

Research Overview

D.K. Arvind

Director

Research Consortium in Speckled Computing
School of Informatics, University of Edinburgh
(dka@inf.ed.ac.uk)



Acknowledgement of support from:

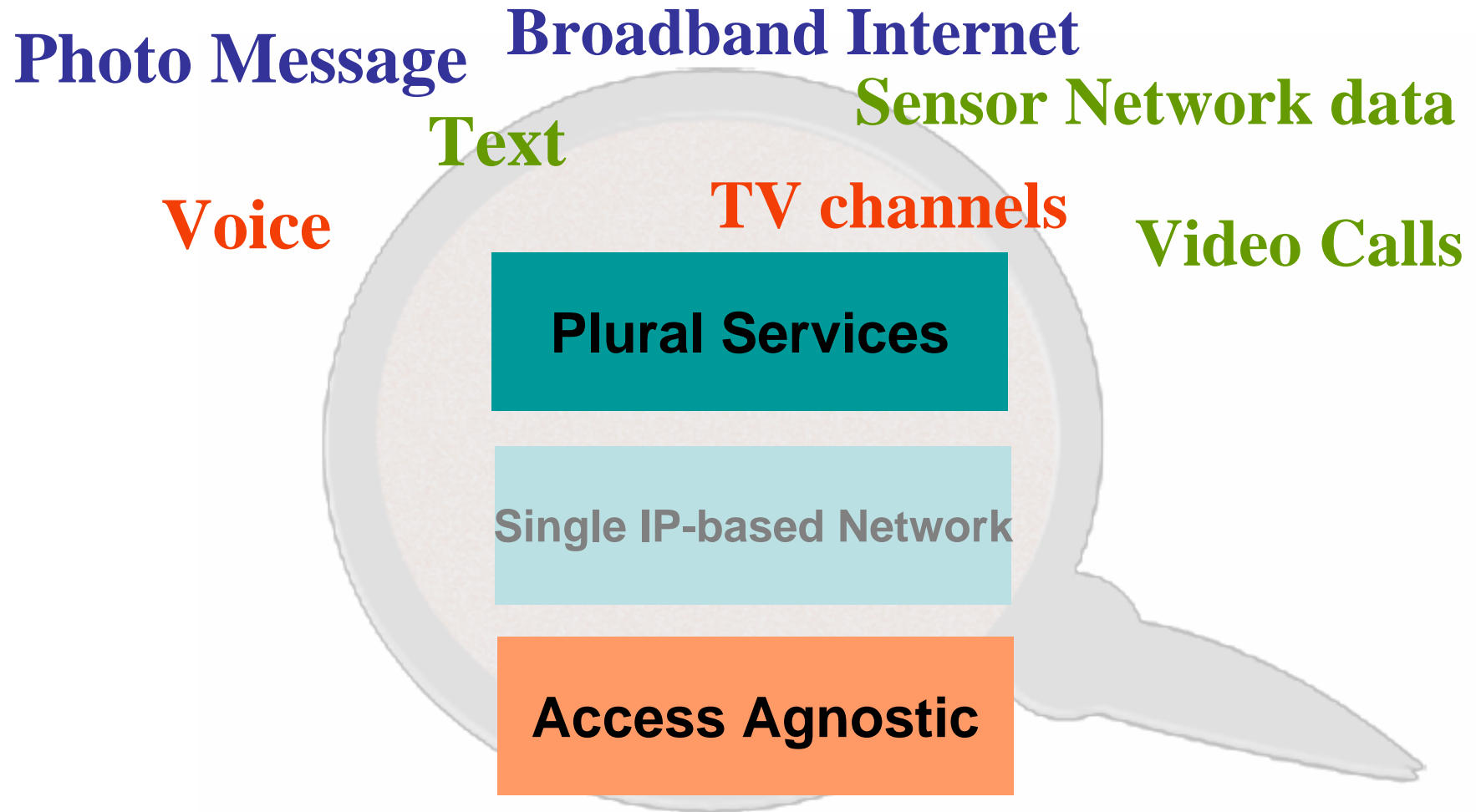
- Research Council
 - Strategic Research Development grant, Scottish Funding Council (R32329)
 - Basic Technology grant, Engineering and Physical Sciences Research Council (C523881)
- Industry
 - Agilent
 - Qualcomm
 - SUN Microsystems

