



# GridStix Flood Prediction

North West Grid Work Package 3

## Project Overview

This project is developing a wireless sensor network that doubles as a light-weight computational Grid, which allows us to move flood-modelling functionality out of the Lab and onto the sensor nodes themselves. This allows us to support diverse sensors, provide more timely warnings and adapt to predicted conditions.

### Supporting Diverse Sensors Using On-Site Grid:

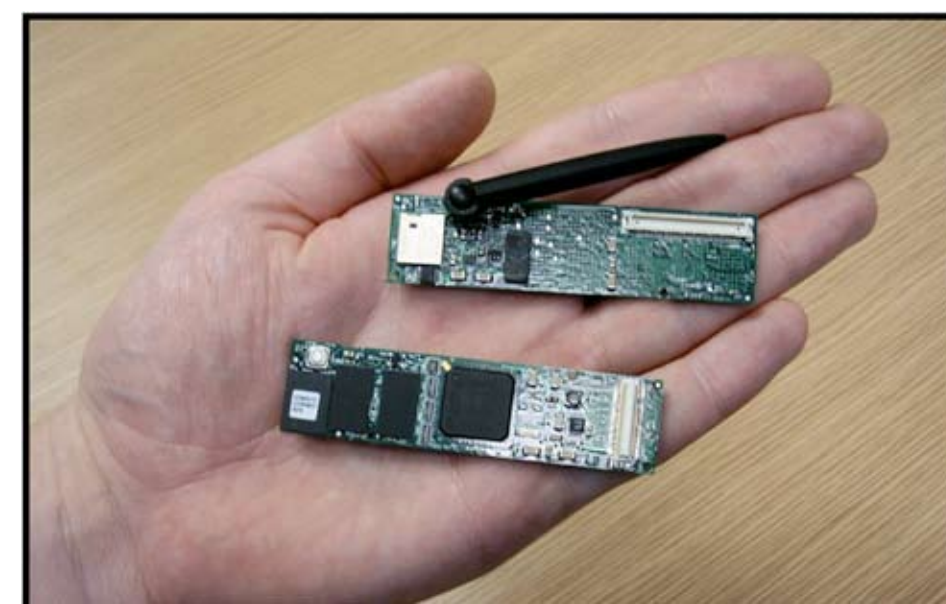
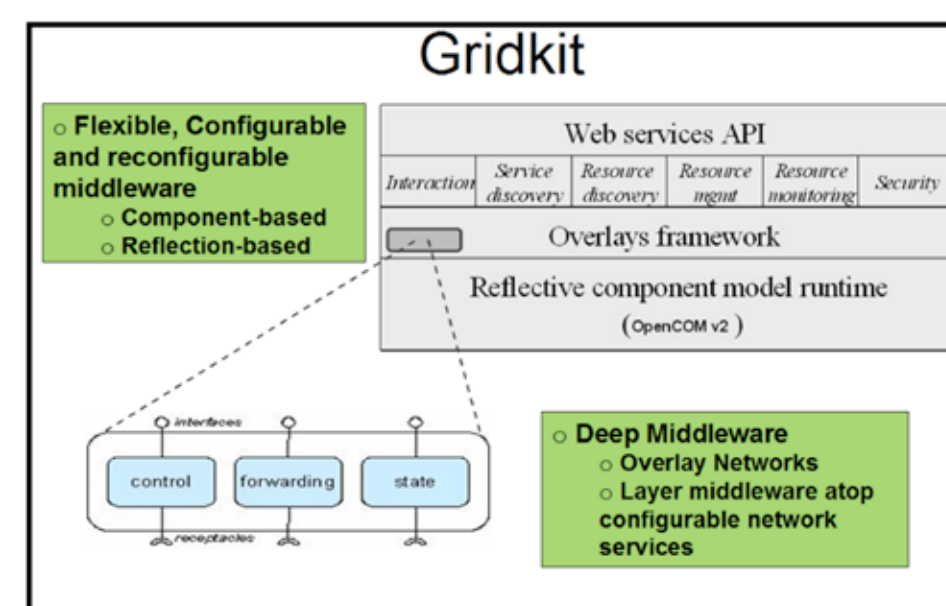
- Image-based flow measurement is cheaper, more robust and easier to deploy than ultrasound.
- Unfortunately, image data is too big to transmit offsite and requires more computation than sensor nodes provide.
- GridKit's Grid functionality supports on-site sensors that require significant computation.

