



# Research and Venturing Overview

April 2005

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General Manager Research



# BT's record of innovation in communications and new wave growth

## BT Innovation Track Record

Optics	Wireless	Broadband	Web services	Pervasive intelligence
				1977 - Optical fibre launch
				1979 - First digital network demonstration (Project X)
				1985 - First transoceanic optical fibre cable (TAT 8)
				1985 - Cellular radio (Cellnet)
				1990 - World's largest fibre to home trial
				1991 - UK ISDN coverage
				1994 - First major ADSL trial Colchester
				1995 - Optical packet routing demo
				1997 - WDM trials
				1999 - Colossus IP network
				2000 - World's first GPRS network
				2000 - World's first telephony IP network
				2000 - IN platform
				2001 - First VDSL trial
				2002-4 Innovation Results
1970s	1980s	1990s	2000s	2010s

## 2002-4 Innovation Results

- Created the world's first fully converged fixed-mobile service
- First European Telco to create partnership with Yahoo for value-add services "BT Communicator"
- Early recognition of VoIP reflected in new 21CN architecture
- **New Wave products and services turnover reached £4Bn per annum, up 35%**



# BT Strategy

## Defend traditional

- Improved service
- Aggressive & creative marketing
- Price innovation
- Reduce costs/  
improve margin



Long term  
partnership  
with our  
customers



## Grow New Wave

- Broadband
- Mobility
- ICT
- Global Solutions



Transformation  
21st  
Century  
Network



Delivering value through transformation



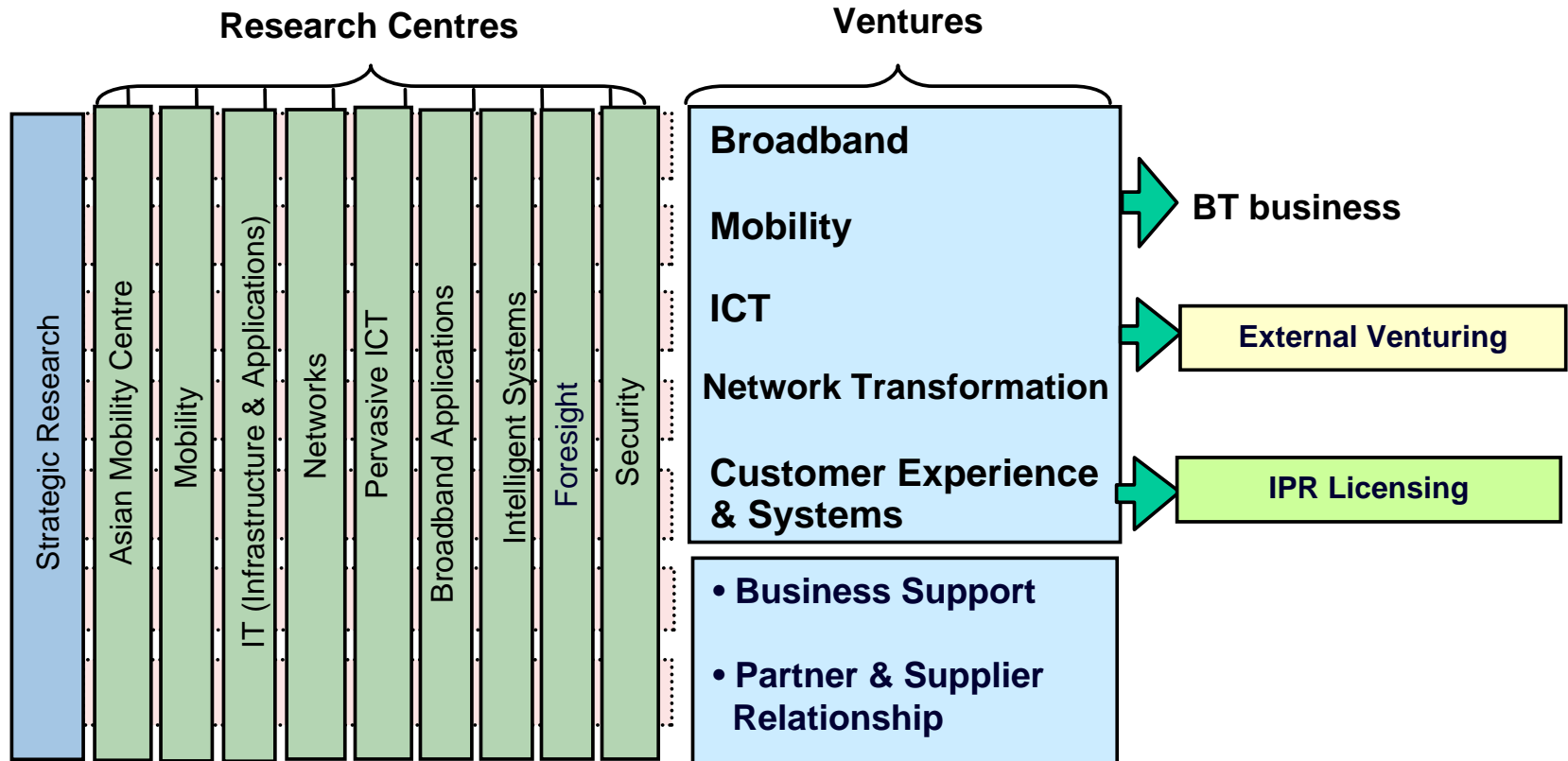
# In the LAST three years we have ...

