MicroLAB Training

Compact Nutrient Monitor

Introduction

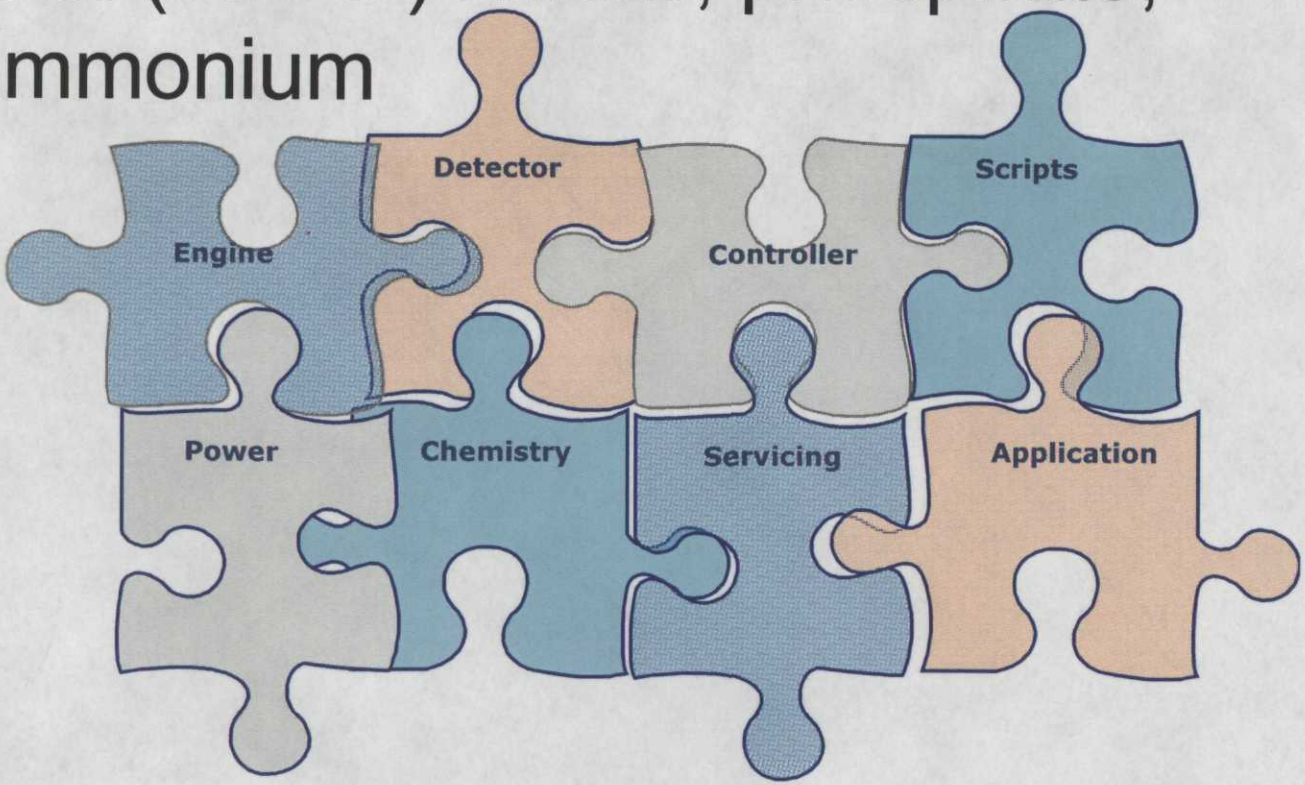
- Overview of MicroLAB system
- Demonstrate operation of MicroLAB
- Introduction of group and backgrounds

Agenda

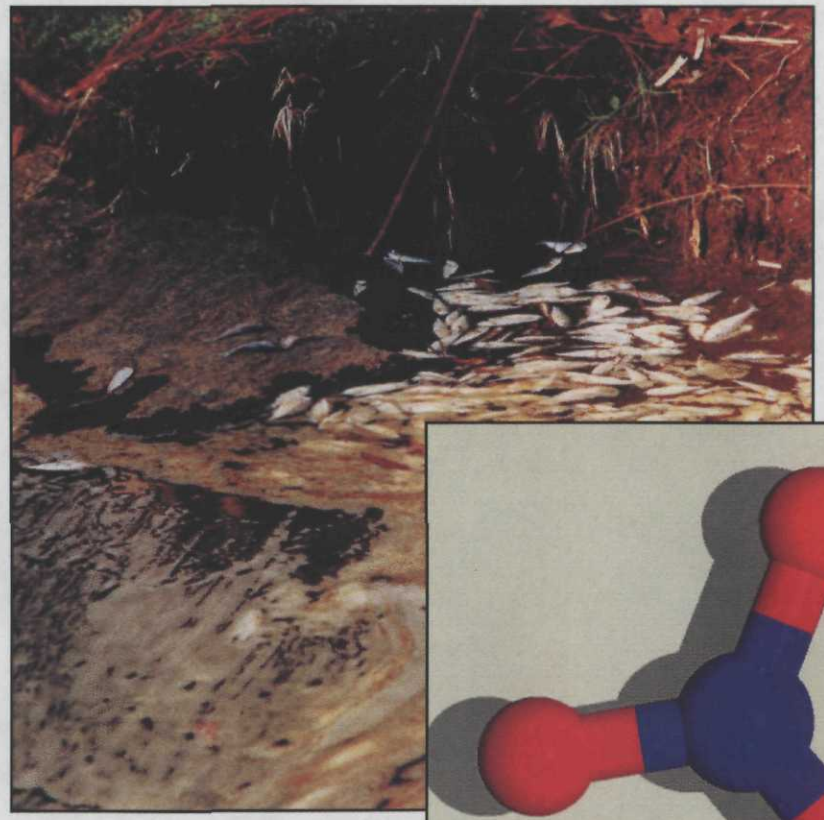
- General anatomy
- Analysis
- Electronic configuration
- Chemical engine
- Detector design
- Commands
- Scripts

