Ubiquitous Computing

Louise Barkhuus, guest lecture

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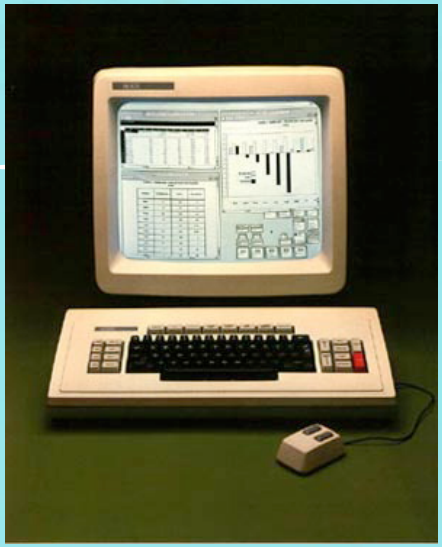
Today

- Introduction to Ubiquitous Computing
- Discussion
- Envisioning Smart Homes
- Exercise

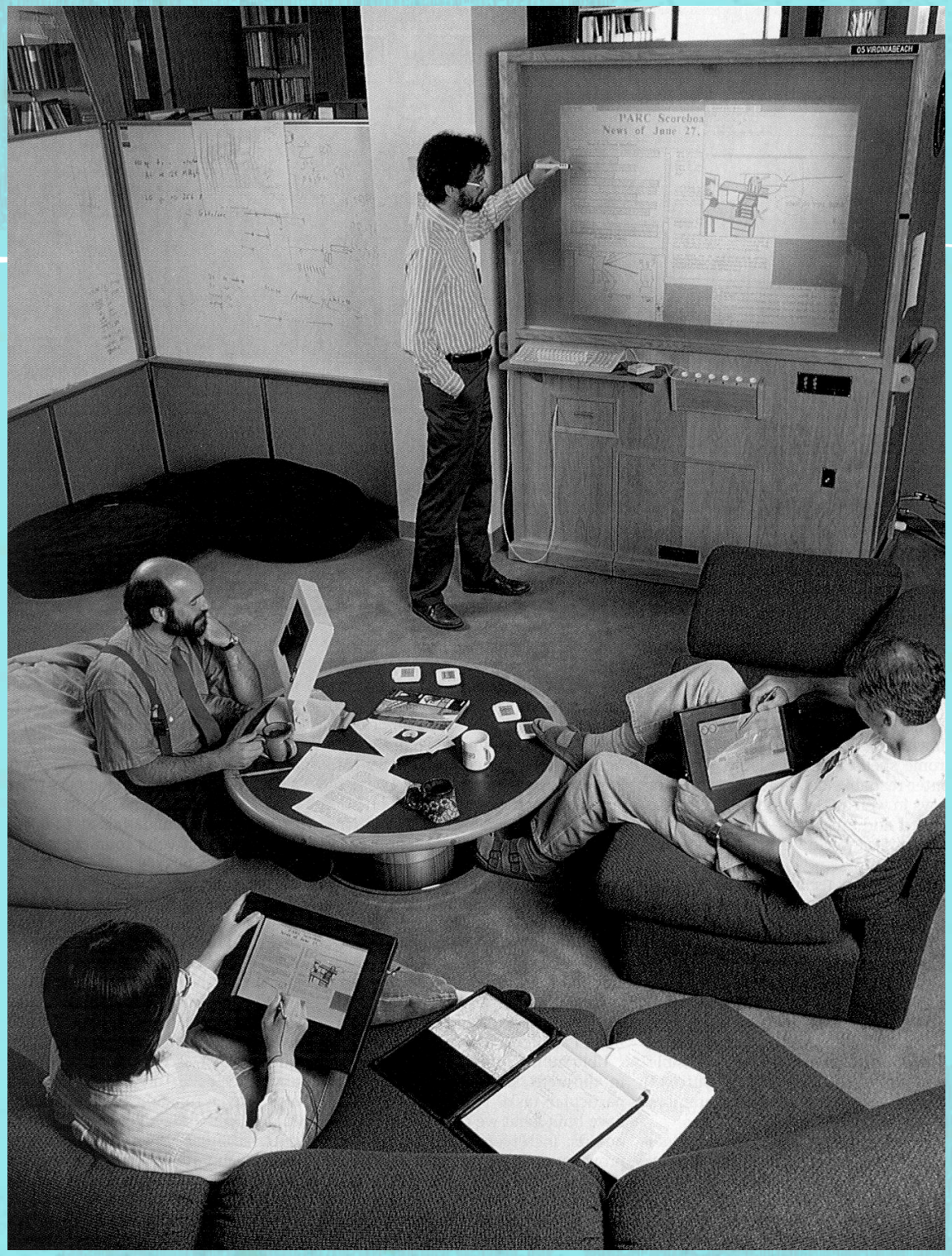
Ubiquitous Computing

- A vision of the future of computing from the early 90s
  - *Partially* playing out now in how we use computers
  - Understanding the vision is an important part of understanding where the future of computing is going
  - Important to think critically about computing and its pervasiveness