- Built new wave into a £4.5bn per annum business
- Delivered Broadband Britain
- Won ICT orders valued at > £18bn
- Reduced customer dissatisfaction by 54%
- Re-established ourselves in the Mobile market
- Taken > £1bn of costs out of the business
- Reduced net debt to < £8bn

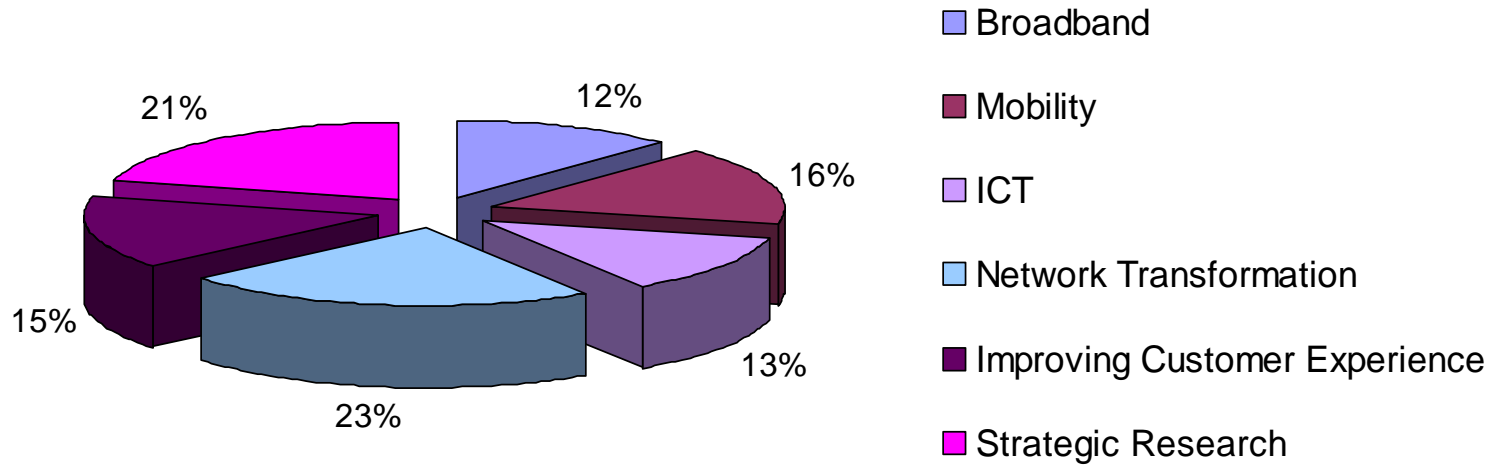
... transformation HAS delivered



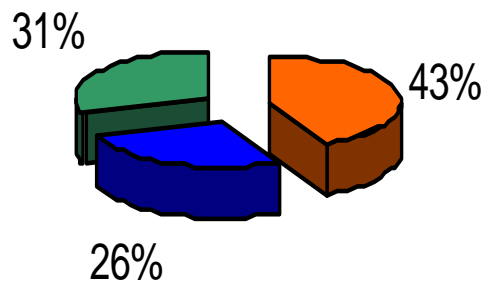
# Research & Venturing



# Programme balance



# Programme balance



 **Core**

 **Alert**

 **Prototype**



Intensive research project with a clear technology deliverable, where we have and maintain world class competence on a subject core to our strategy