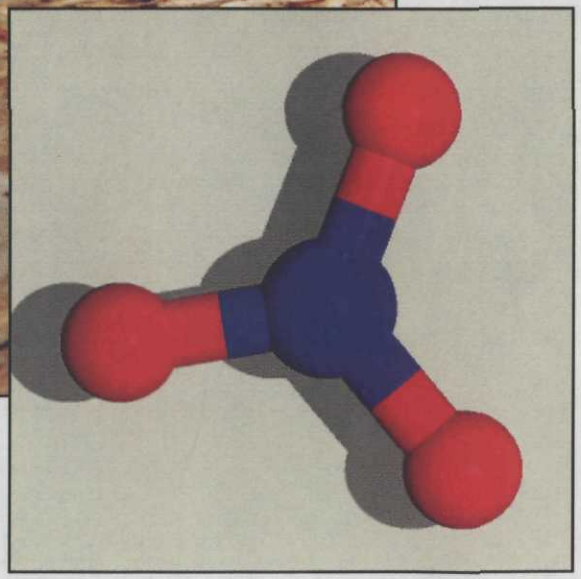
What is MicroLAB?

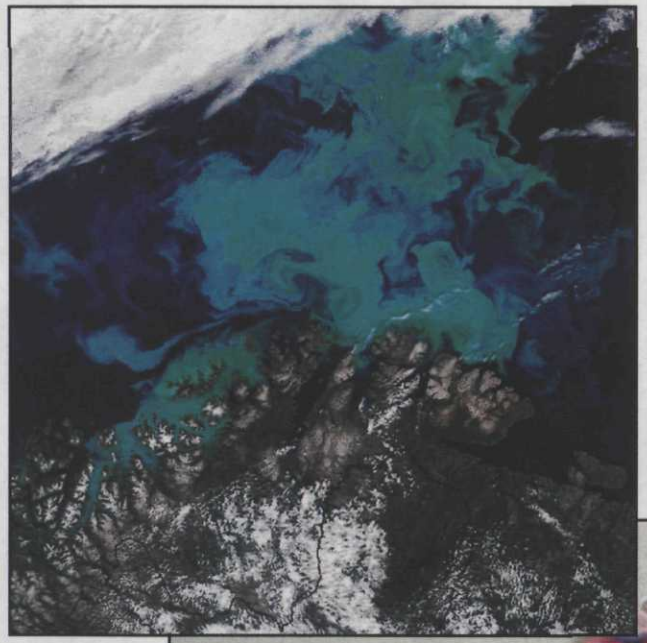
- MicroLAB is a wet chemistry analyzer for the analysis of (one of) nitrate, phosphate, silicate or ammonium

