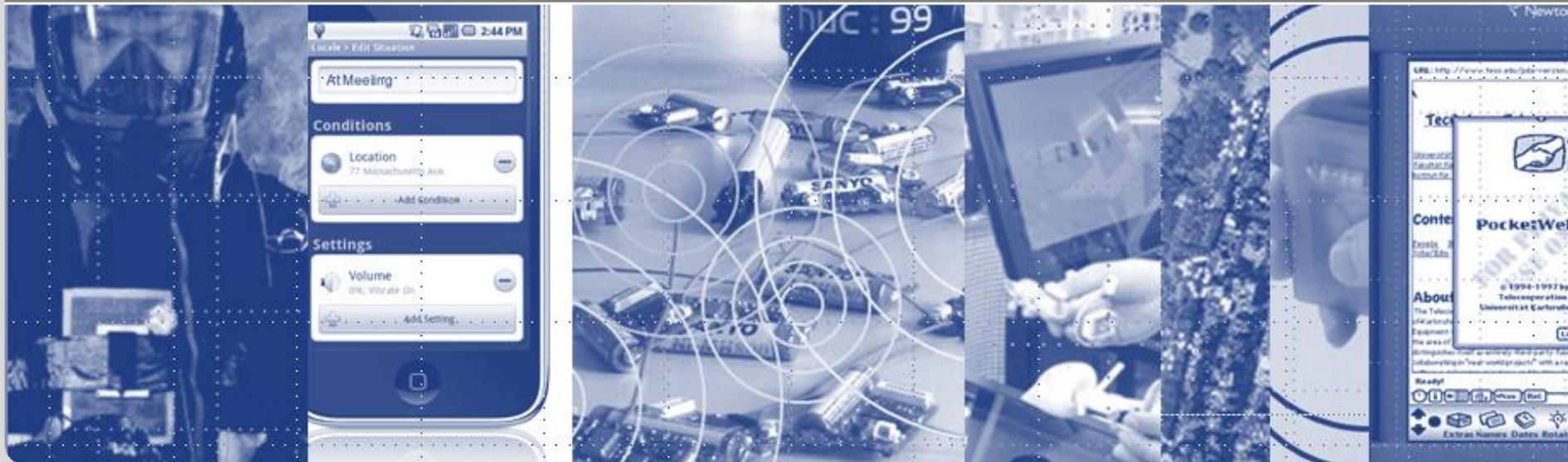


dinam: A Wireless Sensor Network Concept and Platform for Rapid Development

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Intelligent environments

■ Augmented Reality

- Human intelligence
- Additional information Overlays

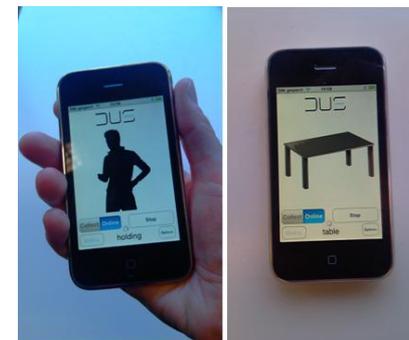


■ Programmable Reality

- User can specify environmental behavior
- User empowerment, injects intelligence into environment

■ Proactive Reality

- Ambient Intelligence
- Self-adapting environment



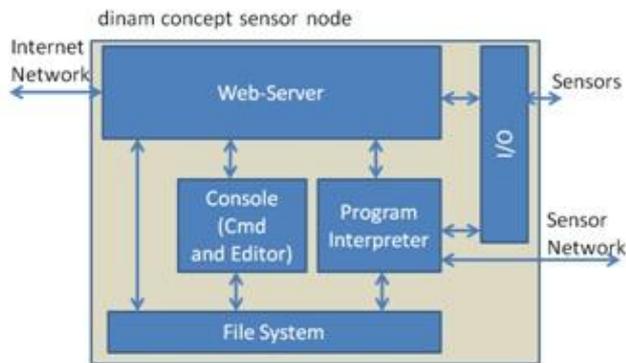
- What stands between us and a pervasive programmable reality?
 - The technology is available!!!
 - Top-down, discrete development flow
 - Design application, set up environment, write code, debug, compile, flash, evaluate, repeat.
 - Portability / Compatibility issues
 - Libraries, hardware versions, drivers, ...

