

# Seamful Ubiquity

## Beyond Seamless Integration

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# Weiser and 'Seamfulness'

- A good tool: focus on the task not the tool
  - Often taken as meaning *seamless* technology
  - All places the same, all tech tools hidden
- Instead: 'seamful' technologies
  - Tool is apparent but with “beautiful seams”
  - Can use or adapt the tool when one wants to
  - e.g. showing mobile phone cells & strengths

# The 'City' Project

- Three visitors to an exhibition room
  - One using a wearable/handheld computer
  - One using 3D VR and textual web pages
  - One using 2D map and textual web pages
- Each visitor gets location-specific content
- Mutual awareness of location in room
  - Activity in each medium represented in others
  - Also shared audio connection and shared exhibition text
- First system built and deployed
  - Recently finished user trials in Glasgow





# Uncertainty

- Handheld has position tracked via ultrasound
  - 95% accuracy of 1.83m
- Sensors always have some uncertainty
  - Ultrasound, GPS...
- Can't always make things 'perfect' and seamless
  - Instead: positive choice to reveal and use uncertainty
  - e.g. system shows sensed position as a spatial extent
  - e.g. people using inaccuracy as a tool for privacy

# Design for Appropriation

- Systems built to support users' adaptation
  - Let users appropriate it for their own new uses
- Design requirement: seamfulness
  - Underlying models visible to users
  - Processes that change the models visible to users
  - Control and feedback of models
- A good tool lets you focus on the task
  - ...even when the task involves the tool itself

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