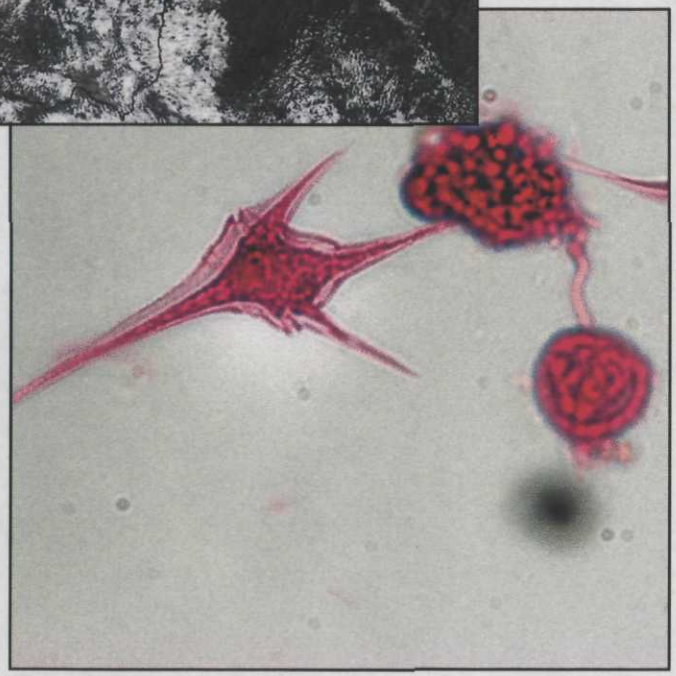


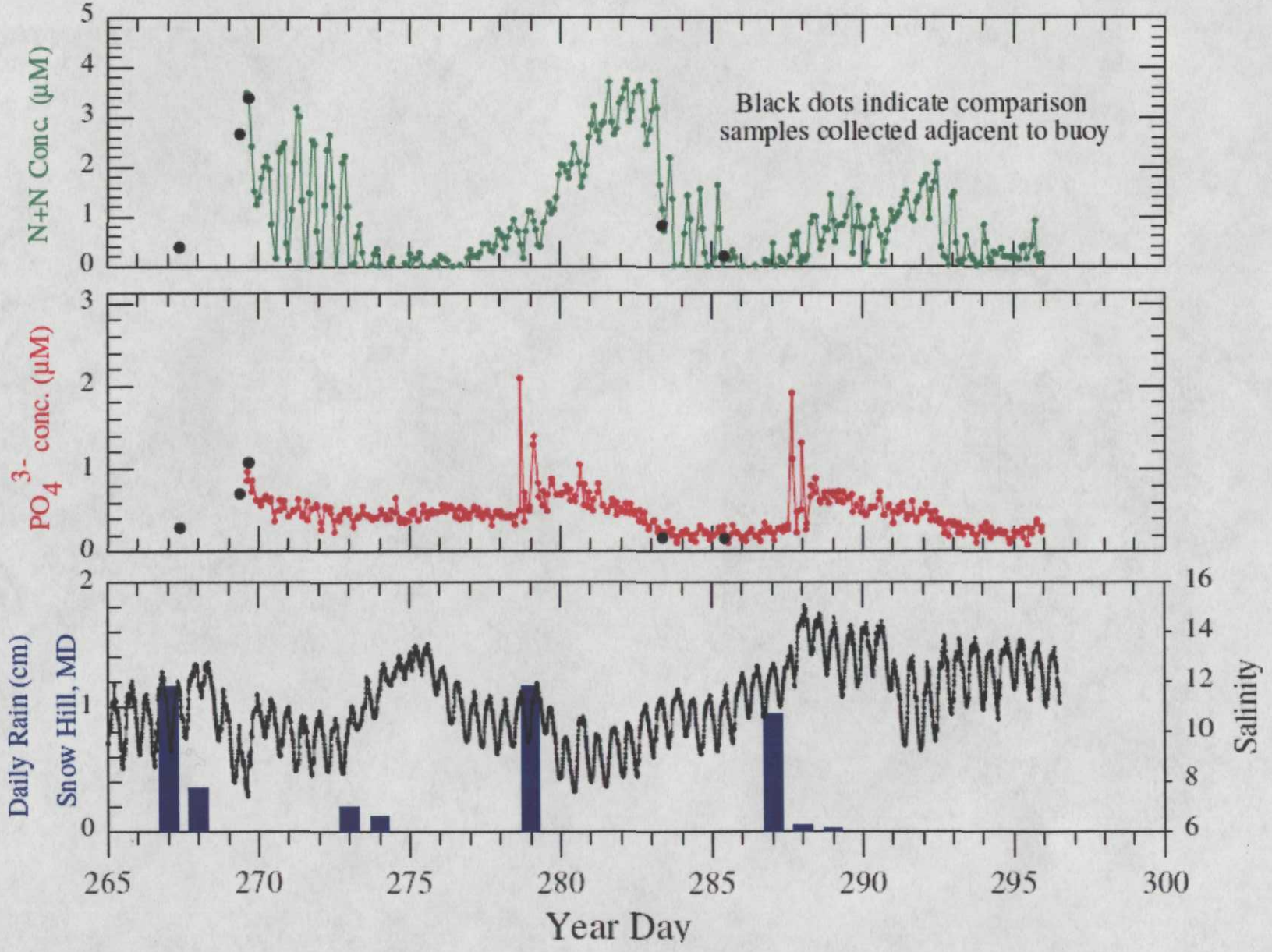
Applications







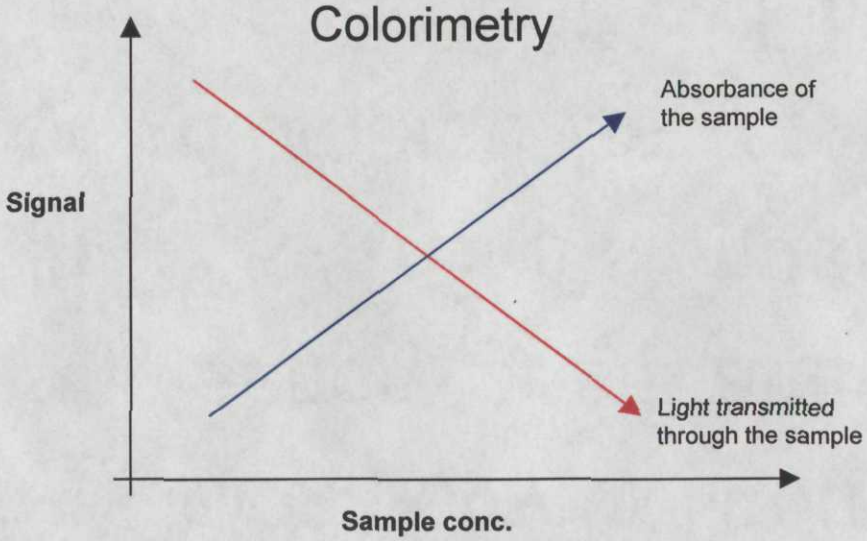


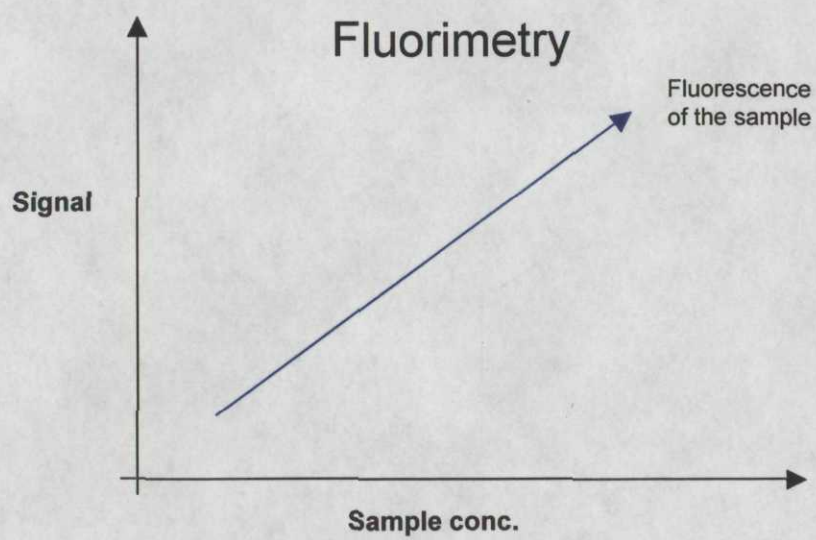

N+N Conc. (µM)
Black dots indicate comparison samples collected adjacent to buoy
PO_4^{3-} conc. (µM)
Daily Rain (cm)
Snow Hill, MD
Salinity
Year Day
265
270
275
280
285
290
295
300

Chemistry

- Colorimetry or fluorimetry (NH4)
- Measure beam attenuation
- EPA / NEMI standard methods
