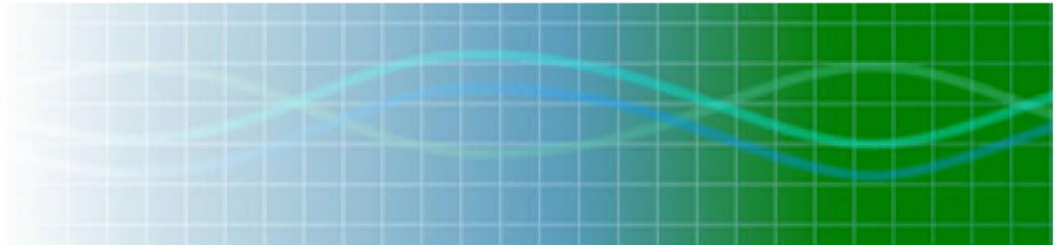# AquaSPECT

Autonomous *In-Situ* Nutrient Monitor

- Wet Chemistry
- Limited Interferences
- Multi-Channel
- Autonomous Calibration
- Durable and Rugged
- Adaptable Chemistry
- Biofouling Control

Description

The AquaSPECT adapts established wet chemical methods to an in-situ chemical analyzer. Precise volumes of sample, on-board standard and reagent connected to a rotary valve are mixed by a syringe pump and reacted solutions are analyzed in high precision colorimeters. In essence, the AquaSPECT is a submersible "chemistry robot". Sample data is calibrated via on-board standards that are also analyzed in-situ at user specified intervals. Sample and reagent volumes, mixing times and flushing are controlled by straight-forward macros that can be customized by users or Green Eyes to achieve specific QC or analytical goals. With the mooring and reagent frame, the AquaSPECT can be deployed from a surface buoy or on a taut mooring for long-term continuous monitoring.

AquaSPECT Specifications

Dimensions (cm) and weight (Kg)
- Analyzer : 50 x 16 (L x max OD)
- Reagent Frame: 56 x 32 (L x OD)
- Battery Pack: 88 x 14 (L x OD)
- Weight: Air 25, Water 4 (not including reagent payload)

Analytical
- Standard Ranges (detection limit to linear range*, micro M)
    High Sensitivity Detectors
        mg/L: N+N 0.003 to 0.70, Nitrite 0.002 to 0.5, Phosphate 0.006 to 0.8, Ammonium 0.004 to 0.3, Silicate 0.008 to 1.7
        micro mol/L: N+N 0.2 to 50, Nitrite 0.15 to 35, Phosphate 0.2 to 25, Ammonium 0.3 to 20, Silicate 0.3 to 60
    Low Sensitivity Detectors
        mg/L: N+N 0.01 to 2.8, Nitrite 0.008 to 2.1, Phosphate 0.025 to 2.0, Ammonium 0.02 to 1.0, Silicate 0.04 to 2.8
        micro mol/L: Nitrate 0.8 - 200, Nitrite 0.6 - 150, Phosphate 1.0 - 75, Ammonium 1.5 to 75, Silicate 1.5 to 100

- Precision (one SD @ midrange of scale): Nitrate 3%, Nitrite 2%, Phosphate 4%, Ammonium 4%, Silicate 3%
- Expanded Ranges: Up to 5 mg/l through auto-dilution
- Accuracy: Based on the accuracy of the preserved on-board standard and sample replicate precision
- Analyses: Approximately 1000 per channel, per deployment. Controlled by reagent payload and chemistry.
- Standard Analysis Time (minutes): N+N 12, Nitrite 8, Phosphate 12, Ammonium 18, Silicate 16 (faster analysis routines available)
*Detection limit calculated as 3 x SD of reagent blank; linear range is variable upon detector path length and chemistry.

General
- Power (volts dc): 10 - 15, current (mA): max 1200 (heaters and motor), mean 22-125, sleep 0.1
- Communications: RS232 19200,N,8,1
- Depth rating: 50m, deeper upon request