### Providing More Timely Warnings:

- The link between the Grid and sensor networks often forms a bottleneck in the environmental monitoring process.
- Powerful 400MHz nodes with Bluetooth, 802.11b, Zigbee and GSM can provide real-time warnings to users.

### Adapting to Predicted Conditions:

- Locally computed predictions can be used to adapt system behaviour.
- Switching between low-power/high performance network technologies, overlays and CPU usage profiles.



GridKit + GumStix = GridStix

## Funding

Funding is provided by the North West Development Agency as part of the NW-GRID project, work package three, which focuses on the development of Grid Middleware.

Specifically, we focus on applying Lancaster's next-generation Grid Middleware (GridKit) to problems from eScience – in this case flood modelling and warning.

## Partners

Lancaster University's Environmental Science Department are our partners in this project, they plan to use our GridStix flood-monitoring deployment to:

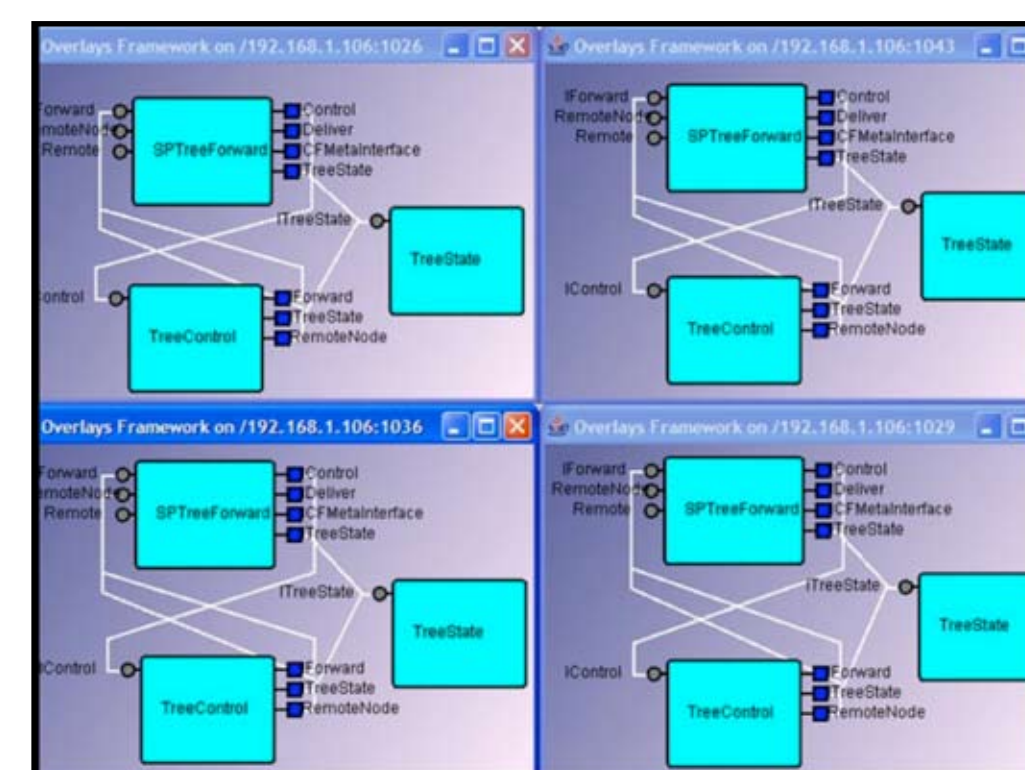
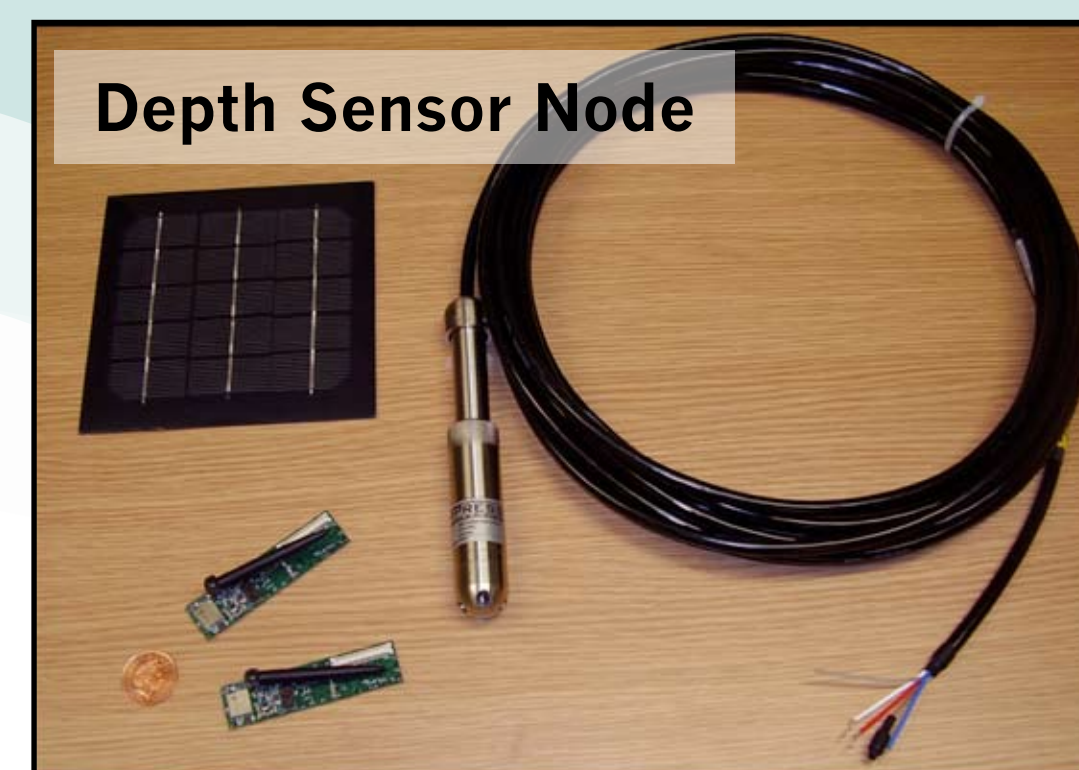
- Test and improve existing flood prediction models
- Test the feasibility of on-site flood prediction and warning
- Support new research into camera-based sensor systems.

Additional NW-GRID project partners include the Universities of Liverpool and Manchester as well as Daresbury Laboratory.

