

CSIRO ICT Centre

“Networking with a Difference”

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Our Vision

- Powering Australia in the global ICT innovation competition.

How?

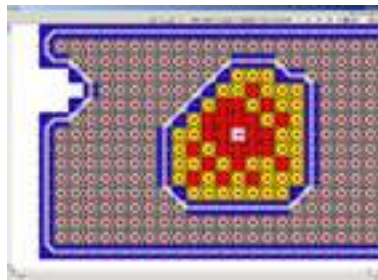
- By applying research results to challenges across all industry sectors in Australia and internationally.
- By being the hub for all ICT research in CSIRO



Who are we?

www.ict.csiro.au

- ~ 180 researchers with a \$40M p.a. budget
- Located in
 - Sydney, Canberra, Brisbane
- Research expertise in
 - Telecommunications, Networking, Information Technology, Data Mining and Interpretation, Web Services, Telepresence.



- The Centre has four Research Laboratories:

Autonomous Systems

- *To improve the international competitiveness of diverse Australian enterprises through the adoption of autonomous systems.*

Information Engineering

- *To change the way we engage with information as individuals and as teams.*

Networking Technologies - home of

- *To create new systems for real-time networked human interaction*

Wireless Technologies

- *To shatter the barriers to high-speed, wideband, untethered communication.*

And Domain delivery through the *e-Health Research Centre*



ICT Centre Research Portfolio

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Autonomous Systems	Intelligent Systems	Robotics	BioMedia Lab		
Information Engineering	Web Services	Information Retrieval	Information Analysis	Information Delivery	Information Security & Privacy
Networking Technologies	Networking Research	Networked Virtual Environments	Networked Media		
Wireless Technologies	Communications	Imaging	Positioning & sensing	Supporting radio astronomy	



Networking, n.

3. The sharing and exchanging of information within a syndicate or network of communication; (now) *esp.* the action or process of networking a number of computers; the use of computer networks.



Some Big Picture Thoughts

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- IP Networks are finally with us
- Some different properties:
 - Connectionless versus Connected
 - Inherently Insecure versus Secure
 - Flexible versus Inflexible
- We now can contemplate gigabit per second speeds.
- Virtualisation
 - Trusted networks, computing, storage
 - Especially in the mobile world, do we care where it happens?



- **Health**
 - Clinicians, health services, government
- **Media**
 - Post-production houses, vendors, other digital content-producers
- **Enterprise**
 - Major corporates and government
- *In CeNTIE 2 apply to*
 - First Mile Forum (with ATUG): Vendors, researchers, users, policy makers, carriers
 - Regional (non-metro): Major vendor/carrier, regional town decision makers, other focus groups