Vision

- Endow persons/objects with sensing, processing and wireless networking capabilities
- Link sensory data from the physical world to the digital world of computers

Aim to bridge the physical and virtual worlds

Telecom Service



**£5.4M
Research Funds**

2004-10

22 Researchers

**Applications
Centre**

**Networking
Protocols**

Photonics

**Photovoltaic
Cells**

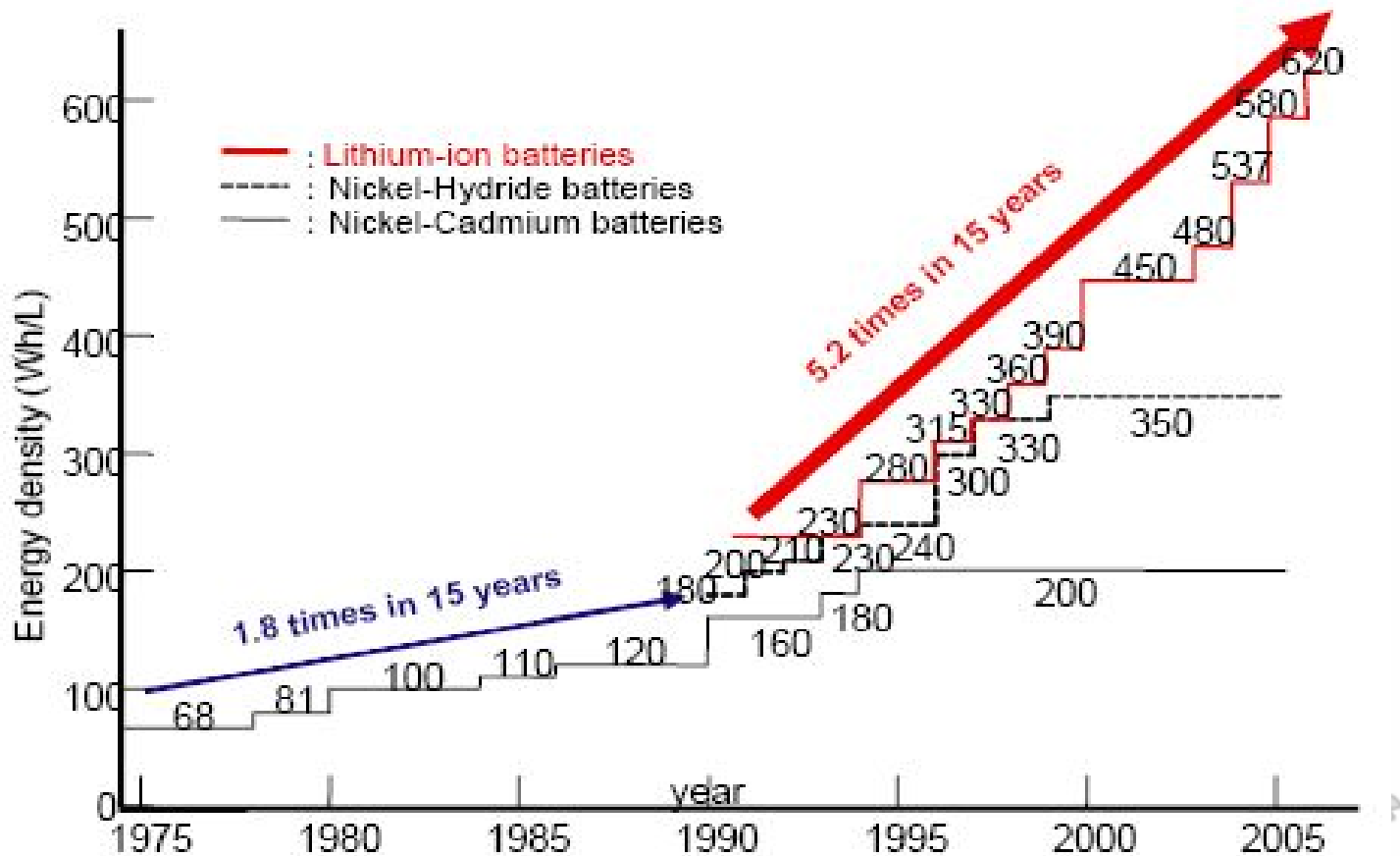
Radio

**Distributed
Computing**

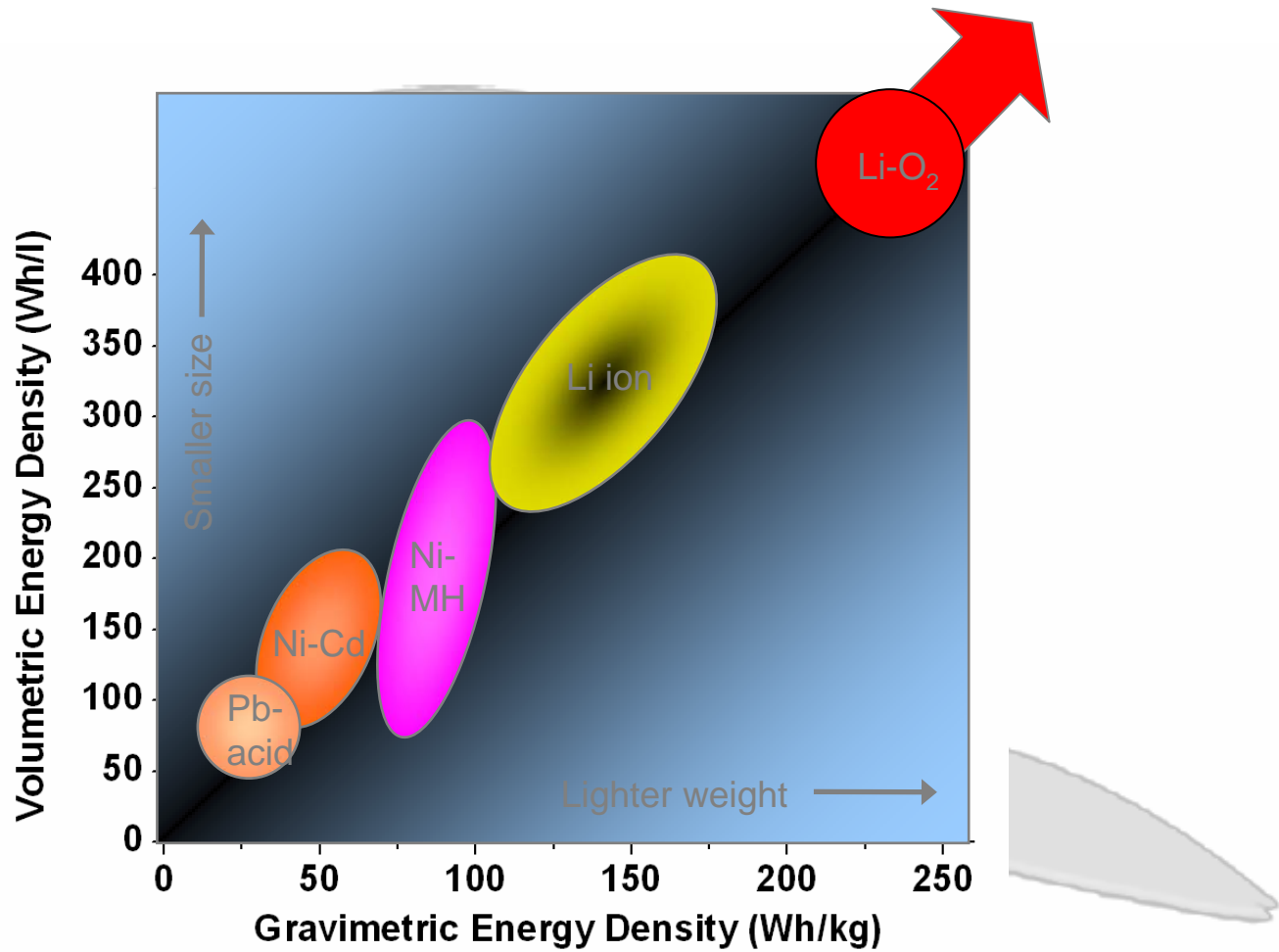
Batteries

**Programmable
Networks**

Trends in energy density of batteries



Source: Materials supplied by the Matsushita Battery Industrial Co., Ltd.