- Automated discrete analysis
- Frequent self-calibration

Measurement Methods



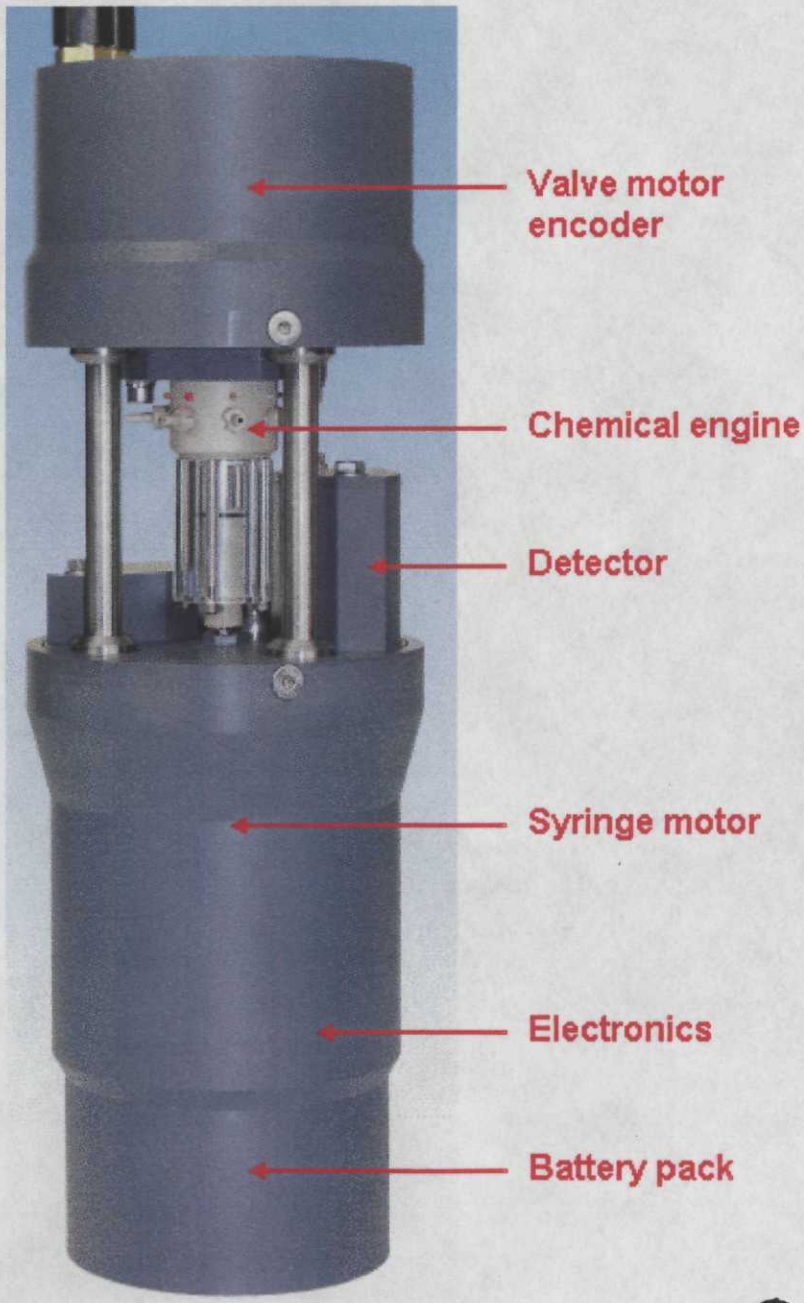


Colorimetry is used to measure NO3/NO2, PO4 and SiO4. The attenuation of a beam of light is recorded. The light passing through the sample decreases with increasing concentration. This is shown by the red line. Absorbance increases linearly (to a point) with concentration as shown by the blue line. This is in accordance with the Beer-Lambert Law.