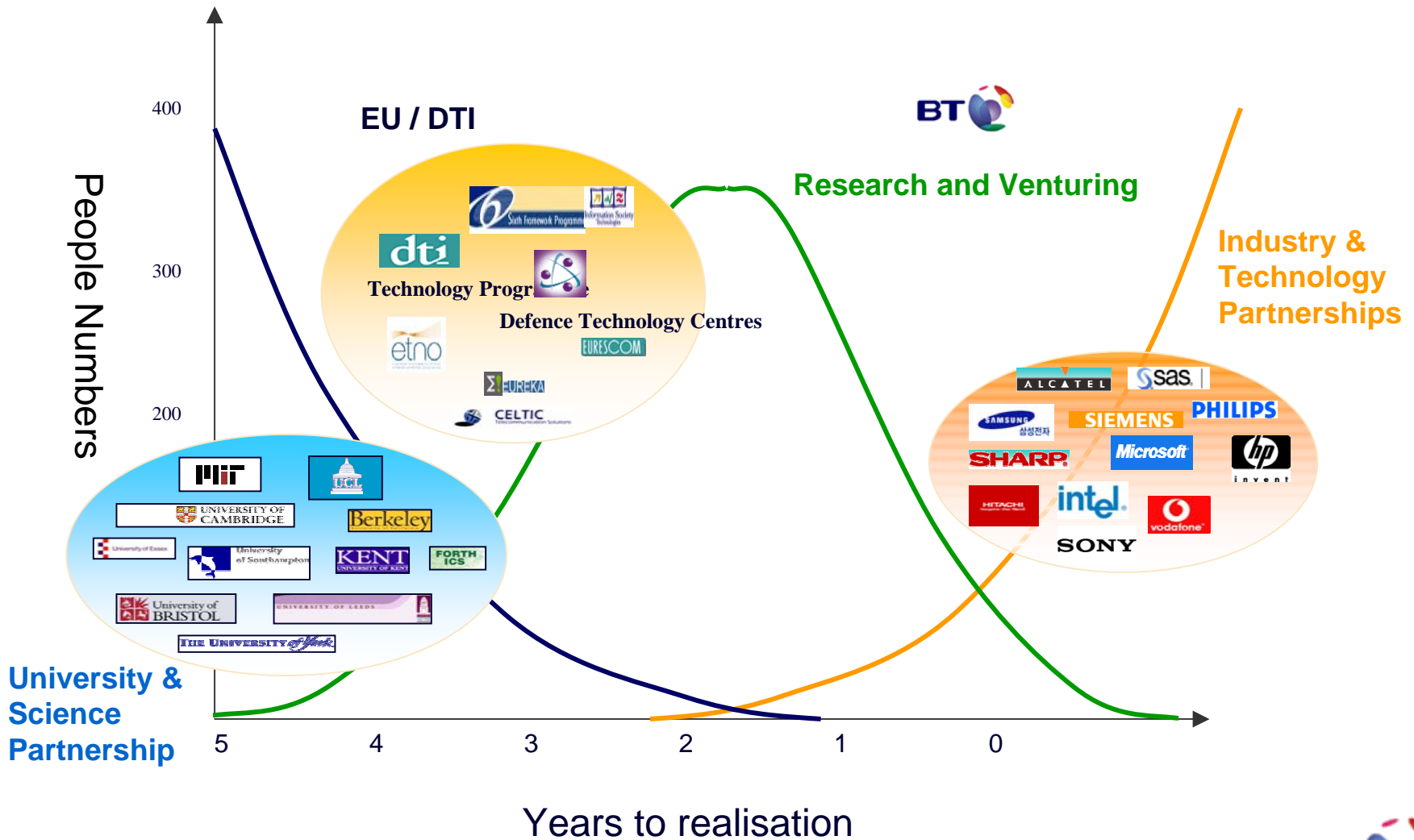


Limited activity and spend, aimed at keeping a healthy level of expertise to assess suppliers, competitors, alert on new technologies.



Building prototypes or running trials

# Internal & External Research





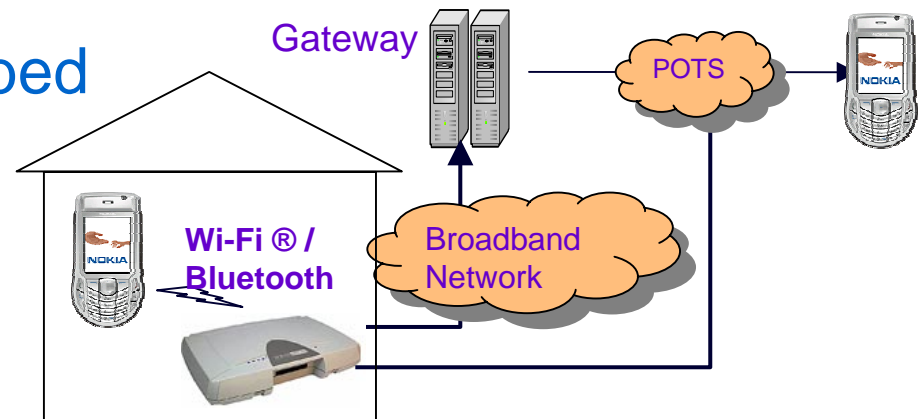
# Broadband centre

Centre leader: Richard Jacobs



## Key research areas

- Video coding and streaming - from mobile networks to HDTV over broadband
- Broadband TV
- Broadband & terminals test-bed
- Fusion futures
- Video security services
- Perceptual quality of service
- eDirectories