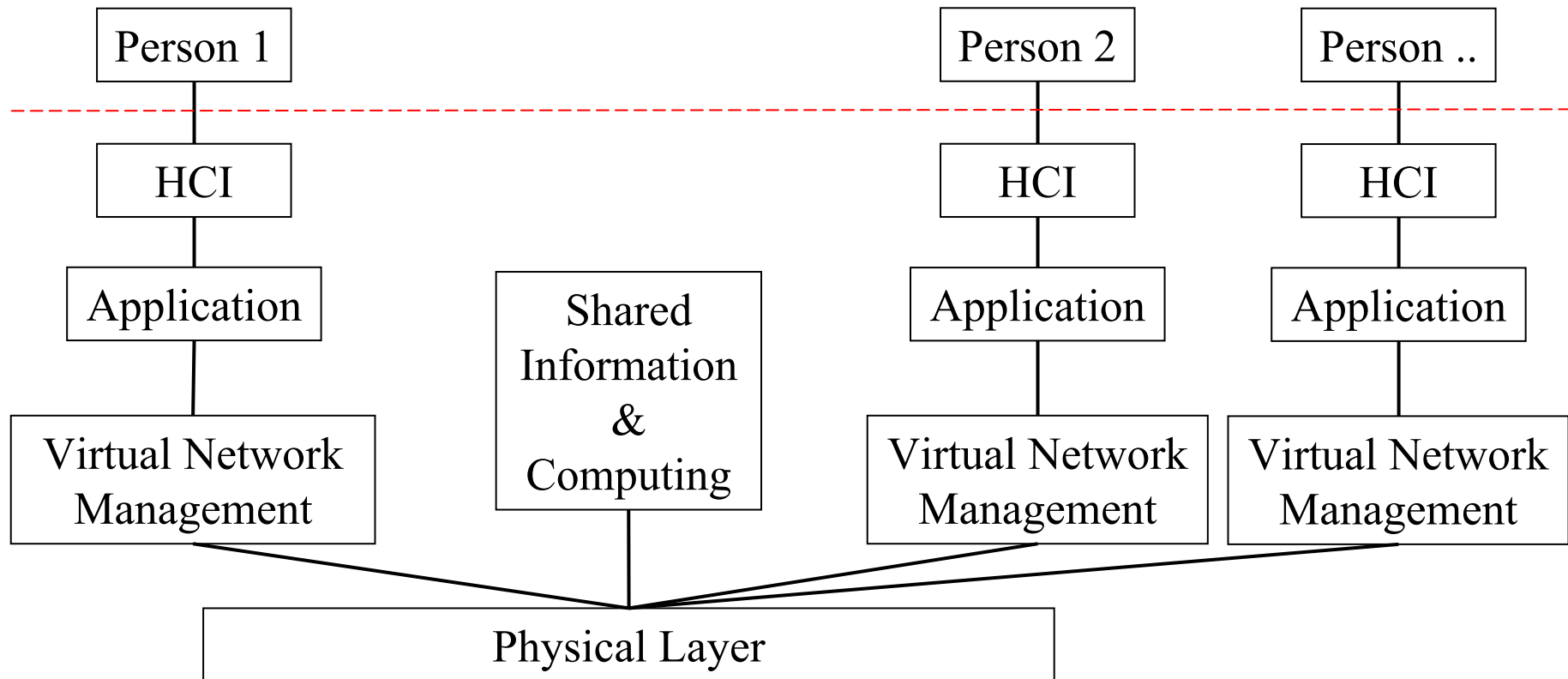


- A systemic or holistic view
 - People
 - Realism in networked interaction
 - Privacy of interaction and shared information
 - Shared Information
 - Indexing, searching and securing digital content
 - Audio, video, text or data
 - Secure networked storage
 - Network Technology
 - Virtual network architectures
 - Trusted computing
 - Managing the traffic efficiently

Our interest is Networked Applications



The Elements

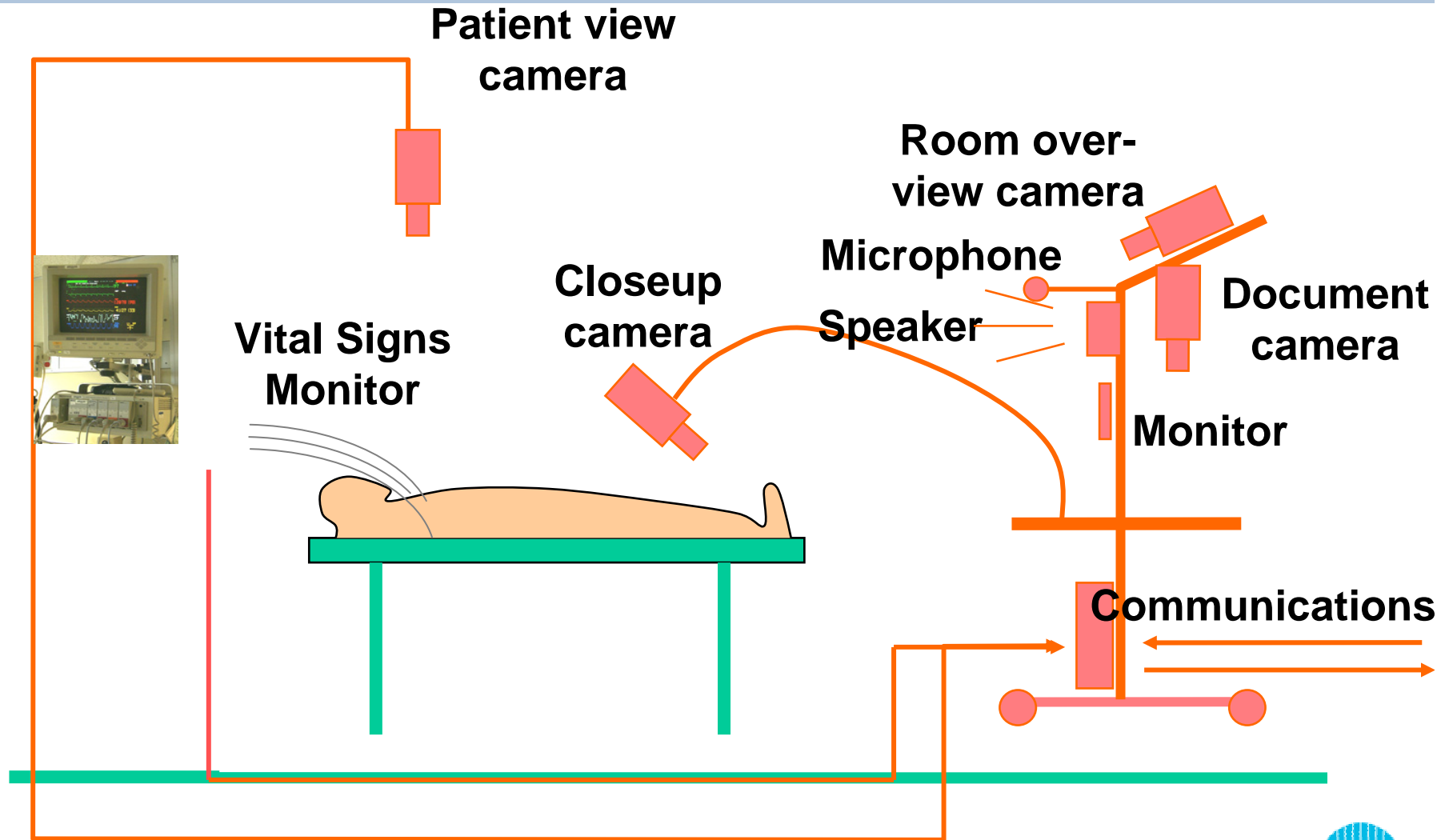


- What can we do to make remote interaction more real?
 - Answer the question and we have approaches to designing networked applications
- Human Factors Research
 - Make some measurements
 - Define some metrics
- Human Computer Interface
 - Make it easy!