Xerox Parc



- Xerox PARC - Californian research labs
  - Where ethernet, laser printers, GUI, the mouse etc. was invented
- Mark Weiser, chief of the computing science lab - pushes his vision of the next revolution in computing
- Computing would become so cheap, so numerous that it would become embedded into everything from doorhandles to light switches


PARC Scoreboa
News of June 27,
05 VIRGINIABEACH

The development of computing

- Computers have become
  - faster
  - cheaper
  - smaller
  - more numerous
  - *more annoying*

As computers have become more embedded in our lives in many ways they have become disruptive

Mark Weiser's challenge

- How can we build computers that integrate with our lives?
- People are most effective and authentic when they are fully engaged in the world with body and mind
- Computing should enhance this ability to engage with the world
- The notion of the disappearing computer

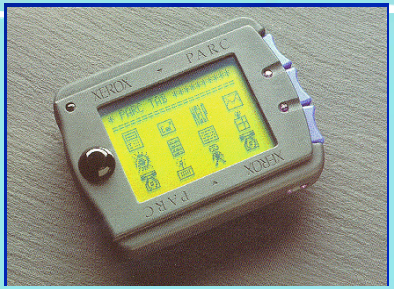
The vision

- Technology embedded into the world in small and large forms
- A wireless network infrastructure that enables devices to work together
- Location sensitive technologies to guess and understand context
  - *Invisible and calm computing*

Interaction mode

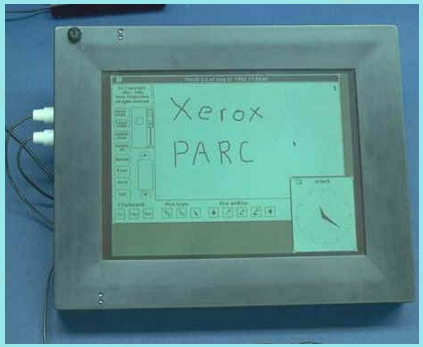
- Handwriting recognition
- Speech recognition
- Small keyboards
- Sensorbased interaction
- The light turns out when there is no motion
- Windows automatically close after 5 pm in the office

How to do this?



Phones

- Tabs
- Pads
- Boards



Laptops

Displays

Clocks

Portable games

Cards

Three prerequisites

- Hardware (cheap and fast computing)
- Software
- Networking (particularly wireless)

Active badges re-route phone calls

Ubicomp in Context

- Xerox Parc was a company out of Xerox, the major copy machine company
- Wanted to go from being a paper company to a document company
- Really worried they would be obsolete soon

Discussion

- Which things have come true?
- Which things have yet to come true?
- Which things will never come true

Envisioning Scenarios

- Stuart Reeves: Envisioning Ubiquitous Computing
- Describes how envisioning is part of a research narrative for ubiquitous computing
- Envisioning has led to certain expectations and actual development
- But real development has often gone in different directions, for example in Virtual Reality

