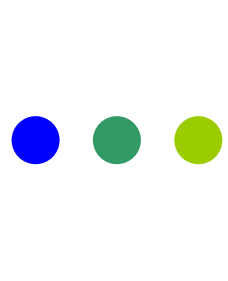




National ICT Australia

Ric Clark
Chief Operating Officer

Agenda



- Establishment
- Research Agenda
- Linkages with CSIRO

A decorative graphic consisting of three colored circles (blue, green, and yellow) and a vertical line to their right.

Establishment

- ICT Centre Of Excellence
 - 80% of ICT R&D in Private Sector
- Deed with Commonwealth Oct 2002
- Member agreements April/May 2003
 - ANU, UNSW and USyd contributees
 - ATP, Kensington and Canberra sites.

● ● ● | Our Mission

To be an enduring world class research institute in Information and Communication Technologies that generates national wealth.

- **Creation**
- **Commericalisation**
- **Education**
- **Collaboration**

2003 Progress

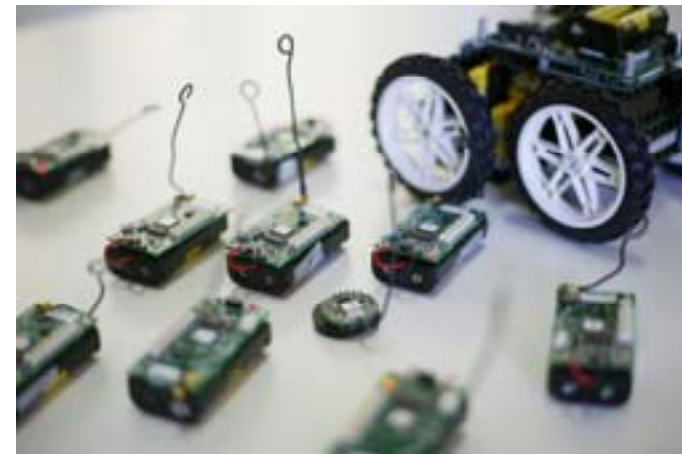
- Growth towards steady-state
- Promising foundation year:
 - Research Management Infrastructure
 - Project Portfolio
 - University Relationships
 - Commercialisation Infrastructure
 - Networks and Linkages
 - Top Australian researchers to return
 - Top young international researchers attracted
- Hindrances:
 - Attracting key people against a background of uncertain continuity in funding





Research Highlights

- Bringing robust and reliable ICT to Industry
 - NICTA researchers are developing a **microkernel-based operating system** that
 - Is a **reliable** platform for embedded software
 - Is **secure** and **easy** to program
 - Will increasingly come with **mathematical guarantees** of its correctness
 - Work has attracted attention of **STMicroelectronics**
 - Linux-based embedded software platforms (in collaboration with IBM)





Expanding Industry Capability

Software Quality Processes for SMEs

- NICTA researchers are working on electronic process guides, process experience repositories and cost estimation tools for SMEs

- Allette Systems
- Roads and Traffic Authority
- NSW Government Office of Information Technology

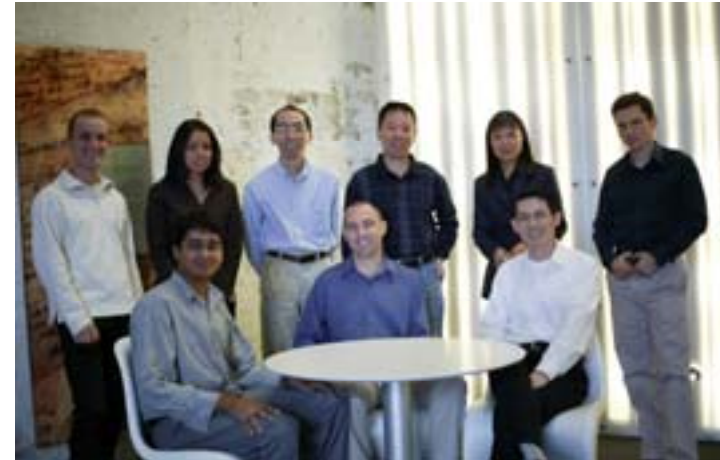
- Investigating capability support for global projects such as Joint Strike Fighter



Widespread Applications

Widespread applications for research are emerging:

- Environmental Monitoring
 - cane toads to bushfires
- Security
 - Critical infrastructure, PM&C SET and DSD
- Commerce
 - customer demand and behaviour modelling
- Communications
 - Reliability, Network integrity, Malicious intrusion
- Industrial Efficiency
 - Software performance, machine learning technology and AI

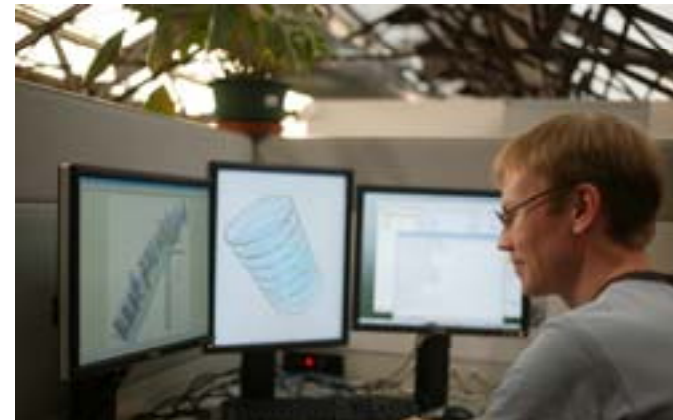




Foundations for Collaboration

Significant Collaboration with DSTO

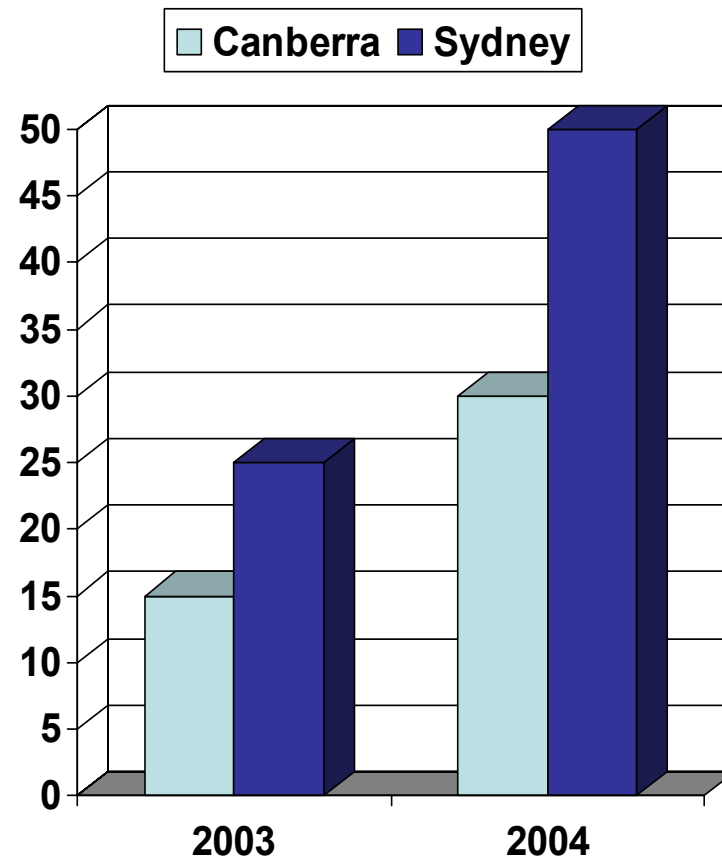
- Project **LEAR**: develop **models** and **algorithms** to support **decision making** for national and strategic courses of actions
- DPOLP: Dynamic Planning and Optimisation
- Developing **virtual tables** that allow teams to collaborate from different locations on design problems
- Agent-based tools for **negotiation**
- Catalyst for F3 “Roundtable” to coordinate public ICT research
 - DSTO, ICT CRCs, CSIRO





Invigorating ICT Education

- Education Agreements signed with ANU, UNSW and University of Sydney
- 2004 research scholarship expenditure:
 - Canberra: \$900,000
 - Sydney (ATP & Kensington): \$1,200,000
- PhD Students





Economic Impact

- CHANNELS TO MARKET
- Lessons learnt thus far:
 - Start –up Opportunities;
 - SME's;
 - MNE's/Major Government Users
- Key Actions Moving Forward
 - Opportunity Scanning;
 - Friends of NICTA'/Networking/Education
 - Industry Hubs and Key Users



● ● ● | Outreach Strategy

- Two options for a National Centre Of Excellence
 - Diffuse resources through NICTA fellows
 - Concentrate resources in strategic relationships