**“simple things must
be simple [to develop]”**

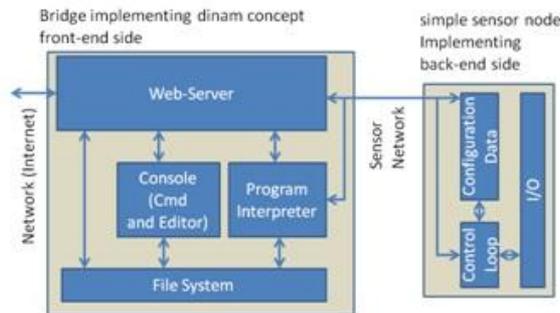
- Create a tool for programmable reality
 - Reality means **everyone!**
 - Augmented reality hard to develop, easy to use
 - How can we enable a programmable reality which is also easy to use?
- Wireless sensor networks are a good starting point: post-hoc computing
 - **BUT:** Tremendous development energy required
 - System complexity in terms fields of expertise required

CONCEPT: dinam

- Self contained wireless sensor node, application, development environment

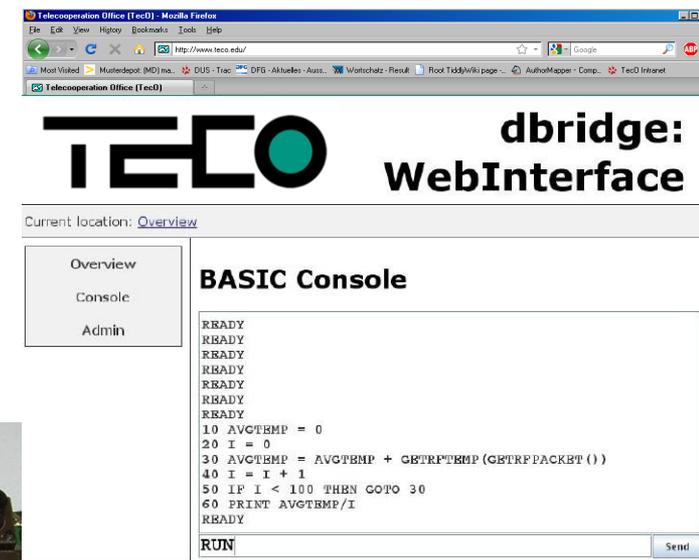
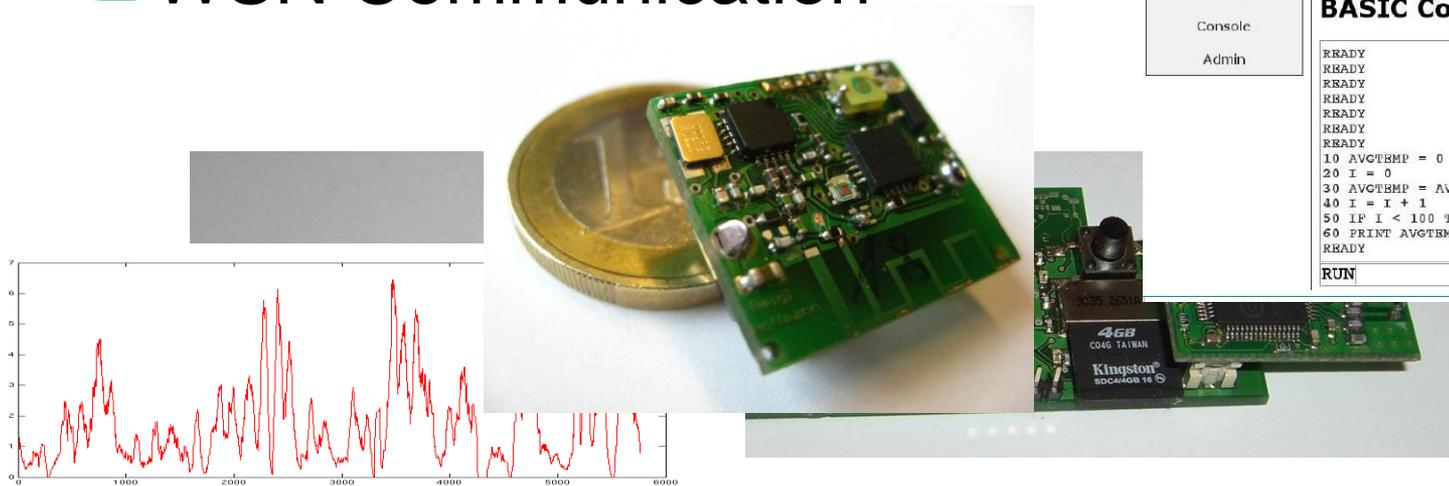