Fluorimetry is used to measure NH4. The fluorescence of the dye when excited by a beam of light is recorded. The light fluoresced (emitted) by the sample increases linearly with increasing concentration. This is shown by the blue line.

Anatomy

Analyzer

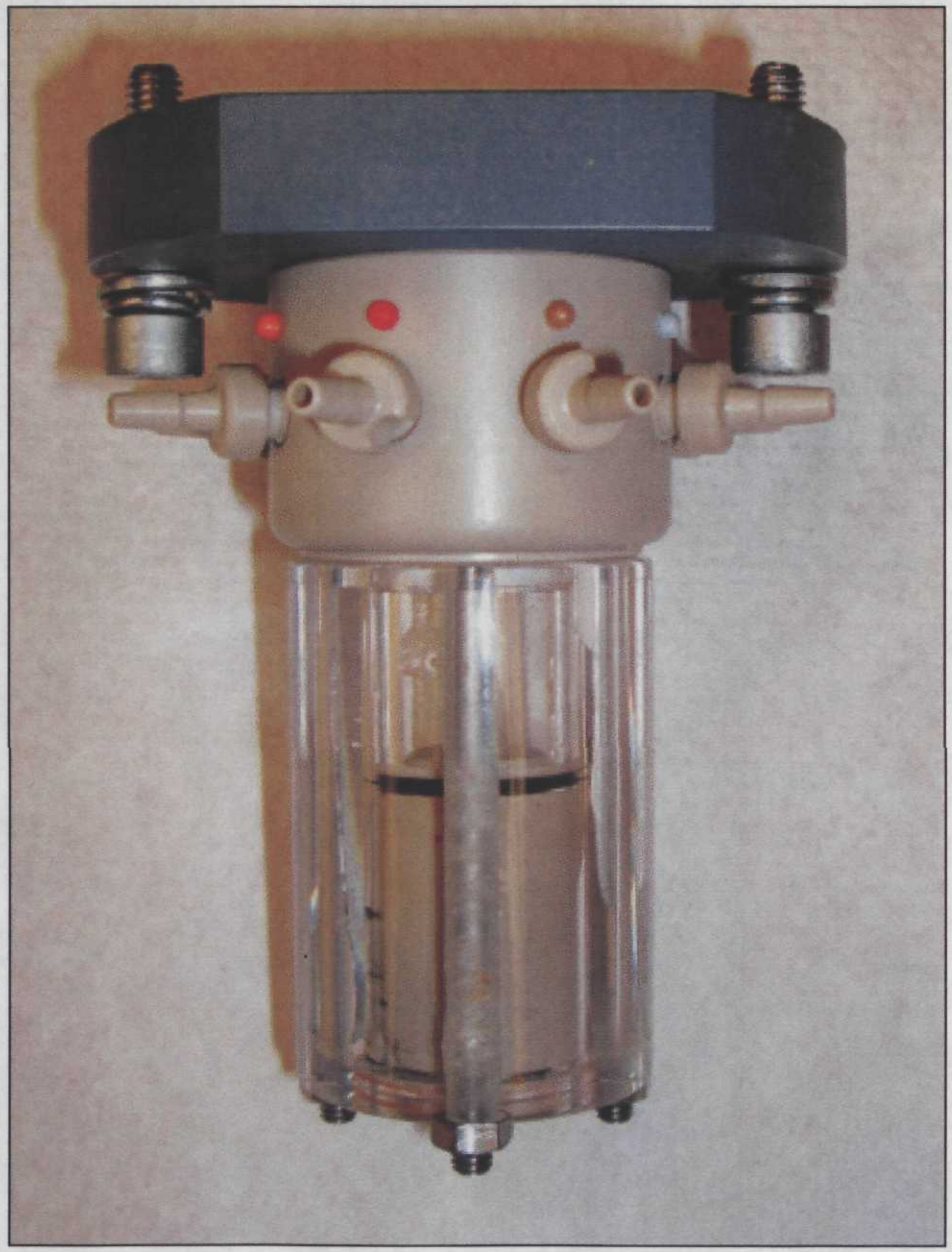

Valve motor encoder
Chemical engine
Detector
Syringe motor
Electronics
Battery pack