Outreach

West Australia

Based on West Australian
Telecommunications
Research Institute
future joint projects,
researcher exchange
and student
exchange

Queensland

An agreement with the Queensland
Government, University of Queensland
and Griffith University, substantial
collaboration between Queensland-
based researchers and NICTA in areas
such as security and trust
management

South Australia

Based on an umbrella agreement
with DSTO which allows for
wide-ranging collaboration:
*Dynamic Planning,
Optimisation and
Learning project
Project Lear*

Victoria

NICTA has secured agreement in
principle for research collaboration
with the University of Melbourne and
the Victorian Government



Centre Growth Path

Performance Measure by Key Result Area	Performance Benchmark				
	2003	2004	2005	2006	2007
Number of research staff	-	110	144	202	260
Number of programs	11	13	15	17	17
Number of projects	10	22	35	45	50
Number of Outreach agreements concluded	2	3	-	-	-
Research students population	37	77	91	108	133
Research student graduating	-	-	-	25	40
% of contestable research funding	-	35	45	50	60

● ● ● | Leading to steady-state

- The plan takes us to the point where NICTA has:
 - Achieved critical mass to become world class
 - Built a pipeline of commercially exploitable IP
 - Established a strong pool of emerging graduates
 - Broad engagement with industries and firms
- The challenge is not just to set NICTA up but to realise benefits



Surety to build....



MINISTER FOR COMMUNICATIONS
INFORMATION TECHNOLOGY AND THE ARTS
THE HON DARYL WILLIAMS AM QC MP

NEWS RELEASE

\$308 MILLION INVESTMENT IN ICT FOR OUR FUTURE

6 May 2004

The Australian Government will invest \$308 million in measures to boost innovation in ICT as part of the \$5.3 billion *BackingAustralia's Ability-Building Our Future Through Science and Innovation* package announced by Prime Minister John Howard today.

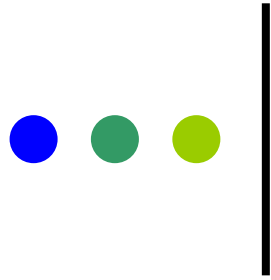
This important new science and innovation package includes the following key strategic investments in ICT:

- a **\$251million extension of funding for the national ICT centre of excellence, National ICT Australia Ltd (NICTA)**; and
- a \$57million extension of funding for the ICT Incubators and Advanced Networks Programs previously funded under the Building on IT Strengths (BITS) program.

ICT underpins the development of Australia as an information economy and is central to innovation across most sectors.

The Government's commitment to ICT innovation through *BackingAustralia's Ability-Building Our Future Through Science and Innovation* will ensure that Australia is able to harness emerging technologies and remain globally competitive.

NICTA is addressing an identified weakness in long-term strategic ICT research by developing first class ICT research, fostering the development of networks between ICT researchers and industry, increasing the availability of high quality research skills and growing Australia's ability to create and exploit ICT for national benefit.



NICTA's Research Agenda

● ● ● | Organisation of Research

- NICTA's research agenda includes how we organise our research
- Simplistic model:





Research - Dimensions



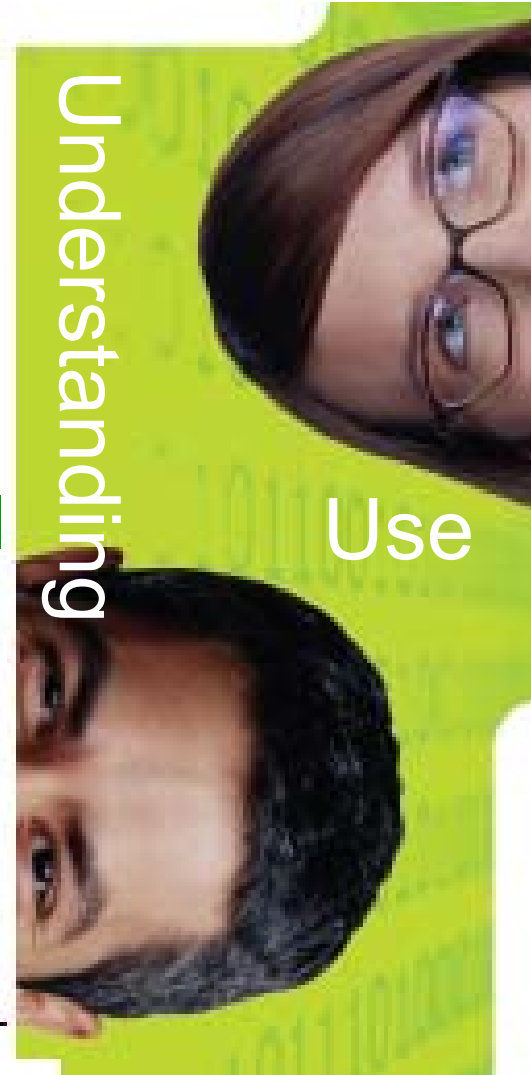
Multidimensional

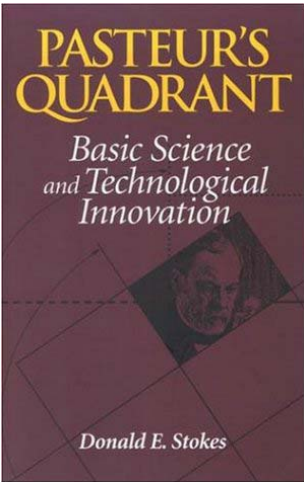


Quest for fundamental
understanding

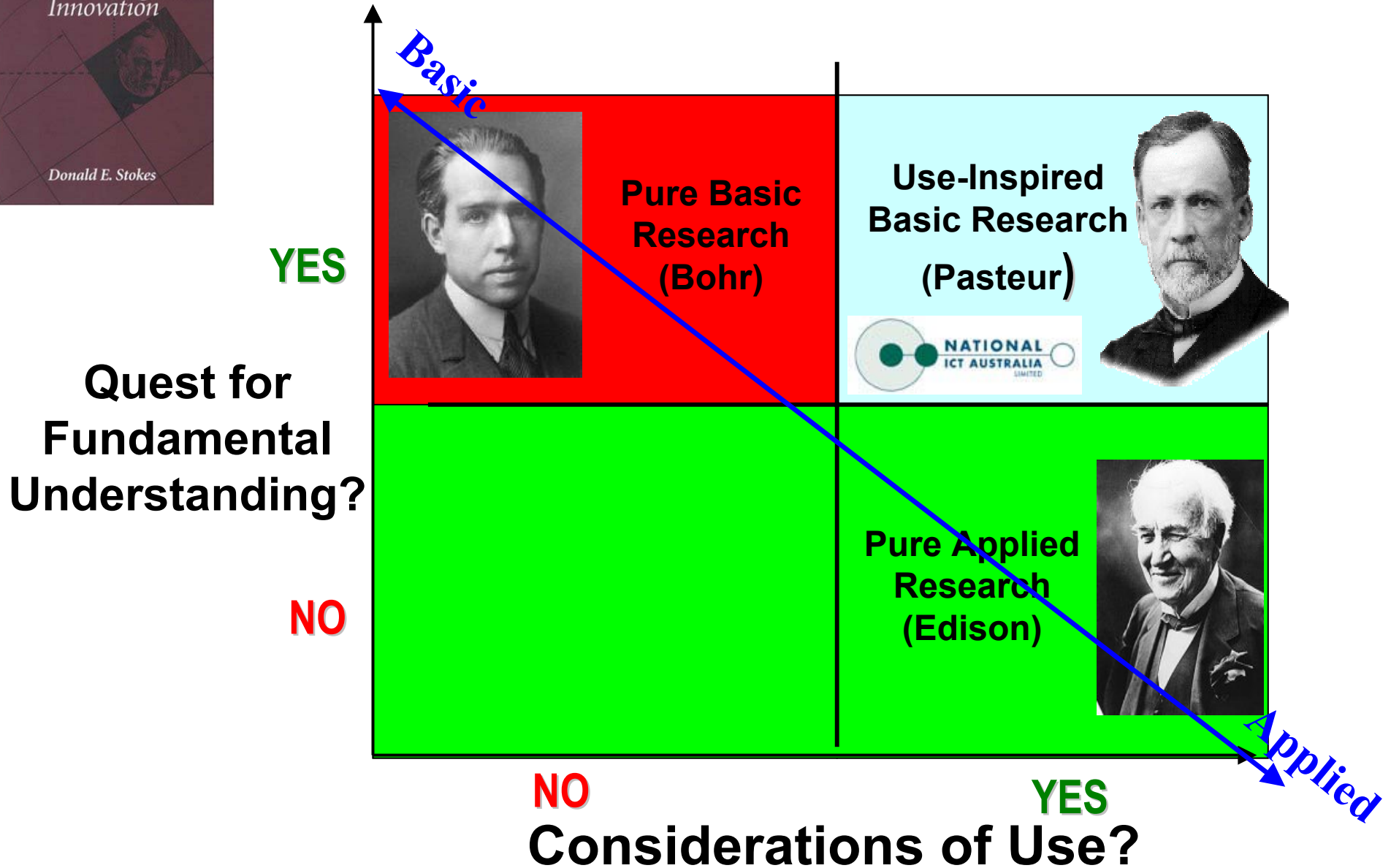


Consideration of use





Pasteur's Quadrant



● ● ● | Research Structures

- Use-inspired research
 - Search for fundamental understanding
 - Guided by consideration of use
- Matrix Structure within NICTA to reflect multi-dimensional reality
 - Programs
 - Projects
 - Priority Challenges

