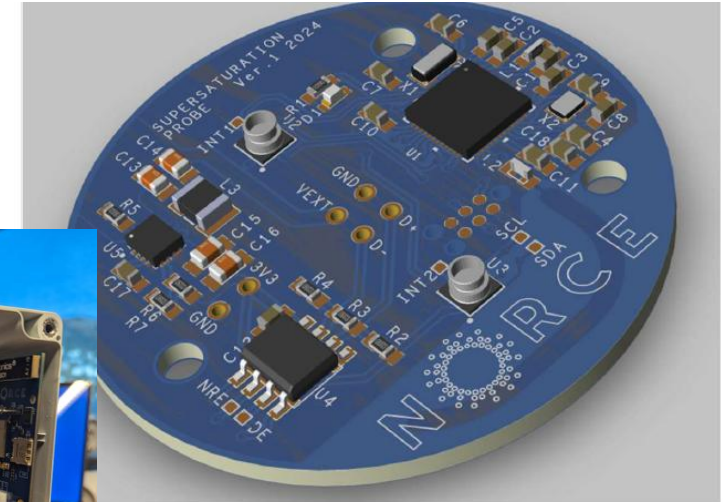
Illustration by Maja Lagervall



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Monitoring Sensor Development - Prototype

- Highly accurate and robust up to 400 (+/- 0.6 %) % TDG
- Connected to online database
- Compatible with off-the-shelf probes
- Digital output
- Calibration stored in the sensor
- Error detection possible

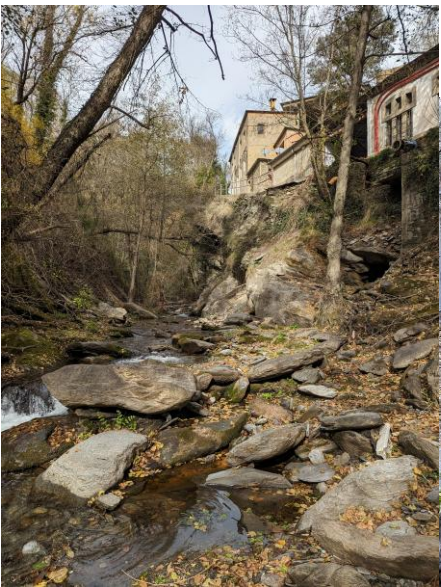


iAMP-Hydro project

Field testing



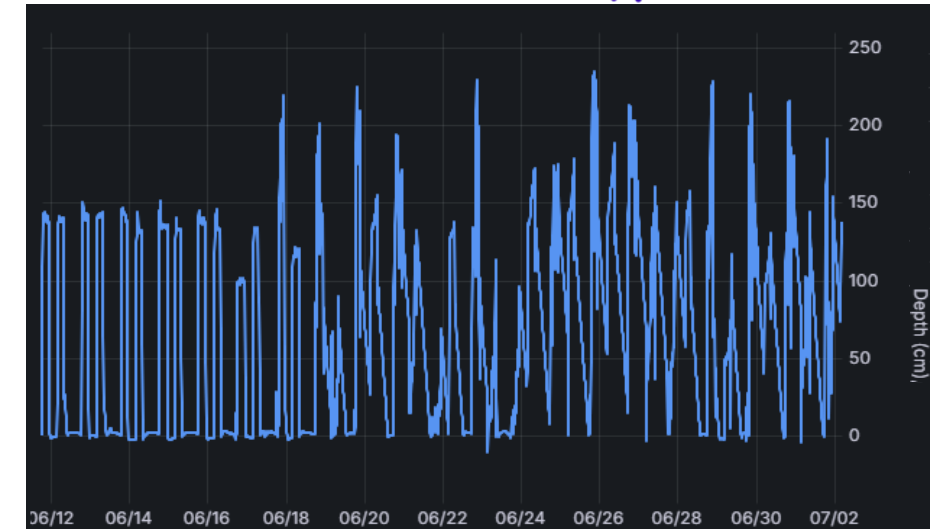
- Testing at 5 EU validation sites
- Testing at 2 Norwegian sites



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Field testing results

- Gas supersaturation and hydro peaking detected
- Damage detection
- Partial compatibility with external probes
- Long term monitoring (7 - 14 months) with high reliability



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Lessons learned



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- Valuable environmental data
- Ecological improvements
- Sustainable hydro power operation
- Increased robustness
- Automatic malfunction correction

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D. García de Jalón¹, M. González del Tánago¹ and C. Casado²

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Effects of Total Dissolved Gas Supersaturation in Fish of Different Sizes and Species

by Shudan Xue, Yuanming Wang*, Ruifeng Liang, Kefeng Li and Ran Li

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Gaute Velle, Trond Einar Isak

Assessing the potential effects of supersaturation downstream of hydropower plants in Norway, Austria and Sweden

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Environmental monitoring Solutions



- Robust field probe monitoring water depth, temperature and gas super saturation
- Digital without need for calibration
- Environmental monitoring system connected to online database
- Compatibility with off the shelf environmental probes
- Alert systems and error detections

