



Intellitect Water Ltd

Presentation by

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Intellitect Water Ltd

Water intelligence
at your finger tips



Intellitect data transfer

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History

- Company founded in May 2005 by existing Directors
- Design commenced Sept 2005 (*first patents filed end of 05*)
- Significant investment by Pemberstone Group and Credit Suisse end 2006
- Commenced trialling of Intellisonde June 07
- Non - Executive Board strengthened in 2007
- Company based at 3 sites (Bournemouth, Bromsgrove and Worcester)
- Plans underway to move Bournemouth operation to new site in local area

Product Portfolio

Intellisonde



In-line Monitoring

Intellisonde SA



Consumer Premises
Monitoring

Intellical



Treatment Works,
Process Plant

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Water Quality Monitoring of Distribution Networks

- Virtually no continuous quality monitoring in drinking water network
- Stringent water quality standards for a number of parameters
- Regulatory sampling rates are low in comparison to volumes of water supplied
- Compliance with standards does not prevent water quality incidents from occurring
- A limited number of parameters are continuously monitored (*expensive, high levels of maintenance, needs chemical dosing and produces a waste stream*)

Intellisonde Overview

- Monitors flow, pressure and water quality in one integral device
- Facility for remote data retrieval using latest third party communication packages
- Sensors use an advanced microelectrode design (*robust with no waste stream*)
- Stirrer increases the sensor lifetime (*reducing maintenance visits*).
- Ongoing operational costs are significantly less than chemical alternatives.
- Light weight in construction making it easy to install.
- IP68 Water Proof Enclosure



12 Water Parameters Monitored

Physical:

- Flow
- Pressure
- Temperature

Optical:

- Turbidity
- Colour

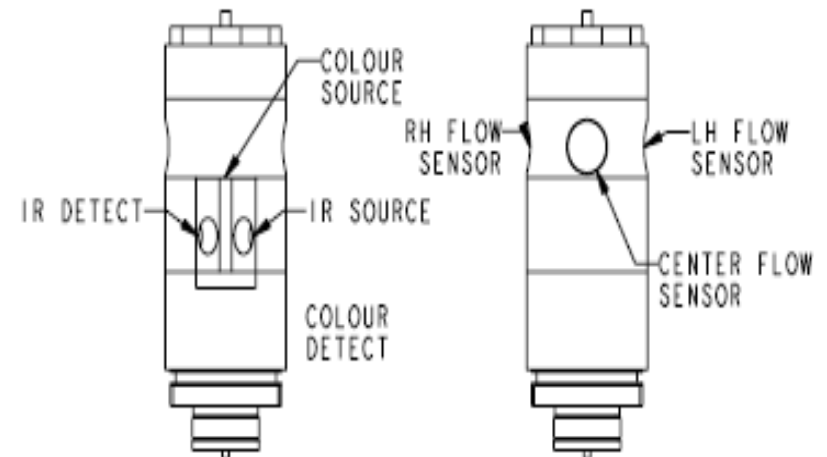
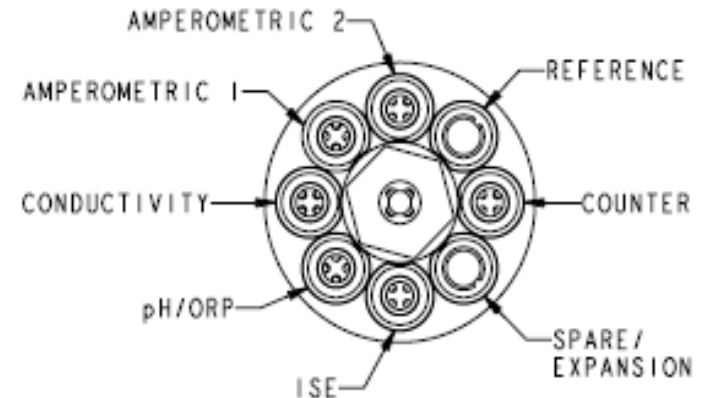
Chemical:

- Chlorine
- Chloramines
- Dissolved Oxygen
- Conductivity
- pH
- ORP (REDOX)
- ISE (e.g. Fluoride)
- Spare port

By combining several sensor readings other water quality indicators can be effectively monitored

Sensor Head

- Electro-chemical sensors are field replaceable
- Non-symmetrical replacement sensors for ease of assembly
- Mass flow sensors detecting forward and reverse flow
- Spare port for expansion
- Sensor head withstands 20 bars of hydrostatic pressure
- Approved plastics for sonde head



Sensor Longevity

Steps taken to minimise fouling

- Chlorine/Conductivity
 - Integral stirrer to maintain minimal flow
 - Location of sensors in head
 - Use of robust manufacturing materials
- pH/REDOX
 - Glass electrode and integral stirrer
 - Occasional cleaning when reference electrode is changed
- Turbidity/Colour
 - Location of sensor (upstream)
- Flow/Temperature (thermal mass - stainless steel components)