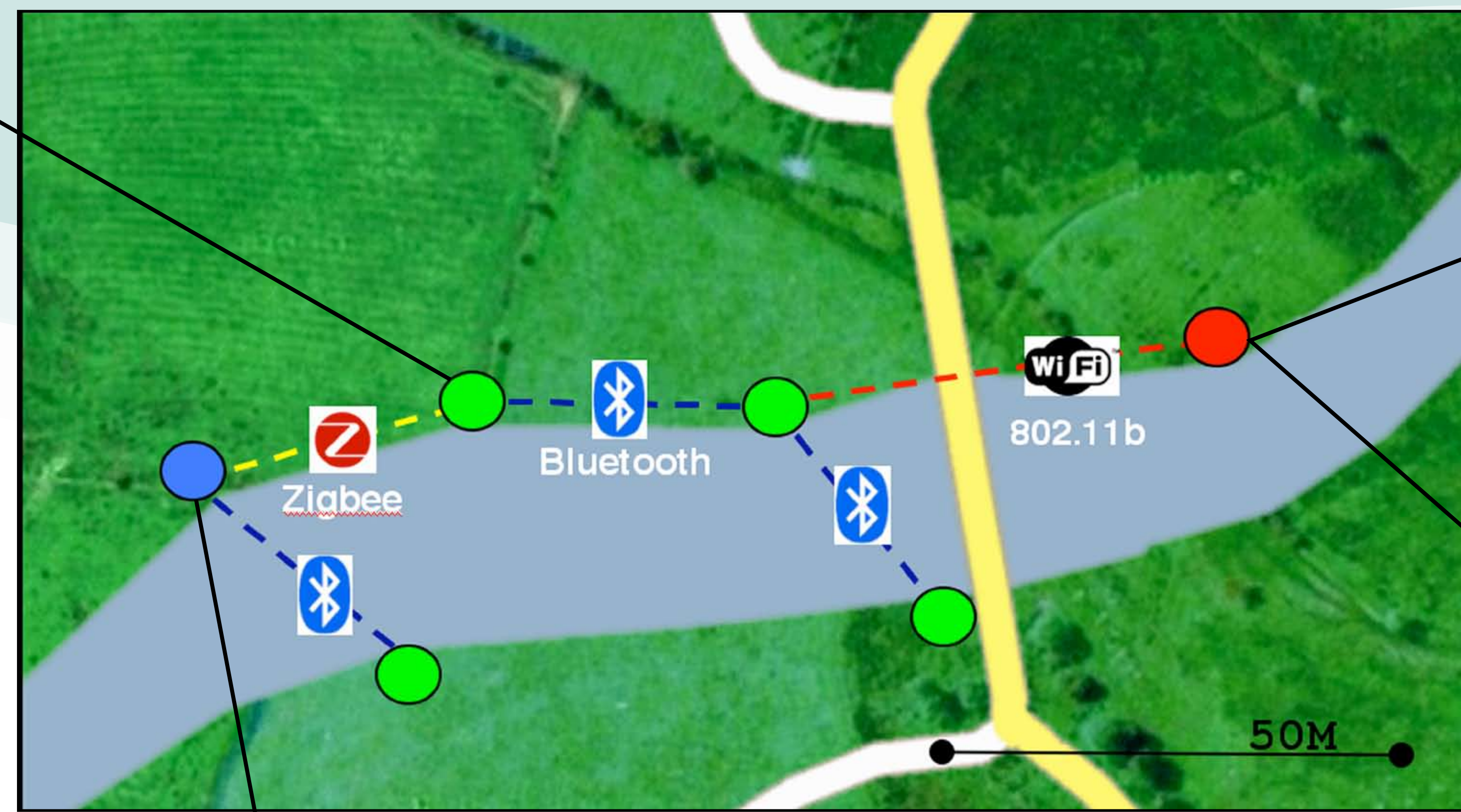
## Impact

- Tackles a major problem for the UK, where the October 2000 floods alone cost damage estimated to be over £1bn.
- Featured in the popular press, including The New Scientist, Wired Magazine and Slashdot.
- Demonstrations and publication at high quality conferences, including best paper at All Hands 2006.
- Provides a platform for the forthcoming FREE project, which collaborates with the environment agency.

