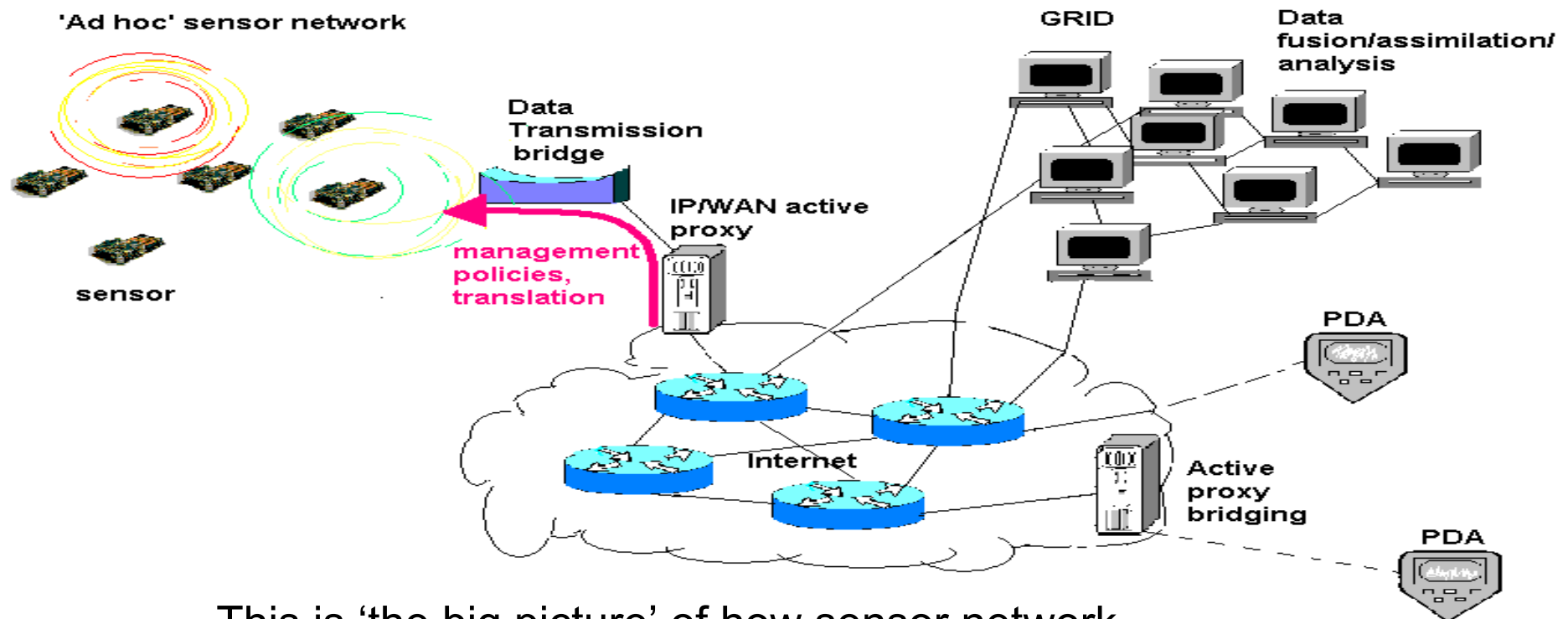


Self-organising sensor networks

Ian W Marshall

University College London

A Distributed System



This is 'the big picture' of how sensor network technology would be integrated into other areas of information technology, to provide users with timely, relevant *information*.