Examples: **Virtual Critical Care Unit (ViCCU[®])**
Augmented Reality & Haptics in Surgical Training

- ViCCU®
 - In collaboration with Wentworth Area Health Service and NSW Health, CSIRO has developed ViCCU® (Virtual Critical Care Unit). This system allows a specialist located at one hospital to supervise a team located at a remote hospital, in real-time. Critical care applications typically include Emergency and Intensive Care.





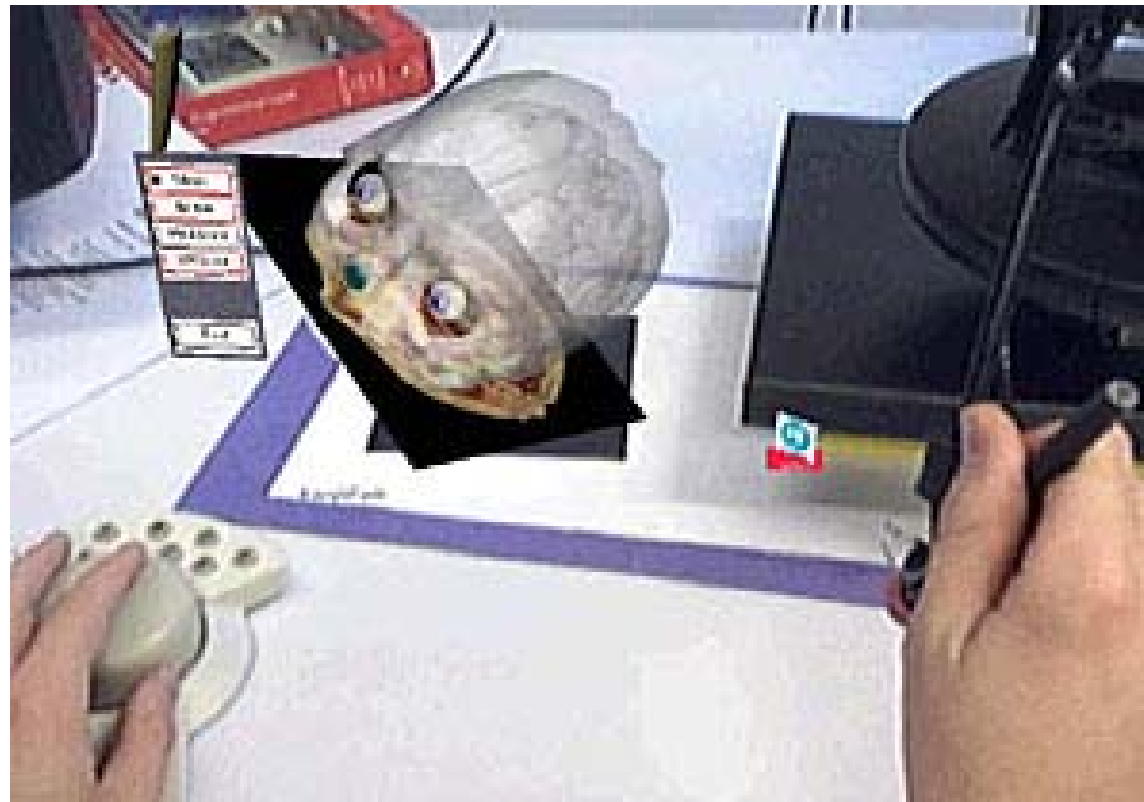
ViCCU[®] at Katoomba

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Networked Augmented Reality & Haptics in Surgical Training

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- Shared Access to Common Content
- True interaction will require finding material easily in real time
 - E-Research for example
Example: Annodex™ – video indexing with a web based approach
- Secure networked storage
 - Fast access to large files
 - Guaranteed security
 - A virtual store
Example: Post-production company collaboration

Mobile Annodex™

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- **Virtual Network Operators**
 - User-managed Virtual Networks
 - Virtual Networks as a service
Example: Post-production Industry
- **Traffic Management**
 - TCP is bandwidth inefficient when loads increase suddenly
 - Treat the network as a control system
 - complex dynamical systems and large deviation theory
- **Trusted Computing**
 - Control all security from your own application
 - Design of secure "trusted" applications and services in a pervasive mobile distributed information environment
 - Leads logically to virtual computing
- **Middleware**
 - Cross-layer communications
 - First step to Network Infrastructure Aware Applications (Nortel DRAC)
- **Hybrid Networks**
 - A simplistic approach to large deviations!
 - λ switching and all that