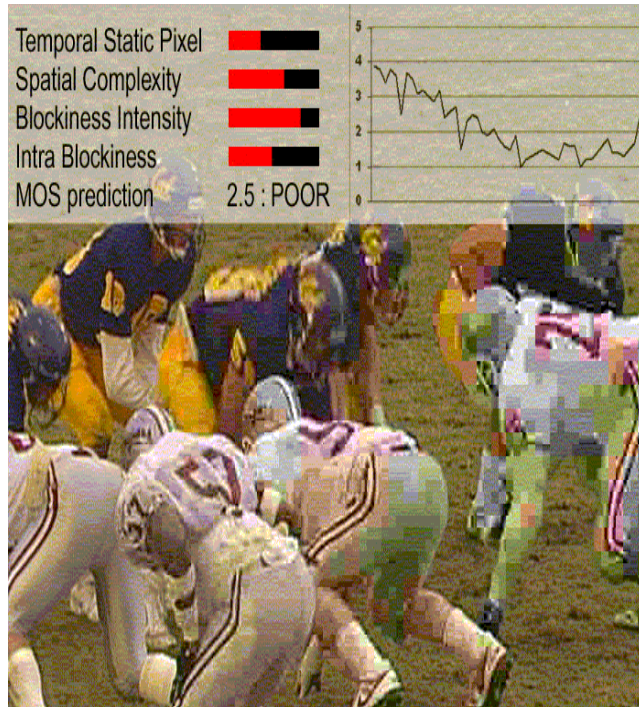


## Key People

- Matt Walker
- Ian Kegel
- Dave Hands
- Martin Russ
- Steve Appleby



# Video Quality of Service



**Measure customers perceived video QoS automatically**

**Maintain at adequate level to ensure continued customer satisfaction**

**Optimise use of network capacity**

**Licensed to Psytechnics**

**Winner of international standards competition**

# Mobility centre

Centre leader:  
Richard Dennis



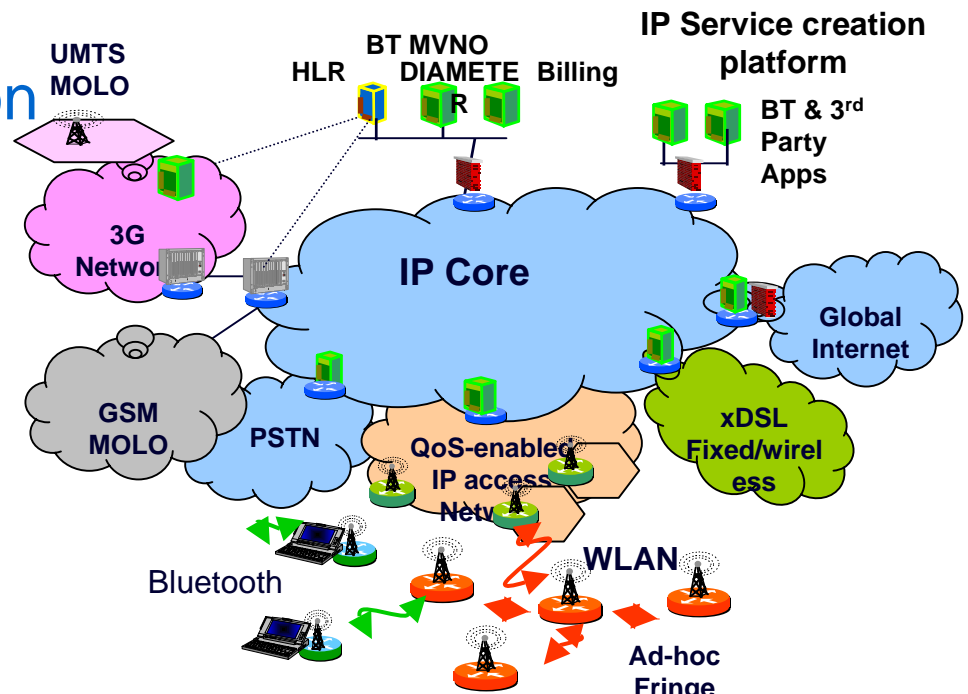
Key research areas:-

- Fixed-mobile convergence
- WiMAX and WiFi
- SIM cards, authentication
- MVNOs
- Mobility in 21C

Key people:-

- Dave Wisely
- Terry Hodgkinson
- Sverrir Olafsson

## 4G Network



**BT - One virtual mobility service across wireless and wired network (2G/3G/WLAN/ADSL/PSTN).**

**With application programming interfaces for third party service .**



# Asian Mobility & Wireless Research Centre

- Key objectives
  - To help our research into Fixed Mobile Convergence, Broadband Wireless Access & Mobile Web services
  - Provide Asia Pacific Region based intelligence & commercial contacts.
- Currently 27 people ramping to 40 next year



## Key People

- Kamal Singh
- Hiew Pang Leang





# Networks centre

Centre leader: Peter Hovell

Research into network architectures and technologies to future-proof BT's network for the 21st century (21CN)

## Key research areas

- The evolution of the Internet
- Network quality of service
- Privacy in a world of pervasive computing.
- Computational networking
- Optical networking