Communication Interfaces Supported

- Bluetooth (Sept 08)
 - Modbus RTU*
 - Modbus TCP/IP*
 - Voltage Out (June 08)
 - Ethernet*
 - GPRS (July 08)
 - GPS (asset tracking)*
 - Local Area Radio Network
- * *Implemented*

Flexibility to meet majority of present communication needs

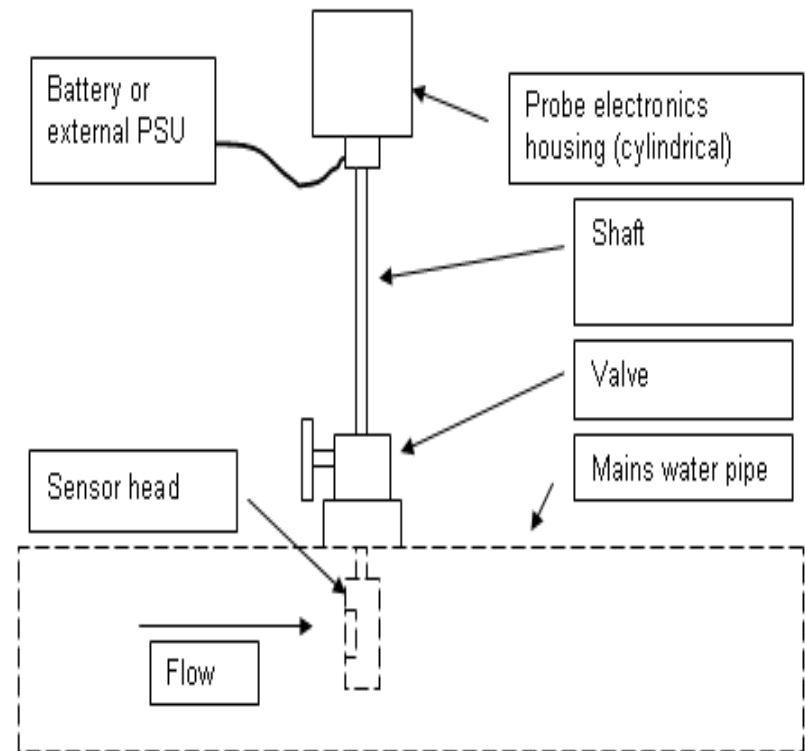
Data Logging

- Twelve parameters logged every 5 minutes for 3 months
- Values measured and logged at intervals from 5/minute to 1/hour
- Maximum, minimum and average values maintained for each parameter
- Option to log average values over 24 hours
- Alarm settings for each parameter and transmitted in real time (via GPRS or Radio Network)

Flexibility for most operating scenarios, no specialist software required

Simple Field Installation

- Fits directly into a 2" or larger mains pressurized pipe via 1.5"/2" gate valve.
- Weight 3.5Kg
- Extension/shaft adaptor screwed to valve.
- Sensor head located in the water flow
- Chain secured to provide pressure safety back up.
- External power supply or battery (9-24VDC or AC)
- Calibrated to simple instructions



Low Cost of Ownership

- No specialist software necessary
- Flexible communications platform making it easy to upgrade
- Easy to install and calibrate
- Reference electrode - 6 months
- Chlorine sensors – 6 months
- Battery pack (16 D Cells) – 6 months (*dependent on flow conditions*)

Benefits of Real Time Monitoring (1)

- Improved cost effectiveness in disinfection and other treatment regimes
 - Operational Control at Treatment Works and Distribution Reservoirs
 - Validating and checking against existing data
- Timely data for control of operational activities and risk assessments
 - Refining process operation
 - Where and when to flush
 - Blending waters and segregation of use
 - Identifying low levels of instability (turbidity)
- More effective asset renewal planning.
 - Quantifiable data to back up capital investment programme
 - Identify highest risk areas

Benefits of Real Time Monitoring (2)

- Reduction in costs of operational sampling and investigative analysis
 - Fits in most places in network
 - Used at unmanned sites
- Raising levels of customer service.
- Improved incident management and usability of data (*not just for sampling but collection of data for a reliable incident report*).