Reagent bags

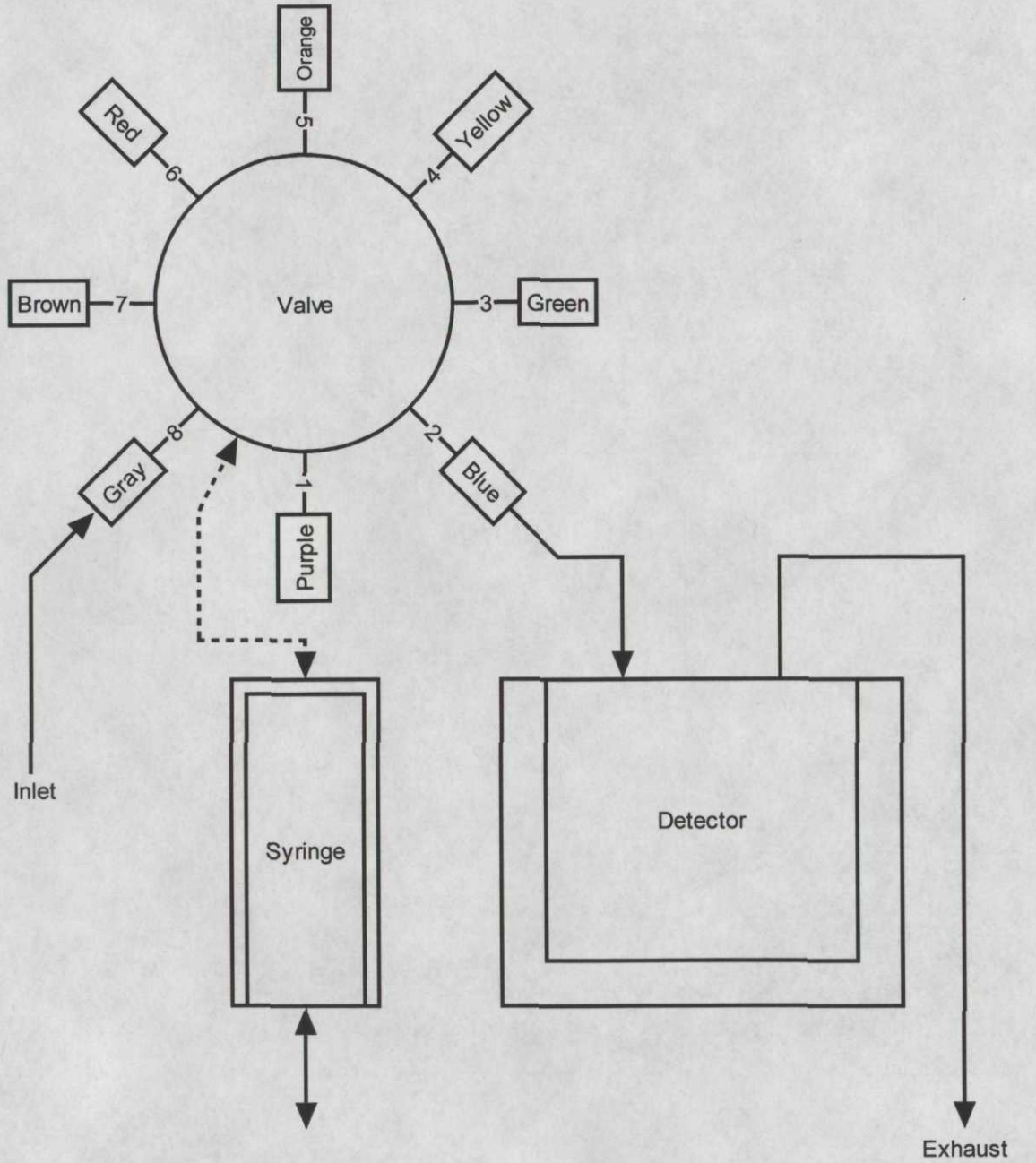
Analysis

- Take water sample
- Read blank (and record)
- Reduce (NO_3 only)
- Add reagents
- Develop (heated for PO_4 and NH_4)
- Read reaction (and record)
- Flush
- Preserve cadmium (NO_3 only)