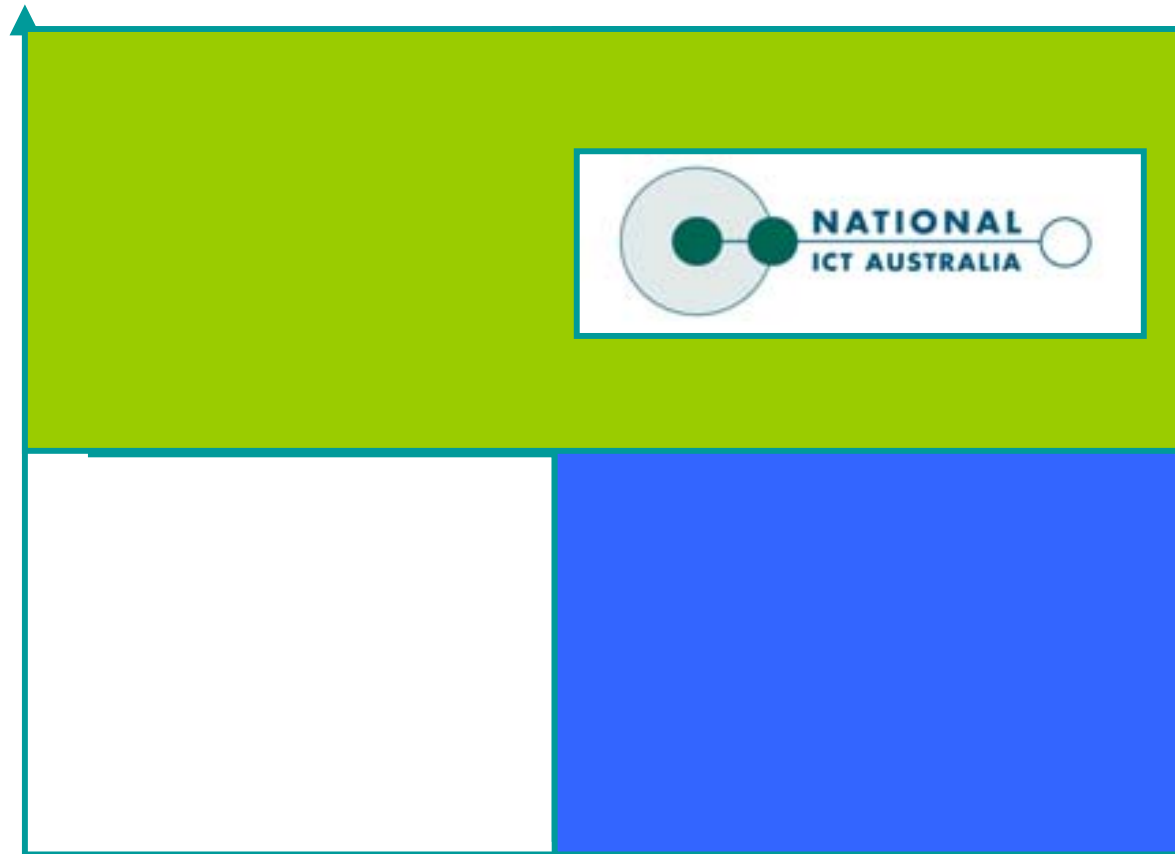




Pasteur's Quadrant

Programs

Discipline Based –
Strong quest for
*Fundamental
Understanding*



Projects

Client based - Driven by
Considerations of Use

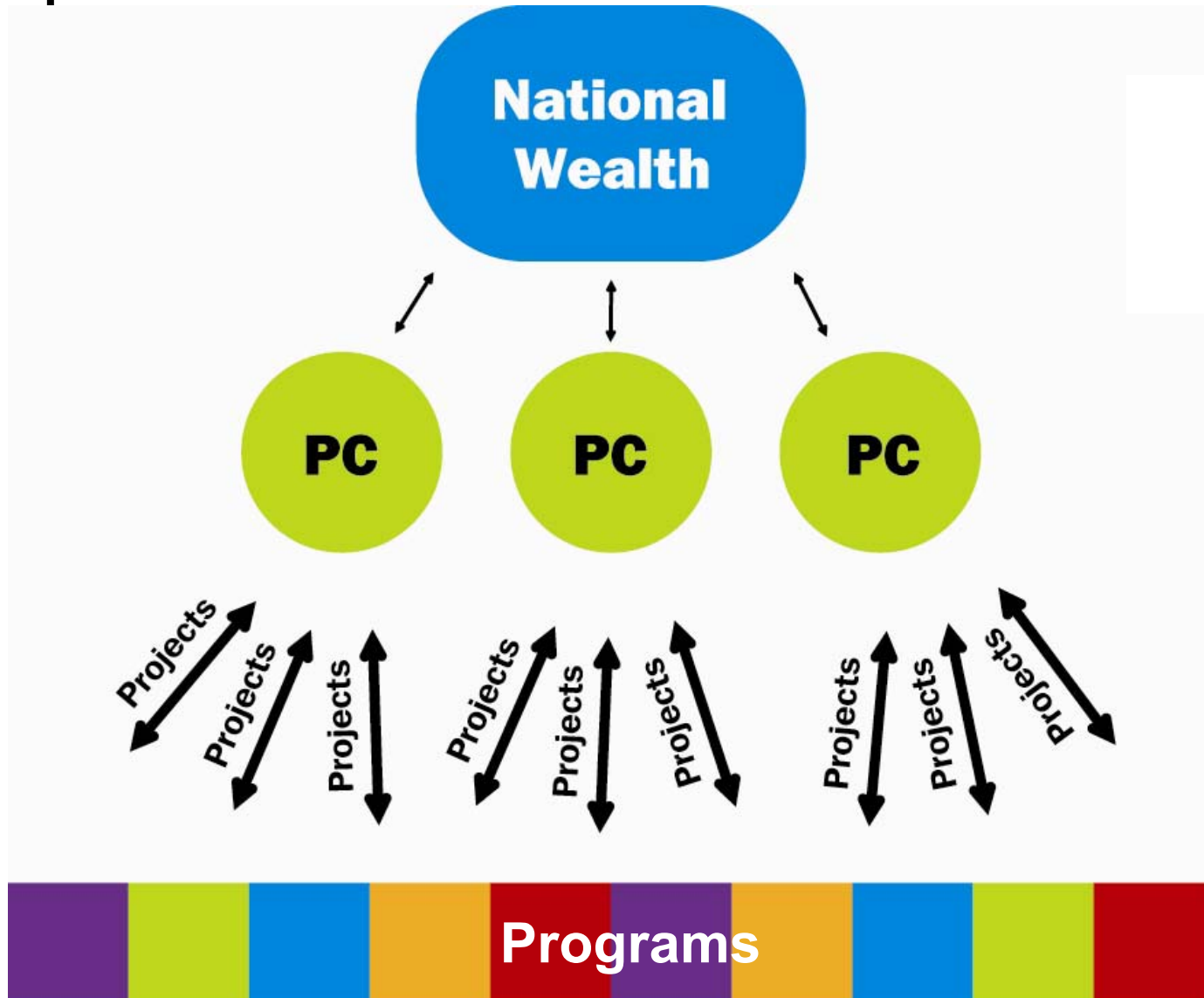
● ● ● | Priority Challenges

- Organising principle
- Focus the research
- Facilitate interaction
- Descriptors of NICTA's research activities
- International Scientific Advisory Group
- Spans traditional industry sectors





NICTA's Focus



Priority Challenges



Trusted Wireless Networks

Enabling greater confidence, freedom and capability through the improved efficiency, reliability and security of wireless environments.