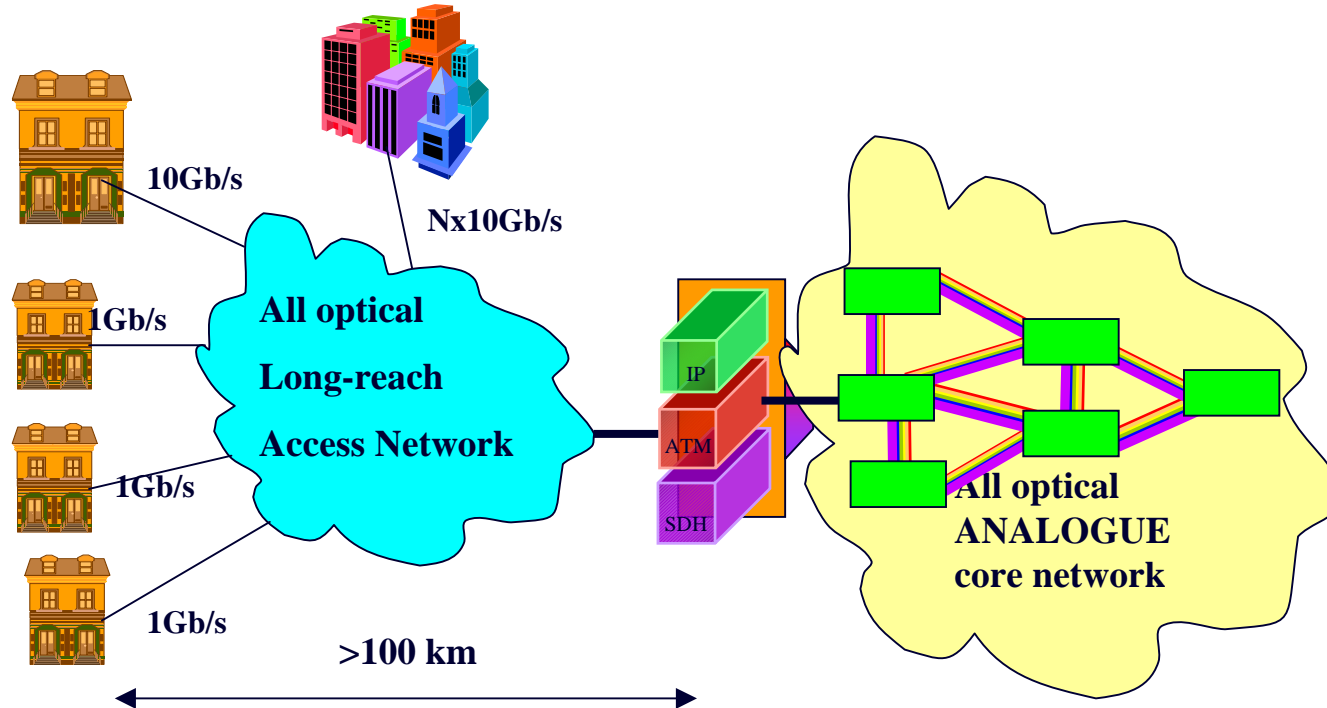
## Key people

- Bob Briscoe
- Jonathan Mitchener
- Ben Strulo
- Nigel Walker



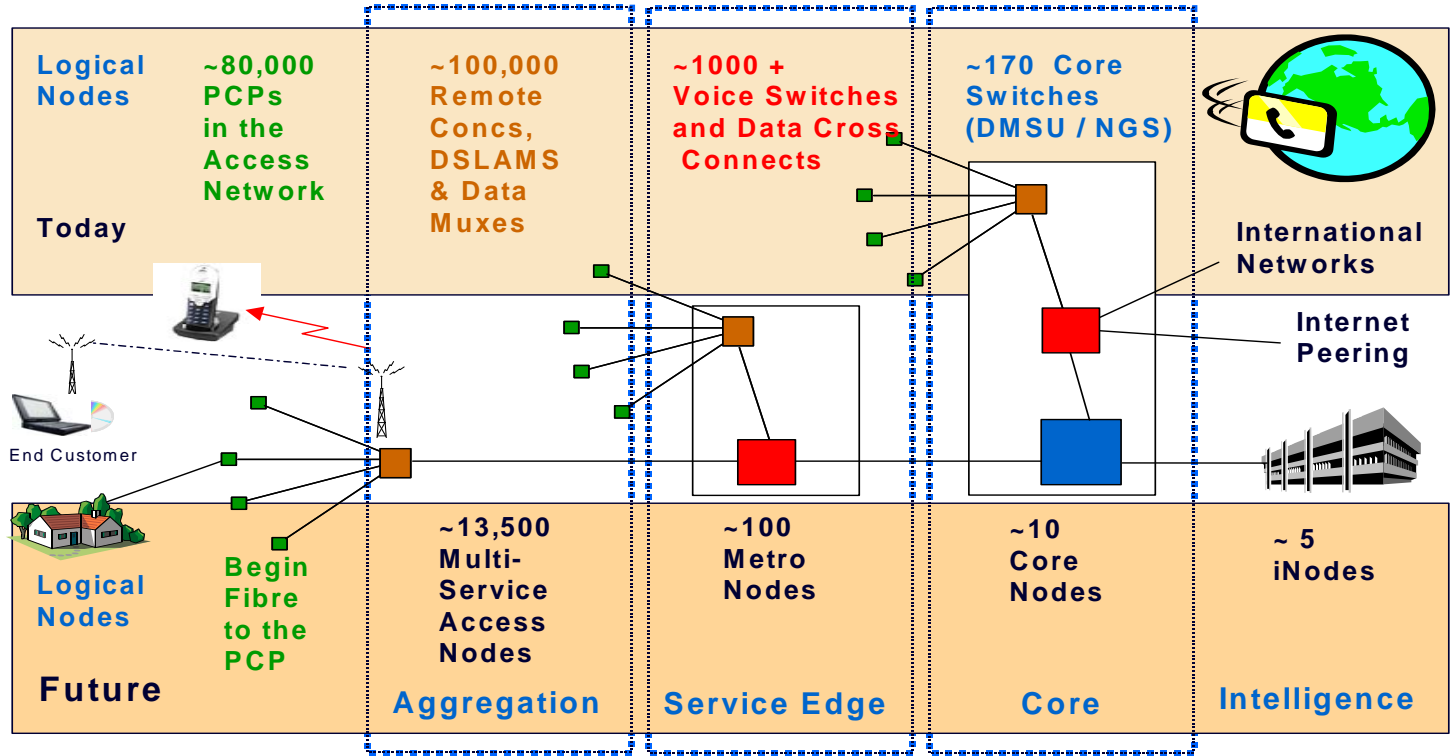
# Optical Networking

- Radical optical network architecture: 50% capital cost reduction
- All-optical core: analogue network management challenge
- Extended access network with 100km reach

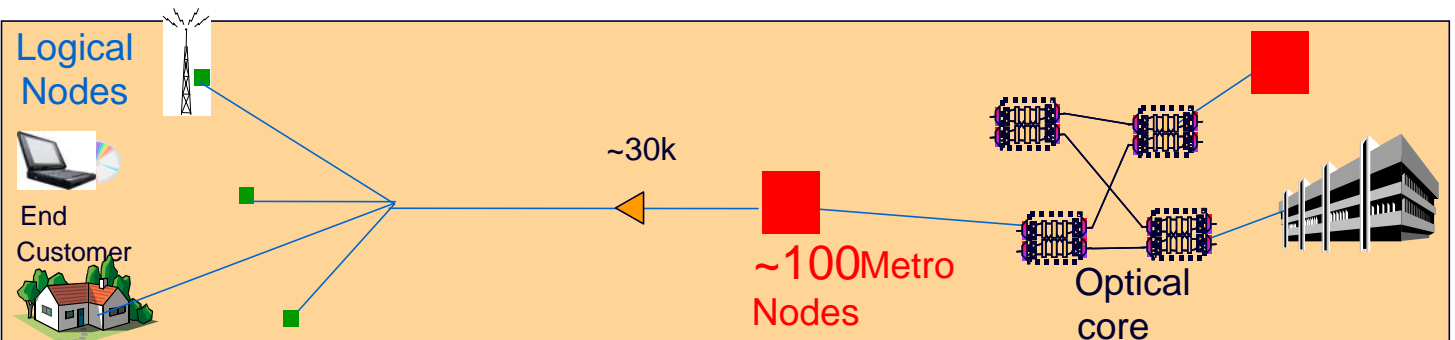


# Network evolution & Optical Network vision

Today



21C



Long reach Vision

# Environmental Benefits of long-reach optical access

Based on Ipswich Exchange serving ~15,000 customers

## Today

900 racks

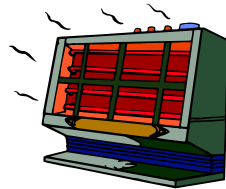
826 kw



## 21C MSAN

20 racks

50-100 kw



## Long Reach PON

1 rack

100W







# Intelligent Systems Centre

Centre leader: Nader Azarmi

Research into novel Intelligent Systems & Technologies to improve the way organisations operate & serve their customers

- World class research into artificial intelligence
  - 15 international and national awards
  - 20 BT technical awards
  - 120+ patents
- Strong university collaborations, eg Berkeley
- Successful downstreaming into BT
- Several spin-out companies and licensing deals
- Highly qualified team
  - 15 nationalities; 100% 2/more degrees; 75% PhDs.