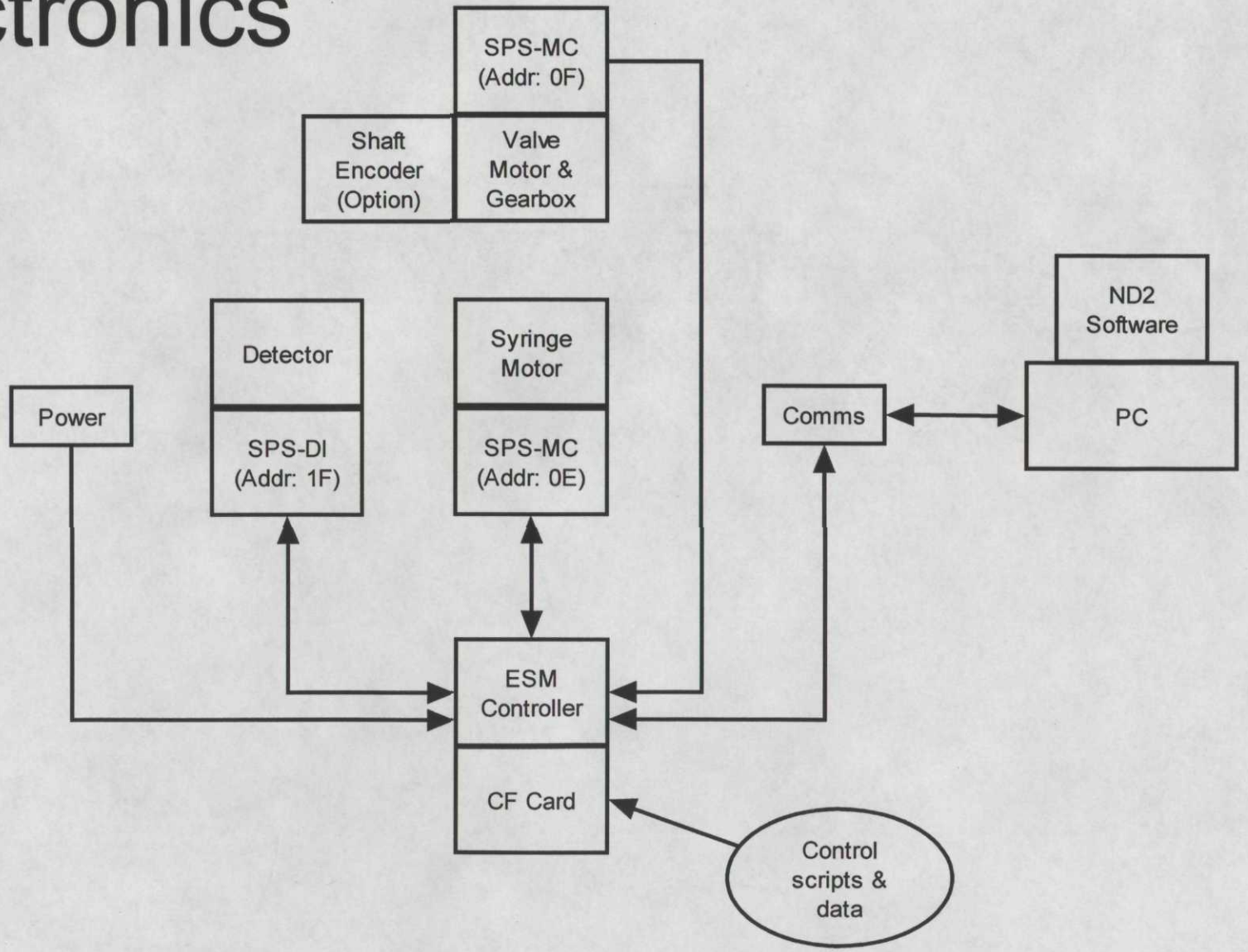
Syringe/Valve



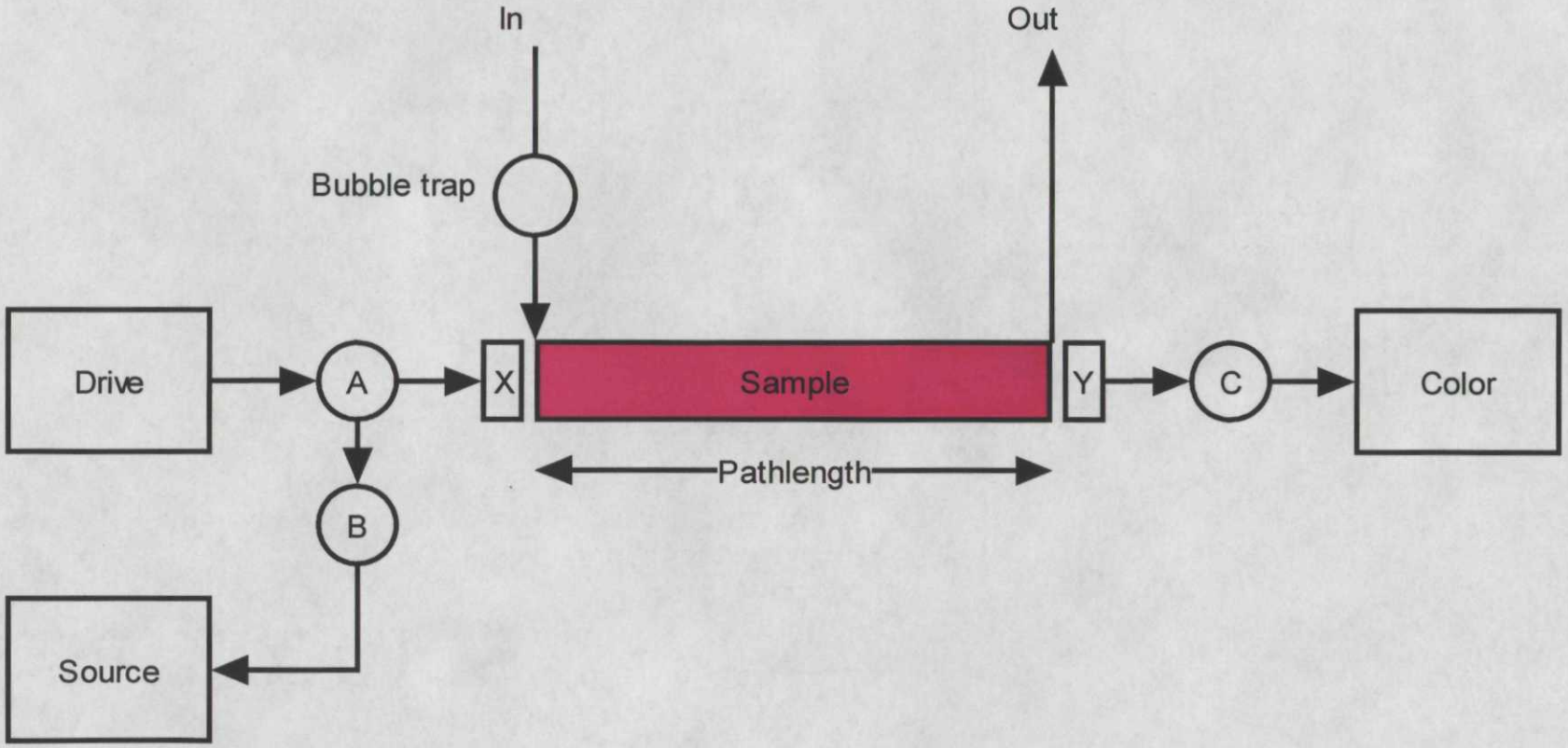
Engine


Orange
5
Red
6
Yellow
4
Brown
7
Valve
3
Green
Gray
8
Purple
1
Blue
2
Inlet
Syringe
Detector
Exhaust