– “Energy-Neutral” Computation – Session 2

Storage: high energy density

Lithium-Oxygen Battery

Energy Harvesting:

III-V

Photovoltaics

Microbial Fuel Cells

Energy Production

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Low-power communication:
radio, free-space optics, PHY layer

Ultra low power Networking protocols:

SpeckMAC

Energy-conscious Architecture

Consumption



Design Environment for Specknets – Session 3

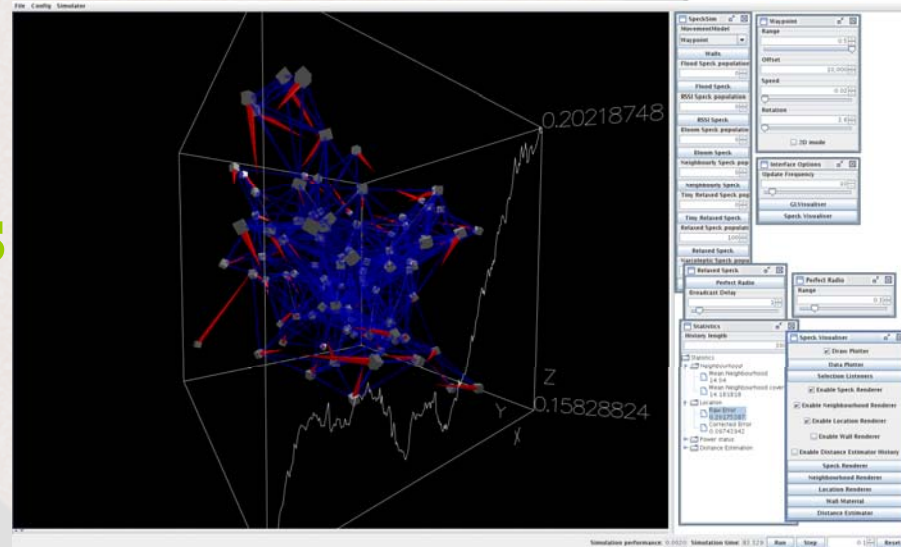
Optimisation of performance before deployment

SpeckSim

Co-simulation

Passive Channel Sampling

Accurate battery models



Wireless Channel Models for specknets

Prototyping of Radios

Low-power 10 GHz radios

**Low arithmetic
complexity IF radio**

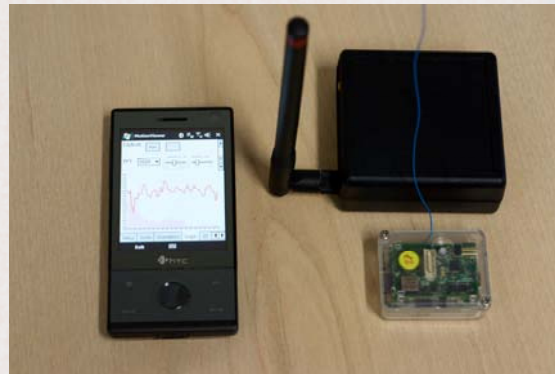
**Low complexity arithmetic
for DSP radio receivers**