Trusted Wireless Networks

The aim is to develop:

- **Fit for use/secure [Trusted]**
- **Pervasive/untethered [Wireless]**
- **Communication systems [Networks]**

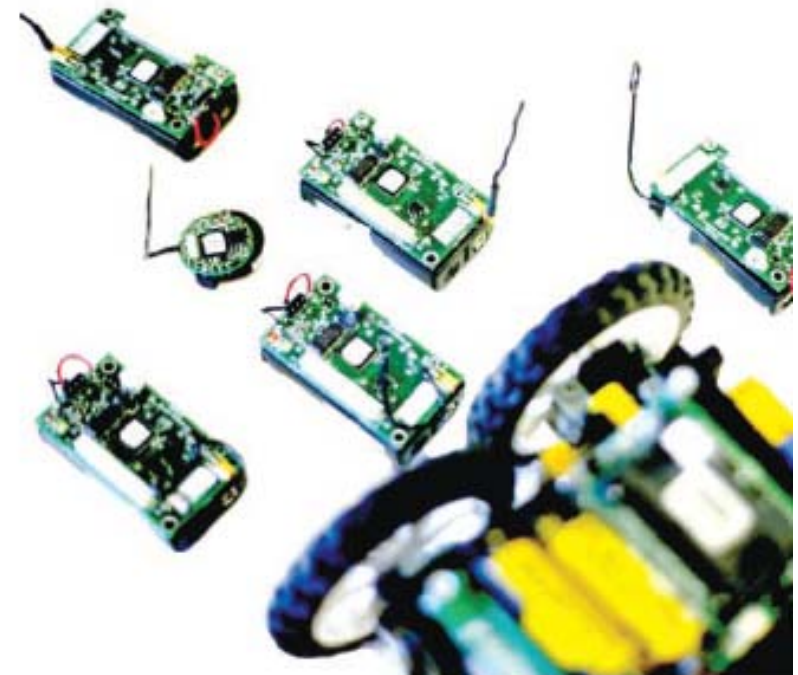
Trusted Wireless Networks

- Current wireless technology
 - Slow
 - Difficult to use
 - Trust issues



Trusted Wireless Networks

- Wireless Signal Processing
- Embedded and Real-Time Operating Systems
- Formal Methods
- Networks and Pervasive Computing
- Security and Trust Management



Priority Challenges



Data to Knowledge

Producing social, environmental and economic value from the gathering and use of information.



● ● ● | From Data to Knowledge

- Development of smart sensors
- Bioinformatics
- Design of sensor networks





From Data to Knowledge

- Machine Learning
- Autonomous Systems & Sensor technologies (*Computer Vision*)
- Visualisation
- Multimodal User Interaction
- Knowledge Representation and Reasoning
- Logic and Computation