Typical Field Locations (1)



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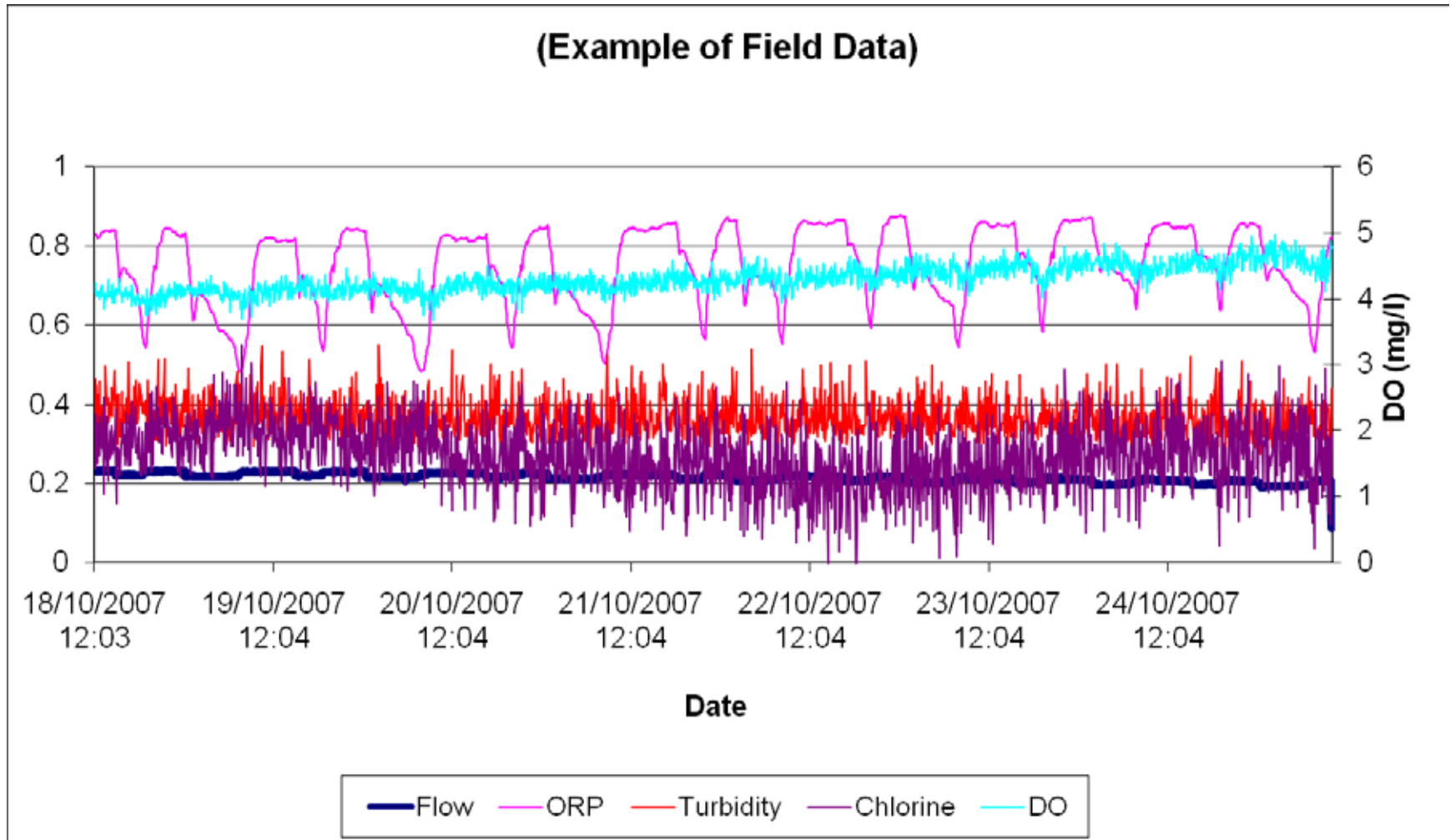
Typical Field Locations (2)



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Water Quality Data



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Specification

Parameter	Performance	Parameter	Performance
Flow (forward/reverse)	0 --2m/s, $\pm 5\%$ reading	Pressure (standard)	0 - 450 psig, $\pm 2\%$
Temperature	-5 to +50°C, $\pm 0.1^\circ\text{C}$	Turbidity	0 - 100 NTU, $\pm 0.1\text{NTU}$
Colour	0 - 50 Hazen, ± 0.2	Conductivity	0-100mS/cm, $\pm 0.001\text{mS/cm}$
pH (Glass)	0-14pH, ± 0.1	ORP (REDOX)	-1.4V to +1.4V, $\pm 0.001\text{V}$
Dissolved Oxygen	0 – 20mg/l, $\pm 0.2\text{mg/l}$	Chlorine	0-5mg/l, $\pm 5\%$
ISE	0 - 1V, $\pm -0.001\text{V}$	Pressure Transducer	Input
Mono-chloramines	0 – 5mg/l, $\pm 5\%$	External Flow Meter	Input