Electronics



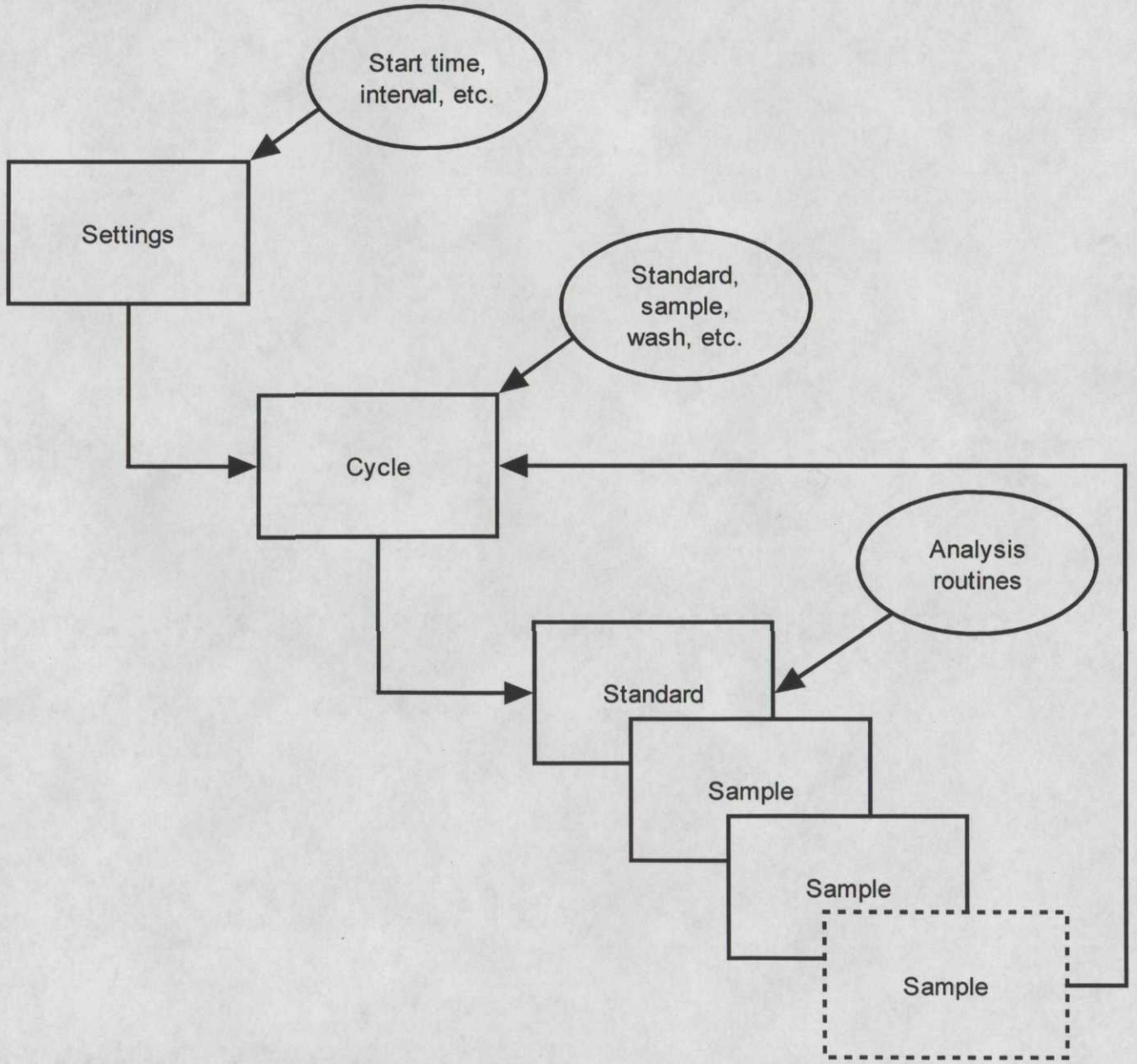
Detector


In
Out
Bubble trap
Drive
A
X
Sample
Y
C
Color
Pathlength
B
Source

Devices & Controls

- Valve motor / gearbox
  - Rotate (clockwise & counter-clockwise), align valve
- Syringe Motor
  - Insert and retract plunger
- Detector
  - Set-light intensity, measure beam, heat, hold temperature.
- Analog instrument
  - Temperature probe, chlorophyll fluorometer, etc.

Scripts


Start time, interval, etc.
Settings
Standard, sample, wash, etc.
Cycle
Analysis routines
Standard
Sample
Sample
Sample

Software


NutrientDATA - NO LICENSING
EnviroTech
NutrientDATA
Manual Control
Script Designer
Data Processing
Monitor Instrument
Deploy Instrument
Configuration

Deployment Frames

Summary & Questions

- Overview of MicroLAB and component parts
- Next: Practical MicroLAB session
- Practice makes perfect
- Please provide feedback on training

More Information

- Comprehensive manual
- Website resources
  - Manuals, articles, software, help desk
- Help Desk
  - envirotechinstruments.com/help.htm
  - help@envirotechinstruments.com

Break