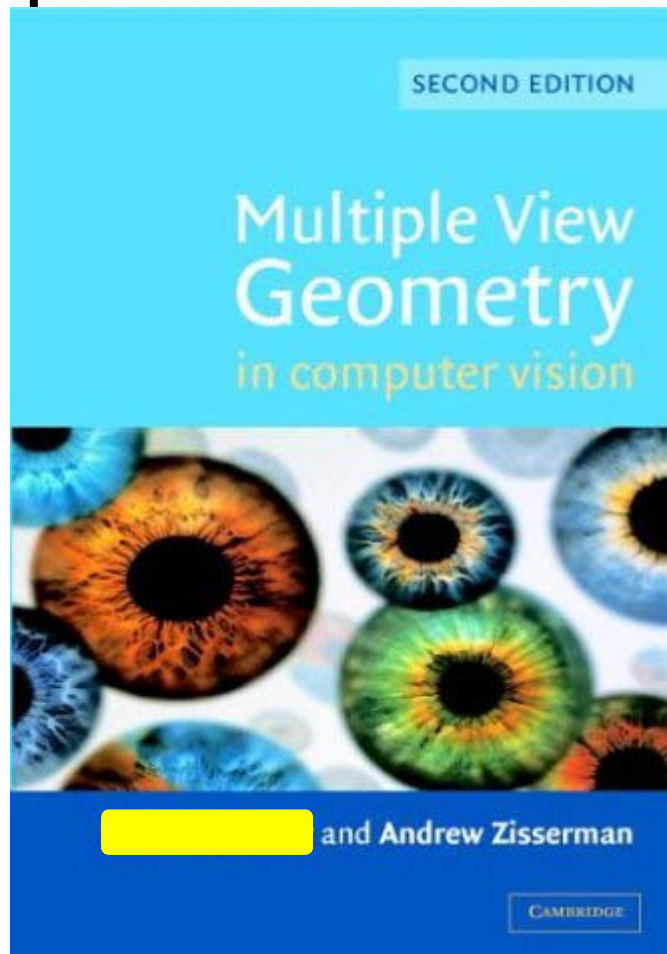


Roadsign detection

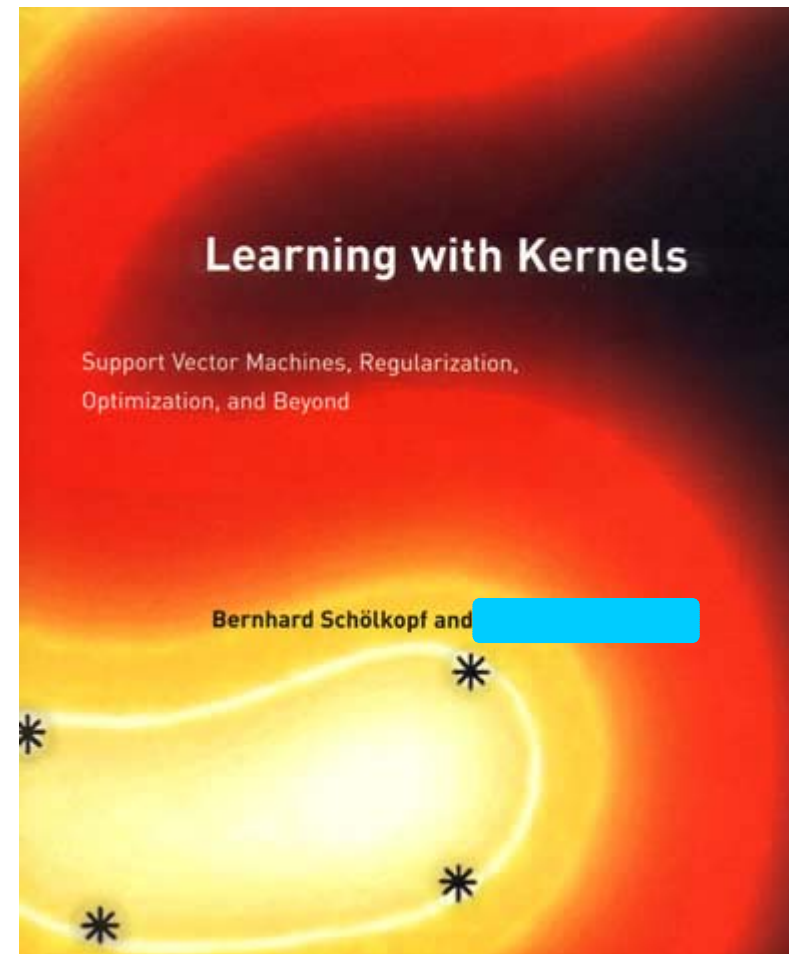
- Extract *knowledge* of what road signs say from the raw sensor data.
- Car could tell you if you are speeding



NICTA's Capability



Richard Hartley



Alex Smola



CSIRO

ICT Centre



Activity Mapping

Security and Trust Management

1.1 Information Security and Privacy

Systems Engineering & complex systems

2.4 Electromagnetics & Antennas

Database & Enterprise Systems

1.2 eServices Integration

3.5 Distributed Systems Research

Wireless communication

2.1 Adaptive Wireless

2.2 Gigabit Wireless Networks

Networking and Pervasive computing

3.1 CeNTIE

3.2 CeNTIE Business Systems

3.3 Networked Media Research

3.4 Networking Research

Humans understanding machines

4.1 Information Retrieval

4.2 Information Enhancement

4.3 Information Engagement

4.4 Collaborative Information Environment

6.2 Collaborative Surgical Training

6.3 Telehealth

Autonomous systems & sensing systems

5.1 Robotics

5.2 Intelligent Systems



NICTA Support

National ICT Australia is funded by the Australian Government's Department of Communications, Information Technology and the Arts and the Australian Research Council through Backing Australia's Ability and the ICT Centre of Excellence program.

NICTA is supported by its members:

- The Australian Capital Territory
- The Australian National University
- NSW Department of State and Regional Development
- The University of New South Wales

And affiliate member:

- University of Sydney