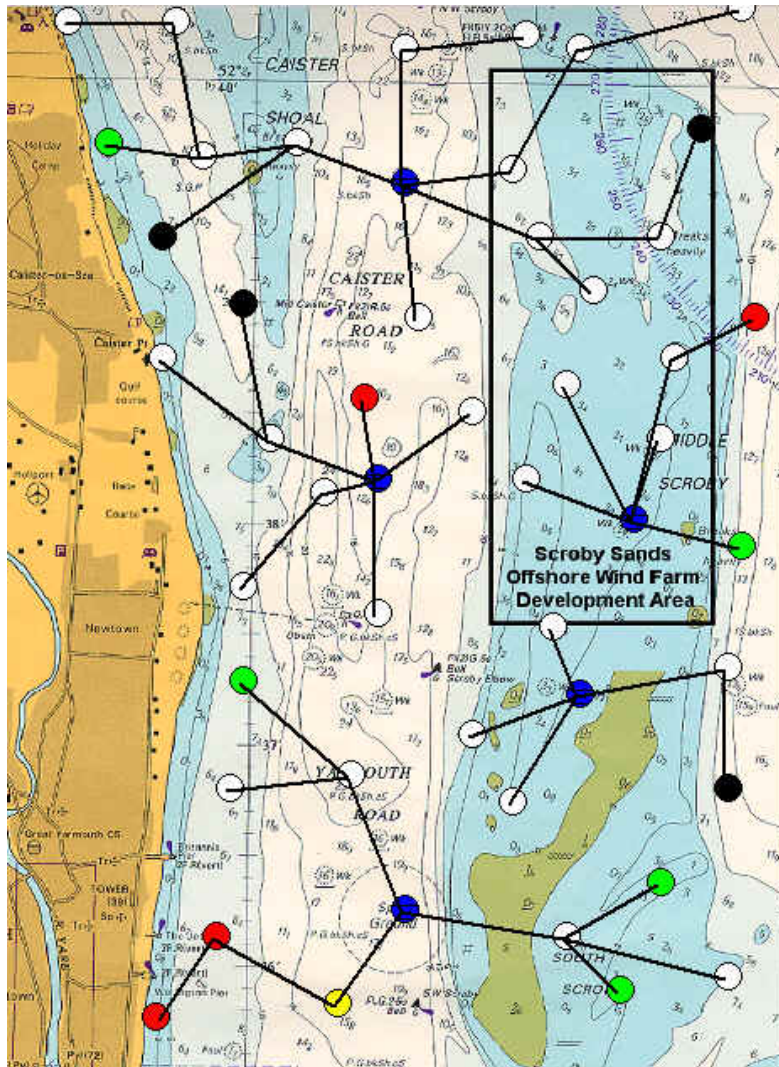
Problems and objectives

- Users cannot configure/maintain large scale systems
- Often programmers can't debug them
- Extensive automation needed
- Central control does not scale
- Use decentralised (nature inspired) approach
- Trial in small scale sensor networks
- Envisense links industry and key UK universities in national research centre

SECOAS Project

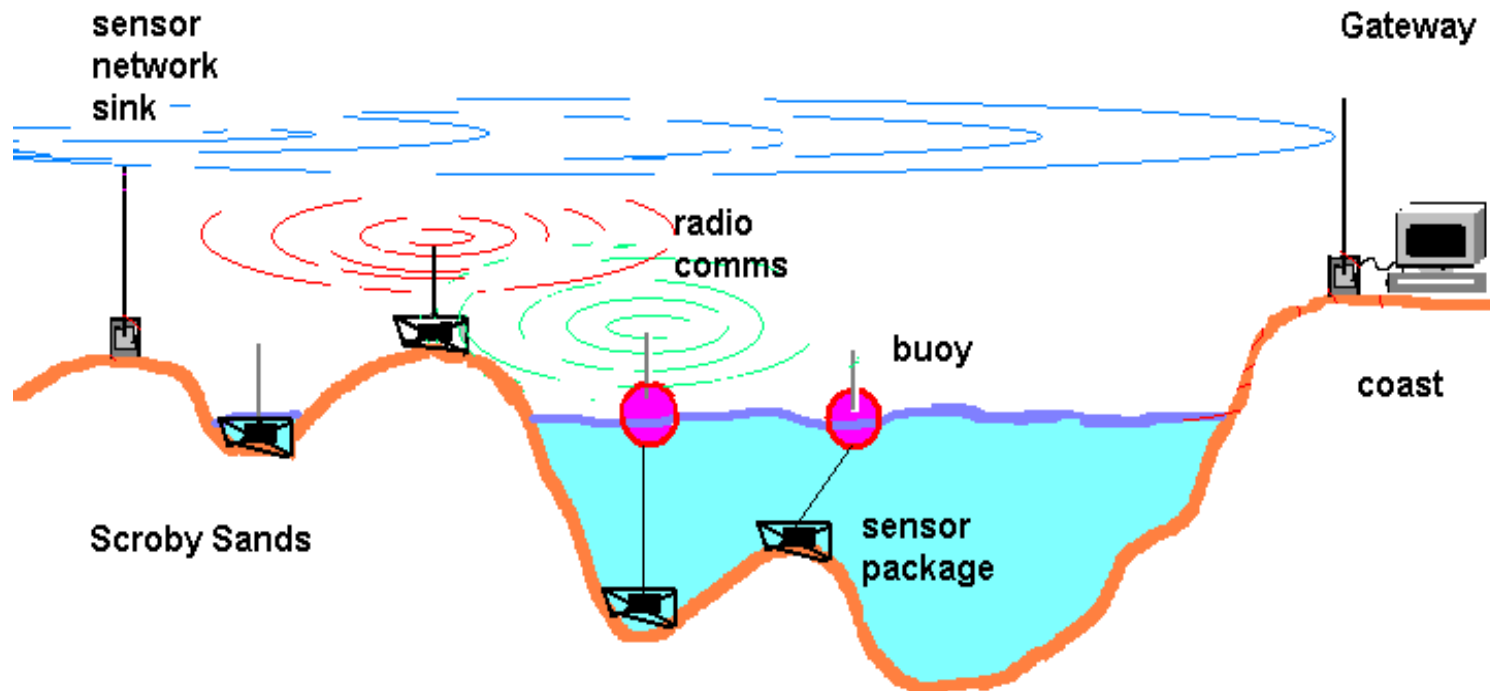
- DTI/Link funded 2 year project involving BT, Plextek & Intelisys in collaboration with UCL, UEA, Essex and Southampton Universities, with aims including:
 - Discover and demonstrate decentralised algorithms for data handling and transport
 - Design lightweight, low power, ad-hoc wireless communication protocols
 - To develop and test an appropriate control interface for scientific user communities
 - To demonstrate and prove the new technologies in a realistic application context