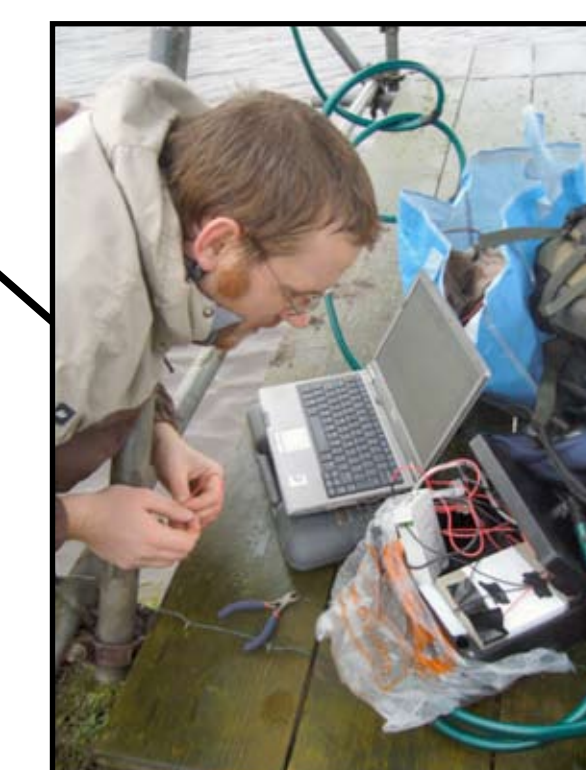
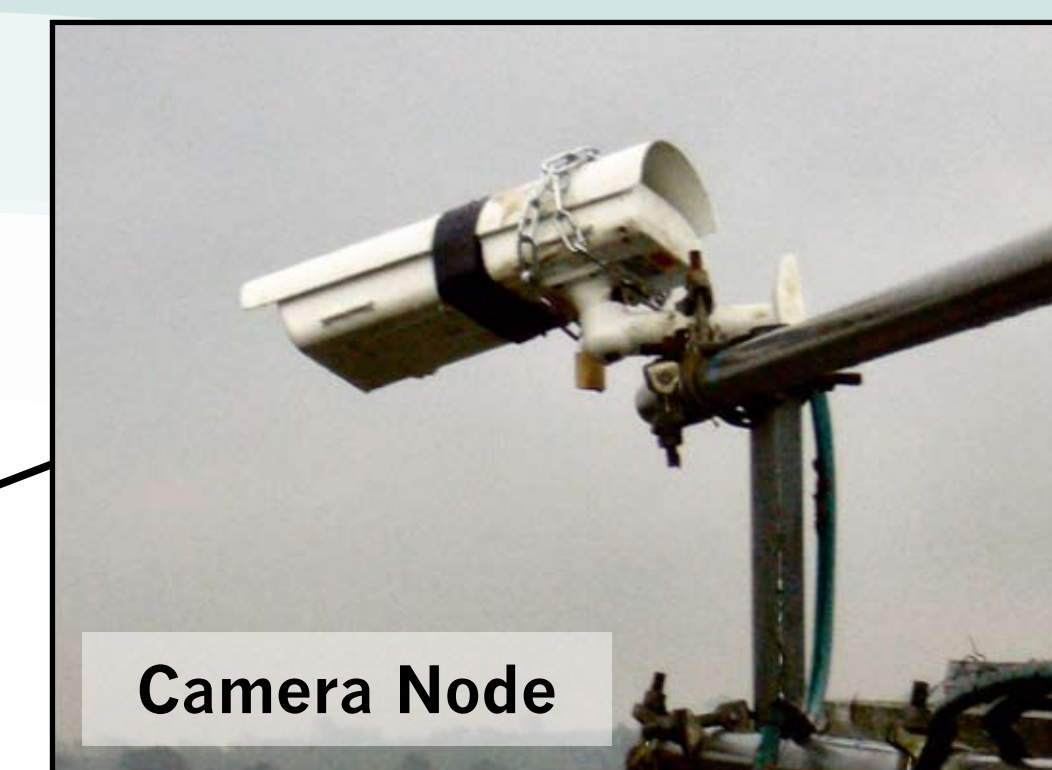
## Cow Bridge Site as of Dec '06



GridStix middleware runs on each node, providing Grid and WSN support



GSM Node



InfoLab21