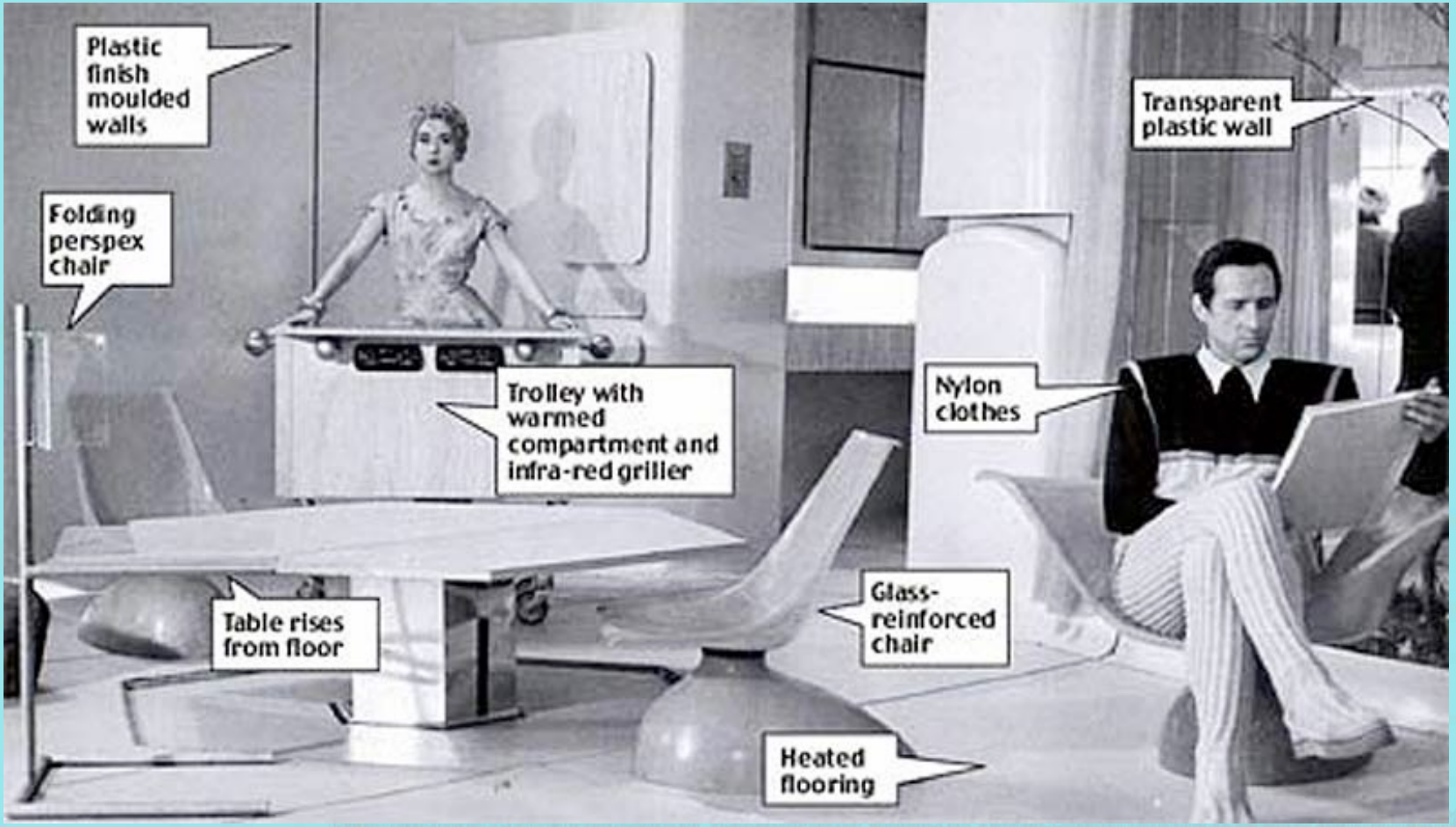
Envisioning the future home

- Has been done since the 50s
- Rooted in home appliance development
- Ubiquitous electricity and cheaper motors
- Vacuums, washers, toasters, blenders
- Technologies that make it easier for the house wife (or do they?)

Future house of 1956

- No Fridge - meat and fish was gamma-rayed for eliminating germs
- No stove - electrical pans and pots can cook on any surface
- Furniture would appear from the floor by a flick of a switch

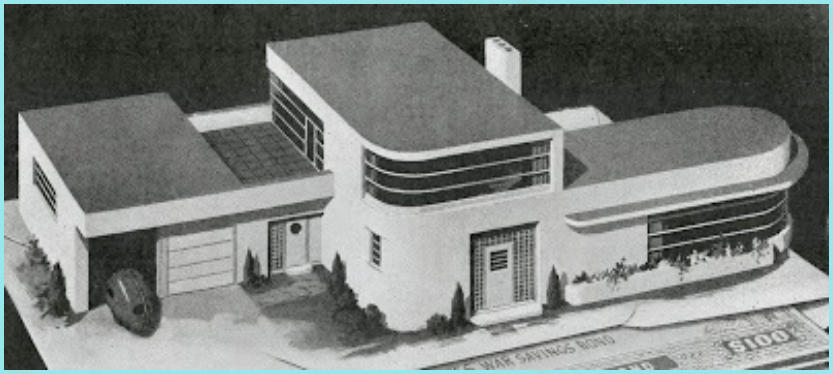
1956: 2006


Plastic finish moulded walls
Folding perspex chair
Trolley with warmed compartment and infra-red griller
Table rises from floor
Transparent plastic wall
Nylon clothes
Glass-reinforced chair
Heated flooring

1956


This is your future
3D Color TV Wall Panel
Slide-back Roof
Personal Helicopter and Roof Landing Area
Moving Stairway
House-control Panel
Channel 33
Glass Walls
Dust-free Floors
Menu Selector and Microwave Stove
Giant-size Fruit
Ultrasonic Laundry
Electrical Heat Unit
Phono-vision Receiver

Actual Implementations



- Several companies started making prototypes in the 70-80s
- The Honeywell House, NAHB Smart House, Xanadu
- Focused on lighting, security and entertainment

Computer Controlled House

- Smart house is a computer controlled house
  - Controlling electricity, music, security
- Integration
  - Energy (heating and lighting), safety (security alarms), communication (information and messaging), entertainment

- Honeywell invited people to test the house for dinner
- Light sensor went out when sitting still at dinner
- Consider voice activation
- Now solved with longer time-outs

- No help with house work
- They merely talk about integration of technologies
- Only examples are about communication
  - vacuum cleaner will stop automatically when there are someone at the door

Why not focus on housework?

- Smart homes essentially conceptualized by men (and engineers)
- Housework is invisible
- Housework is boring!

Philips Vision of the Future

Envisioning Discussion

- What does Stuart Reeves say about Envisioning as a way of addressing technology development?
- How does envisioning affect our perception of computing?
- Think of examples of envisioning in the media

Exercise

- Discuss with your neighbor an envision scenario of a mobile device in 30 years. Describe the user and the situation. How realistic is this scenario?

Thank you!