Test Site



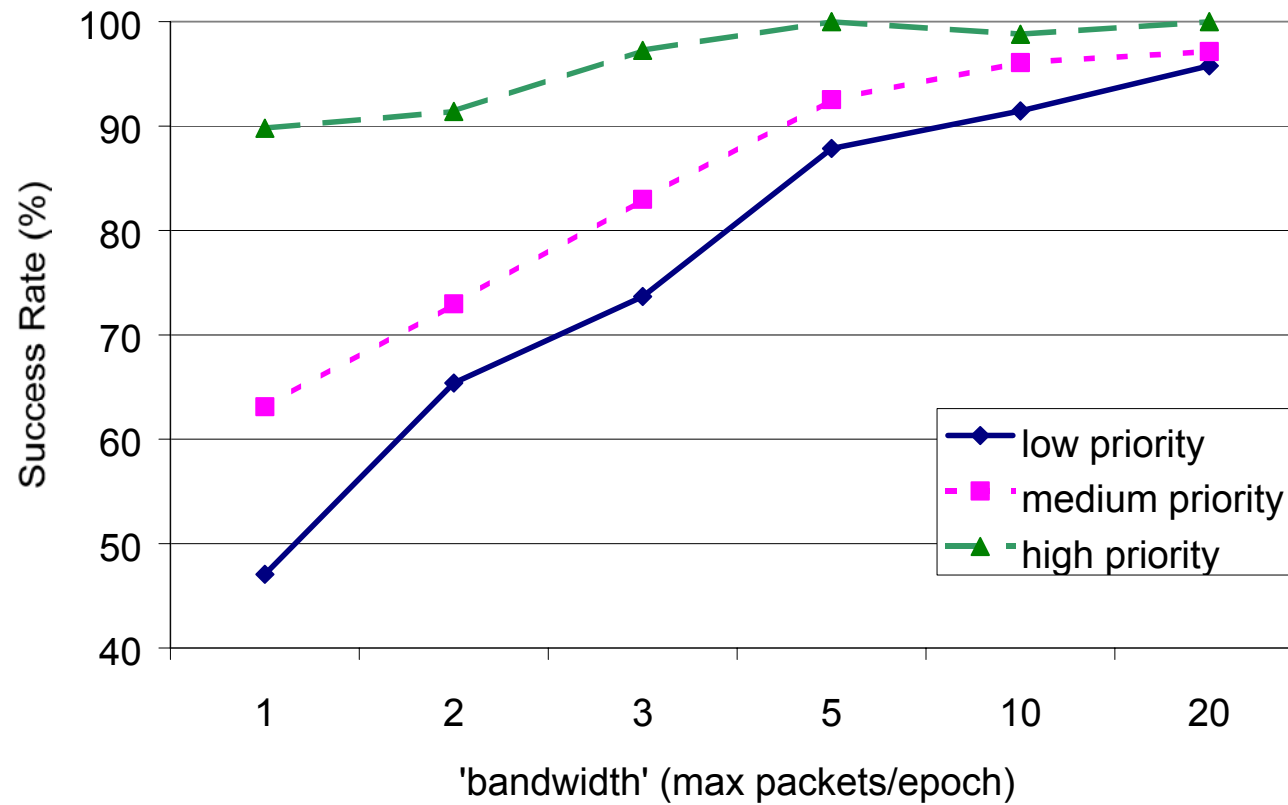
Scroby sands wind farm and its impact on the surrounding environment

SCROBY SANDS SENSOR NETWORK SCHEMATIC



This is a schematic to represent the way that the prototype wireless sensor network will be deployed at Scroby Sands, with some sensor packages on the sandbank, some partially covered, and others under water, linked to buoys carrying radio antennae.

QoS on a Sensor Network



Research Issues

- How can users empathise with autonomous decisions and develop trust
- How can modification be facilitated
- How can reuse be enabled (no guarantee of shared understandings)
- What is appropriate level of domain expertise to embed
- How can public engagement be encouraged

Next steps

- Extend intelligence (continuous unsupervised learning) using ANNs
- Cognitive impedance matching for Human interface
- System on chip implementation
- Data fusion
- Large scale model support