Sigma-Delta Microphone Array

Orient III and Base Station

Orientation Estimation Algorithms

**OFDM for
multichannel
Data
Synchronisation**



Step Tracking

**Integration with
camera**

**Classification of Movement Data
for Learning by Imitation**

**Foundations of Motion Understanding using
Wireless Motion Sensor Network**

Emitters and Detectors


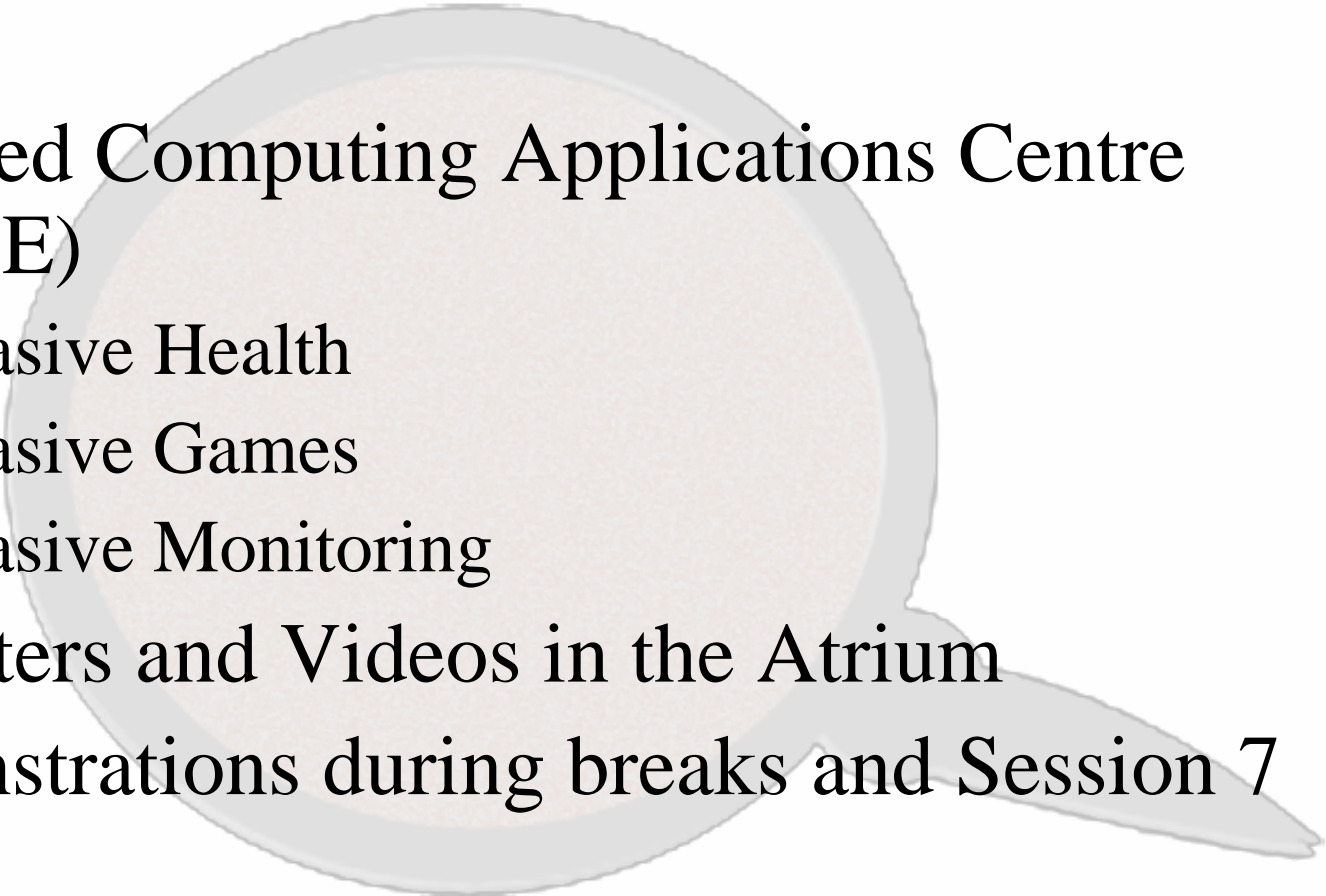
Integration of Optical Devices

**Optical Communication
System using VCSELs**

**CDMA-based
Optical Network**

Sectoring Localisation Algorithm

Implementation of SLA on Perspeckz Testbed

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- Speckled Computing Applications Centre (SPACE)
 - Pervasive Health
 - Pervasive Games
 - Pervasive Monitoring
 - 20 Posters and Videos in the Atrium
 - Demonstrations during breaks and Session 7
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Bringing it together

