

Taking It To The People

Challenges faced in using wireless sensor network technologies to build solutions for a non-technical audience

Background

- Monitoring and automation solutions in large scale environments
- Reducing costs and improving operating efficiency



Observant

- Formed to develop solutions to existing problems
- Started in pastoral and grazing industries
- Expanding in to other industries with similar issues
- Key Focus
 - Simplicity of operation and installation
 - Reliability
 - Robustness

Challenges

- Adoption & Acceptance Criteria
- Technical Constraints
- Technology Issues
- Commercial Considerations
- Organisational Concerns

Simplicity

- Simplicity of operation
 - Focus on key tasks
 - Enable exception based orientation
 - necessary for large scale networks
- Dealing with Complexity
 - balance between control and simplicity
 - allow for different modes of operation
 - reduce it rather than hide it

Environmental Toughness

- Harsh physical environment
 - heat
 - water
 - pests
- Realities of target market
 - Products must be very robust



Installation

- Ease of Installation
 - physical design needs to be installation friendly
 - use materials that are available
- Reduce complexity
 - standardised cables and connectors
 - no bare end wires
 - focus on cost of ownership
- Diagnosing and correcting on-site errors

Radio Coverage

- Minimise impact of radio coverage issues
 - UHF is familiar
 - anecdotal experience is unreliable
 - modelling and testing always needed
- Rely on pervasive Mapping/GIS
 - coverage of many areas very high resolution
 - aids in planning phase
- Will kill the best product

Physical Scale

- Had to pick technologies that could cover 000's of sq. km
- Add significantly to cost of failure
- Long term cost of operation
 - most impacted by original installation
 - only requires operations that can be expected of existing staff

Remoteness

- Many clients in very remote settings
- Physical access is cost impractical
- Major emphasis on diagnostics
- Huge amount of information available locally and centrally
- Designed from start to consider these aspects

Operating Constraints

- Ultra low power
 - 60mA standing requirement (4mA sleep)
 - 12W Solar Panel
 - Size and price considerations
 - Batteries are impractical
 - Balance between performance and power is critical
 - use of battery and liveness primary consideration
 - 300W vs 0.6W

User Driven Concerns

- Non-technical users
 - PC adoption solely driven by utility
- Lack of trust in technology
- Intolerance of 'newness'
 - Expect it to just work
- Early adopters are there too
- Cost

Technology Issues

- Jargon is unfriendly
 - Route, ping, etc
- Still need techniques
- Must package in a practical way
- Automate as much as possible
 - Self discovery, self-healing
- Don't over bake it
 - Complexity is death

Automation & Control

- Automation in semi-reliable conditions
 - Fail fast, fail safe
 - Favour operational safety and cost reduction
- Large cost of mistakes
 - remediation will be expensive
 - can have significant economic impact
- OH&S concerns
 - safety criticality
 - requires up front design consideration

Does Size Matter

- Physical packaging a large consideration
 - robustness
 - security
- Not a typical 'mote' style packaging
- What is too small? Too big
 - advantages of size
 - practicality of form factor

Organisational Concerns

- Scalability of manufacturing
 - processes must be scalable
- Cost to manufacture
 - off-the-shelf components
 - produced in large commercial quantities
- Testing complexity
 - working with electronics manufacturers
 - radio path testing – very expensive

Commercial Considerations

- Enable regional support
 - Can't expect large training or expertise commitment
 - solutions must be designed to enable a tiered channel
- Ability to support different distribution models
 - equipment purchase or service based
 - varies per industry

The C1

- Single box solution
- Ground up design to meet market needs
- Ultra low power



The Software

- Use of colour, icons and notifications

Observant C1 Manager
File Edit History Help

Notifications for **serial-local**

No errors, alarms or warnings

Observant Water Management Solution

Remote Bore

Today, 14:36

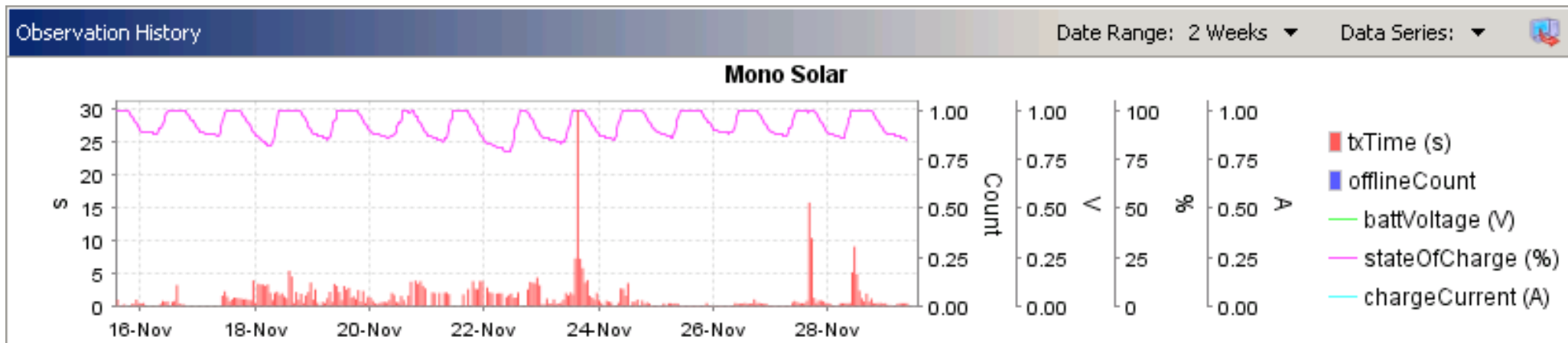
Remote Bore Camera Nutridose

State	ok
Set Point (ms)	1,000
Last Nutrient	29 May 2007 14:13
N since refill (L)	136
Last Water	29 May 2007 14:18
W since refill (L)	3,650

500-600 Tank 820 mm
80-110 Trough 130 mm

Historical Data

- All operating data is retained
- Vastly improves reliability and utility



Questions

- ???