R&D

- In-house R&D (*design authority, requirements specification, engineering control*)
- Mixture of permanent engineers, on-site design sub contractors and a network of design consultants (*hardware, software and mechanical drawing*)
- In-house Project Management
- Flexible approach provides access to resources with experience in emerging technologies
- Building block design improves time-to-market (*i.e. Environmental Monitor*)
- Environmental Monitor being developed; New sensor development planned

Environmental Monitor

- Monitoring of fresh water into treatment works and treated waste outflows from factories etc into rivers (unmanned sites)
- Monitors ammonium, dissolved oxygen, pH, conductivity, colour and turbidity cost in one device
- Used in remote applications
- Low maintenance costs
- Trialling Commences End of April 08
- Production unit available Oct 08

Manufacture

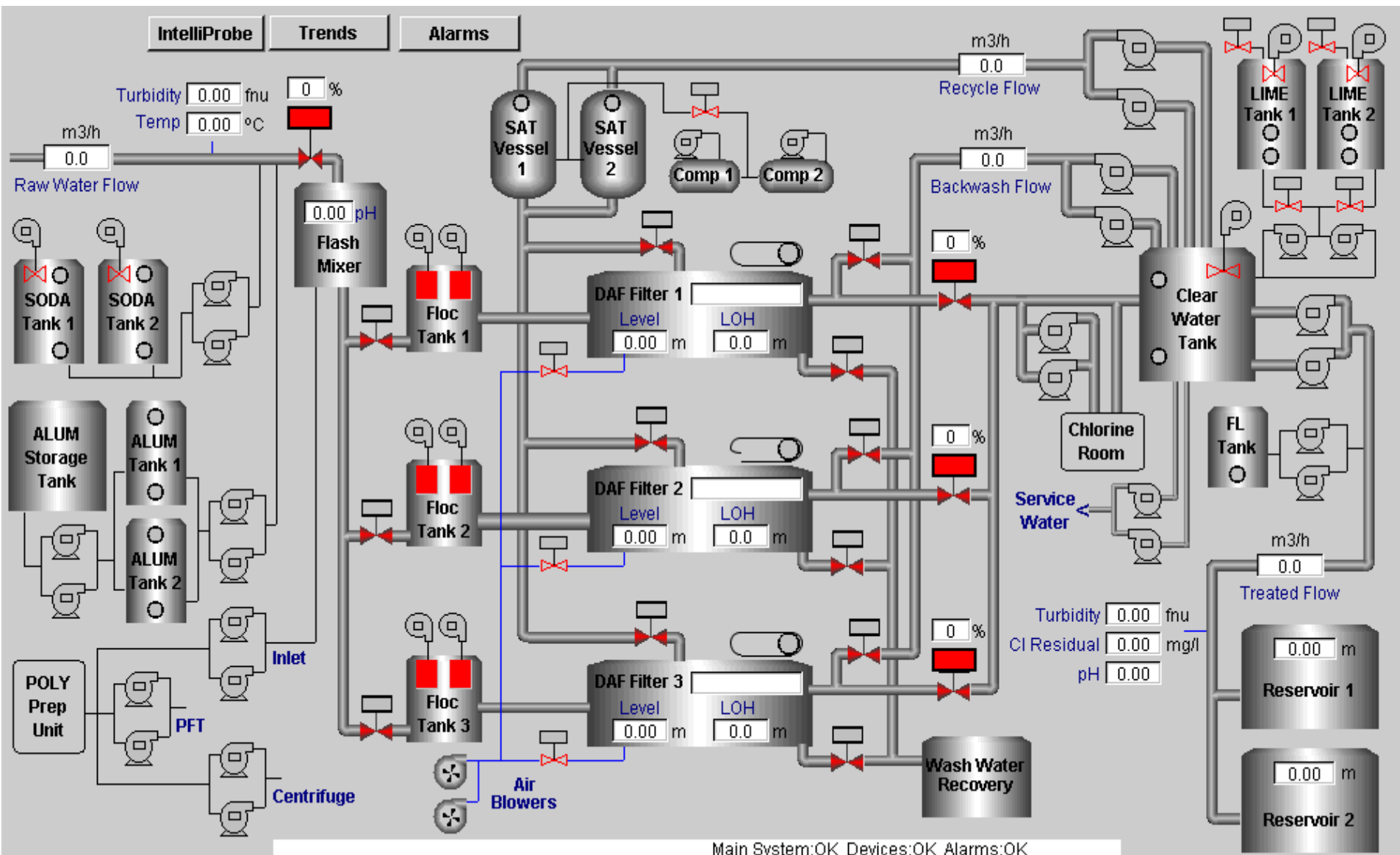
- All components and sub assembly outsourced to a network of suppliers
- Assembly and final test performed in-house focussing on core competencies
- Flexibility to increase manufacturing capacity
- Good supply of experienced personnel in the area

Test Rig Example



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Main System:OK Devices:OK Alarms:OK

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The End

