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## TURBIBUOY TURBIDITY MONITORING SYSTEM



Turbibuoy is designed for sheltered water operations to typically 50m depth and can be either permanent or temporary platforms.

The system is designed to monitor record and display turbidity data in support of water quality monitoring or dredge monitoring operations. One or two sensors may be deployed at differing depths.

Turbidity is an ideal surrogate for simple assessment of general water quality and effects of sediment disturbance by dredging and other civil engineering projects. The Turbibuoy system allows users to enter their own calibration curve to convert NTU to mg/L. Users may also designate one buoy as "upstream" the other as "downstream" so that alarms can be triggered dynamically based upon the background field data rather than a fixed NTU/Mg/L value.

Turbibuoy is most often deployed as a surface buoy but can equally be installed on fixed structures, piles, piers and jetties.

The system acquires and sends data directly from the point of measurement to our own password protected data portal on the internet via GPRS where data may be viewed monitored and controlled via a simple web interface. This means that expensive infrastructure and hardware ashore is eliminated and data can be viewed from any where in the world with internet access including smart phones etc. Data may be sent by email automatically each day or on demand for offline processing and alarms can be sent by both email and SMS text.

Position is monitored using on board GPS and watch circle radius can be set by the user.



As standard the system uses the Analite NEP-395 turbidity sensor. These sensors have advanced attributes that make them ideal for this application. Sensors are fitted with lens wipers to minimise effects of bio fouling and have advanced signal processing algorithms to minimise the effects of transient increases due to fish, stones, or other unusual events. Measurements are auto ranged up to 1000 NTU (5000NTU to special order) and data are averaged over 100 discrete samples which themselves are pre-averaged. Data are presented as the average value as well as the maximum, minimum and variance to allow users to see how hard the sensor is working to provide accurate results. The system is also suitable for use with the WET Labs range of ECO turbidity sensors or the YSI-600MS single parameter sensors.



Sensors may be deployed through the hull using a rugged deployment frame, allowing service without recovery of the buoy.

The floatation unit, and other key components, are manufactured from rotationally moulded polyethylene with optimum E.S.C.R. (Environmental Stress Crack Resistance) Pre-coloured virgin polymers, with high UV stability Robust wall thickness collars filled with marine safety approved close-cell foam and are virtually unsinkable. Steel work is galvanised, as standard, to BS EN ISO 1461-1999. TURBIBUOY is most commonly deployed on our 1.25m buoy, but hulls up to 3m are available.

## SPECIFICATIONS:

### Turbidity sensor (Analite NEP-395)

Technique	90° Infra-Red (ISO7027).
Range	40, 100, 400, 1000, (V1) and either 3000 (V2) or 5000 NTU (v3)- user set.
Resolution	Digital
	Range RS232/SDI-12
	40NTU < ±0.01NTU
	100NTU < ±0.02NTU
	400NTU < ±0.1NTU
	1,000NTU < ±0.2NTU
	3,000NTU < ±0.10NTU
	5,000NTU < ±1.5NTU
	<i>Over 10% to 90% of range.</i>
Repeatability	±1% at 25°C.
Linearity	<1% for 40NTU, 100NTU and 400NTU, 3% for 1,000NTU 5% for 5000 NTU. (using 3 point cal)
Measurements	Latest turbidity measurement -1 sample. Mean and Sample Variance (over 100 samples) Median (over 100 samples) Minimum (over 100 samples) Maximum (over 100 samples)
Calibration	2 or 3 point calibration for each range may be set by the user only through the RS232 interface.
Wipe Time	6 seconds nominal.
Depth Rating	70g/m for cable NEP390-CBL .Cable Length To order 60m (200ft) max.
Operating Temp.	50m (plastic) 100m (Stainless).
Storage Temp.	-10°C to 40°C. -20°C to 50°C.



### DB-125 buoy

Diameter mm	1250	Solar Panels	Typ 2 x 10W
Hull depth mm	450	Nav light	Self contained solar. Typ Gp5 ev 20 amber, range 2nm in UK.
Typical water line above base mm	250	Radar reflector	Internal Echomax MIDI giving peak RCS24m <sup>2</sup>
Overall height with X and lantern mm	2256	Fairlead deployment tube	128mm ID 160 mm OD x 560mm long
Overall height with X and lantern mm with pre-ballast keel	2326		
Overall Wt Kgs	100		
Overall Wt with pre-ballast keel Kgs	180		
Typical Chain size mm	16/19		
Max weight of Mooring Kgs	145		
Minimum weight of mooring Kgs	75		
Sinker Weight typical in water Kgs	450		

### General

Sample rate	10, 15, 20,30, 60 minutes
Email alerts	Multiple
SMS alerts	One standard multiple possible
Data dump	Day to date, Week, Month, Total
GPS position alarm	User selectable
Turbidity alarms	Minimum, maximum, average, variance
Temperature alarms	Probe and buoy, maximum and minimum
Power supply alarm	Maximum, minimum

Data Buoy Sensor Interface - LAWSL										
These lists show the latest 5 data entries from all the buoys currently deployed. All times are in GMT. Click the 'Google maps' link next to the buoy name to view the last known location of the buoy. Click <a href="#">here</a> to return to the main menu.										
Buoy name: Buoy 1 (B944121391634598263) (Google maps)										
Time (GMT)	Date	Latitude	Longitude	Probe Temp. (°C)	Turbidity Min (NTU)	Turbidity Max (NTU)	Turbidity Average (NTU)	Turbidity Variance (NTU)	Battery Voltage (V)	Case Temp. (°C)
19:40:00	27/10/09	51°19.8267N	000°45.7040W	17.8	392.7	396.8	394.7	0.83	12.79	16.5
19:30:00	27/10/09	51°19.8267N	000°45.7040W	17.9	393.2	396.7	394.9	0.74	12.84	16.5
19:20:00	27/10/09	51°19.8267N	000°45.7040W	18.0	393.3	396.9	395.1	0.80	12.81	16.0
19:10:00	27/10/09	51°19.8267N	000°45.7040W	18.0	393.4	397.0	395.2	1.06	12.88	16.0
19:00:00	27/10/09	51°19.8267N	000°45.7040W	18.1	393.1	396.6	394.9	0.75	12.79	15.5
Buoy name: Buoy 2 (B944121391634598228) (Google maps)										
Time (GMT)	Date	Latitude	Longitude	Probe Temp. (°C)	Turbidity Min (NTU)	Turbidity Max (NTU)	Turbidity Average (NTU)	Turbidity Variance (NTU)	Battery Voltage (V)	Case Temp. (°C)
19:40:00	27/10/09	51°19.8232N	000°45.6993W	17.7	82.96	83.38	83.19	0.0112	12.71	17.9
19:30:00	27/10/09	51°19.8232N	000°45.6993W	17.7	81.71	82.12	81.87	0.0085	12.71	17.9
19:20:00	27/10/09	51°19.8232N	000°45.6993W	17.8	81.81	82.04	81.92	0.0022	12.71	17.9
19:10:00	27/10/09	51°19.8232N	000°45.6993W	17.8	82.35	83.41	82.79	0.0817	12.71	18.4
19:00:00	27/10/09	51°19.8232N	000°45.6993W	17.8	81.68	81.96	81.84	0.0045	12.69	18.4

TURBIBUOY iss B Jan 2010