- Extended concept with wireless



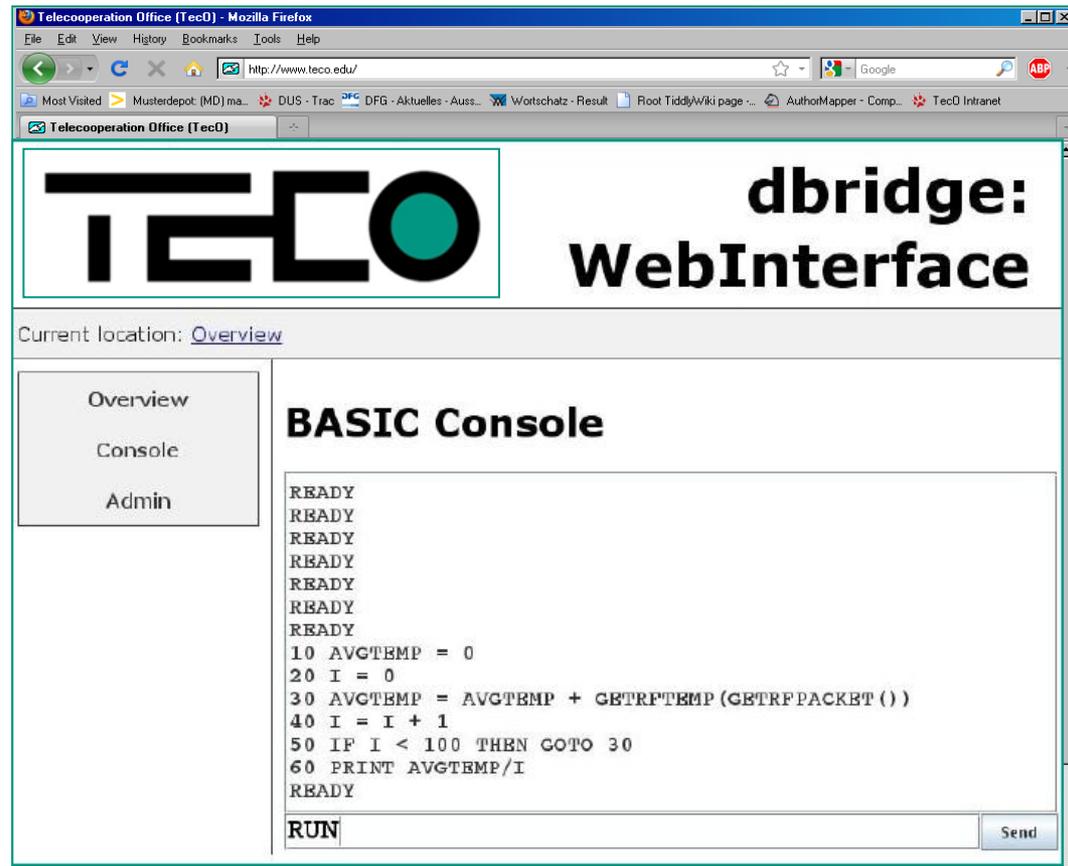
PLATFORM

- Based on the D-Bridge
- Access over web server in browser
 - Development environment
 - Data visualization
 - WSN Communication



DEVELOPMENT ENVIRONMENT

- Novel BASIC flavor for WSNs
- Interpreted at node
- Command I/O over AJAX
- Console or script-based programs
- Integrates segmented development process



- Simple evaluation of application development effort
 - Of the 5 subjects, none had any experience with BASIC
 - Each student given 5 Minute syntax and functional introduction
 - Subjects were asked to calculate and print the average of 100 received WSN temperature packets to the console
- Time required for completion measured

■ Time

- Minimum at 3:50
- Maximum 7:11
- Average time of 5:20

■ Implicit baseline: application on COTS Node?

■ Interesting initial observations

- Free text editor significantly more efficient
- Previous programming experience greatly effects learning curve, regardless of language

CONCLUSION

- The age of programmable reality has arrived
 - The tools to bring it to the masses are still missing
- The dinam concept is enabling technology for this paradigm
 - Non-expert user-friendly interface for configuring the Programmable Reality
 - Reduces normal discrete programming to a fluid process

- Evaluation of the dinam concept for extremely low cost, low effort applications
- Insights
 - WSNs must be easy to install and maintain
 - The killer app will reduce cost of its platform
 - App stores can help cover costs
- Indicate that the dinam concept will facilitate ULC-WSN development



That's All

- Thank You!
- Questions?