## Key people

- Chris Voudouris
- Ben Azvine
- Detlef Nauk
- John Shepherdson



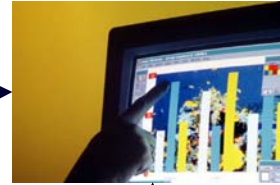
# Use of Intelligent Systems in Customer Service Management

Customer

151 Customer Centre

Automated Resource Management

Field Engineer



reports fault, orders service

creates job

schedules job

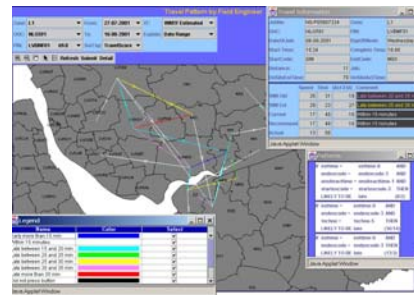
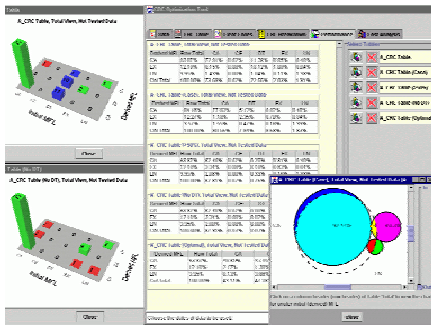
repairs and reports back

**A set of intelligent tools for supporting decision making**  
By call centre operator

**Forecasting, resource planning**

**Travel time estimation**

**Information Management**



# Pervasive ICT centre

Centre leader: Paul Garner

Established in April 2004 to explore the opportunities arising from the dramatic growth in intelligent digital communicating devices

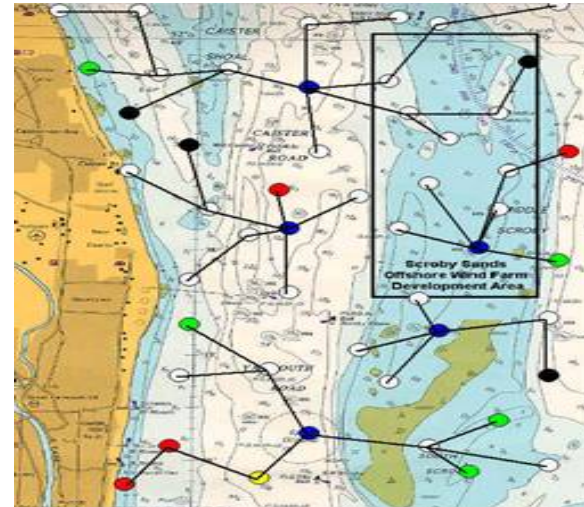


## Key research areas

- Tele-medicine and Telecare
- Customer networks
- Sensor networks & environmental monitoring
- Adaptive ICT
- System modelling

## Key people

- Dave Heatley
- Phil Bull
- Mark Shackleton
- Robert Ghanea-Hercock

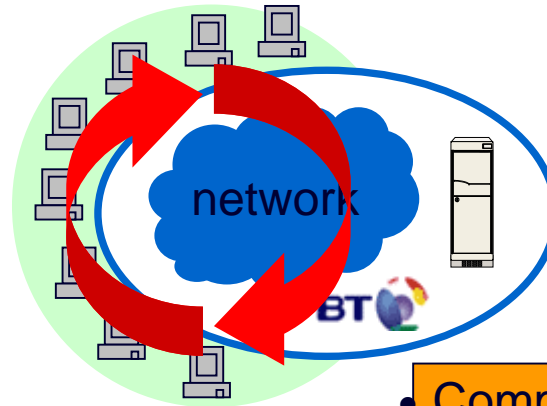


# Adaptive / Autonomic ICT

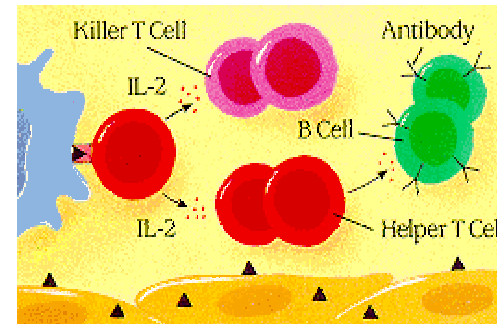
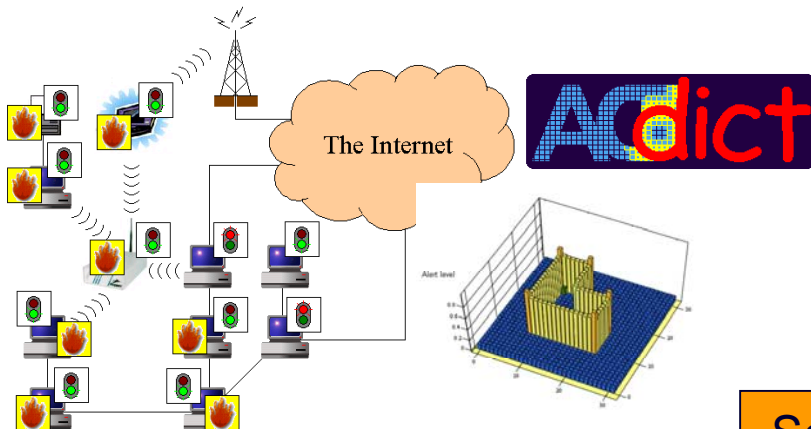
- decentralised, autonomic, lightweight

- From: complex & costly manual management
  - To: self-managing “autonomic” ICT solutions
  - And: resilient provision of services in a complex Pervasive ICT world

- Self-managing Peer-to-Peer and Decentralised architectures



- Complex systems engineering & nature-inspired solutions



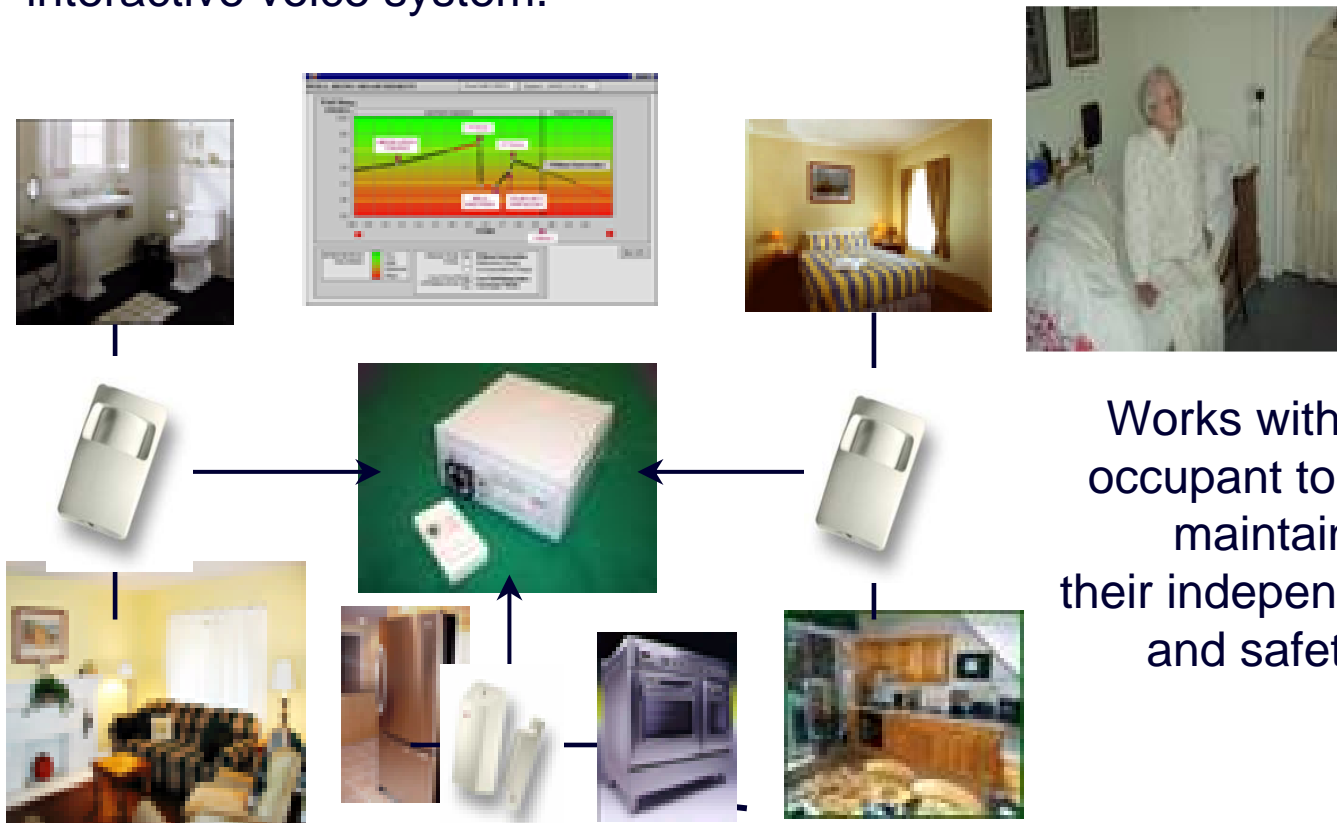
- Self-healing ICT “immune systems”



# Telecare

- intelligent 3<sup>rd</sup> generation systems

An automated intelligent supportive home care system using an array of sensors and an interactive voice system.



Works with the occupant to help maintain their independence and safety.

*Liverpool Telecare trial*

# Security centre

Centre leader: Bryan Littlefair



New centre created to look at the security challenges of new wave networks and services

- IP networks, VoIP
- mobile/wireless networks
- secure and trusted business communications
- Biometrics, intrusion prevention, DPI, web-services security .....
- Security test-bed for One-BT security practice

Key people

- Mark Drew
- Mark Pawlewski
- Paul Kearney
- Theo Dimitrakos





Thank You

