Ubiquitous and Mobile Computing
new directions in user system interaction

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Wireless Communications

- Mobile Phones' Wireless Data units will have the most often used interfaces.

- One of the major impact of wireless communications will be the **synchronization of social activities** in time and space.

Ubiquitous Computing

- Two issues are of crucial importance: location and scale

  - Location : ubiquitous computers must know where they are

  - Inch-scale machines: approximate active Post-It notes

  - Foot-scale machines: like a sheet of paper (or a book or a magazine)

  - Yard-scale machines: the equivalent of a blackboard or bulletin board

- Prototype tabs, pads and boards are just the beginning of ubiquitous computing

Mobile Computing

Mobile application categories:

- information access

- communication

- computer supported collaboration

- remote control

- local data/applications

Three characteristics differentiate a tab, pad etc. and the kinds of applications that it supports from traditional personal computers:

- **Portability**:
  very small form factor, low-weight

- **Communication**:
  low-latency interaction between users and system

- **Context-sensitive operation**

Half-QWERTY

- Typing With One Hand Using Your Two-handed Skills

- Half-QWERTY is a one-handed typing technique, designed to facilitate the transfer of two-handed typing skill to the one-handed condition

The PARCtab

- The PARCtab is most easily operated with two hands: one to hold the tab, the other to use a passive stylus or a finger to touch the screen.

- But since office workers often seem to have their hands full, we designed the tab so that three mechanical buttons fall beneath the fingers of the same hand that holds the tab, allowing one-handed use.

- The device also includes a piezo-electric speaker so that applications can generate audio feedback

The Unistroke alphabet

a b c d e f g h i j k l m

n o p q r s t u v w x y z

- Techniques for handwriting recognition have improved in recent years, and are used on some PDAs for text entry.

- But they are still far from ideal since they respond differently to the unique writing characteristics of each operator.

- Xerox PARC have experimented on the PARCTAB with Unistrokes, which depart from the traditional approach in that they require the user to learn a new alphabet---one designed specifically to make handwriting easier to recognize

The PalmPilot

- The PalmPilot has a lot functionality.

- This device fits with its pocket size into one hand.

- There is a communication channel via IR to the PC.

- Small, and a reasonable price

Handwritten Input for PalmPilot

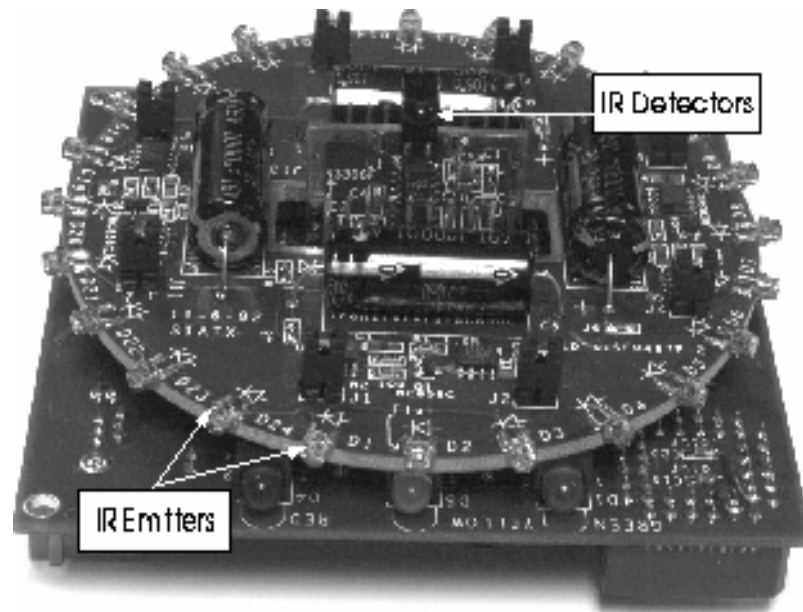- Input similar to "natural" alphabet

- not user specific

- minimize the user's learning and adapting costs

The PARCTAB transceiver

- Xerox PARC designed the transceiver conservatively to ensure reliable communication. For transmission, two dozen IR emitters are placed at 15 degree intervals on a circular printed circuit board. For reception, two detectors provide a total viewing angle of 360 degrees. The transceiver is designed to be attached to a ceiling, preferably in the middle of a room as this usually gives an unobscured communication path over the required area.

Love-Gety

- There's a Lovegety for men (blue underside), and a Lovegety for women (pink underside).

- They notify each other when a Lovegety of the opposite sex is in range.

- The lovegety operates on 300Mhz frequency and uses 2 AAA batteries.

How to operate a Love-Gety
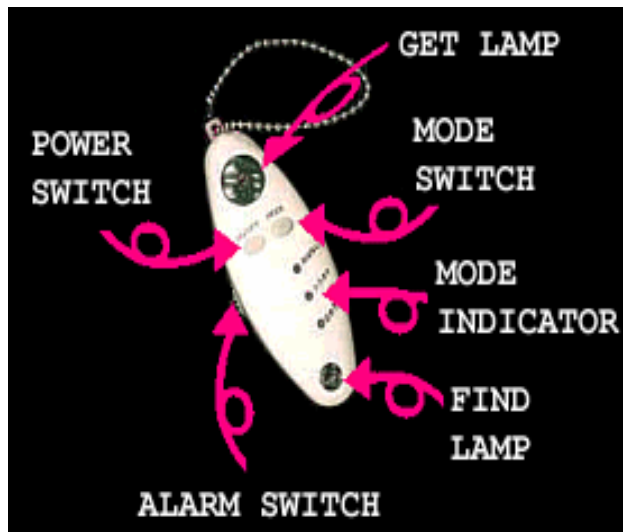
- Turn on the "**POWER SWITCH**" and select the "**MODE**" you want with the "**MODE SWITCH**".

- You can confirm the "**MODE**" you just selected while the red indicator blinks.

- The larger "**GET**" light on the LOVEGETY blinks when someone with a Lovegety of the opposite sex has selected the same "**MODE**" as your *LOVEGETY*.

- The "**FIND**" light on the *LOVEGETY* also blinks when someone nearby with an opposite sex *LOVEGETY*, has their LOVEGETY on but under a different "**MODE**".

Wearable Computer

- Providing hands-free operation
- Sharing the data in real-time with background
- Supporting user comfort
- Allowing audio interactions in a noisy environment
- Creating a simple user interface
- Keeping costs down

Electronic Performance Support System

- Food processing plant worker with a first-generation prototype wearable computer.

- Possible applications include support for quality control data collection or assistance with environmental auditing.

- This system gives its users the information the users need to perform a task as they actually perform the task.

Airline Applications

- This remarkable ultra-lightweight computer, worn as a belt, delivers maximum information to users with a minimum of work.

- Designed for individuals who demand mobility, this computer offers voice control and heads up display for complete, hands-free operation.

- Users can enter or retrieve information while going about their jobs, instead of constantly returning to the shop area to check a stationary computer, or stopping work to punch keys.

The Interactive Office
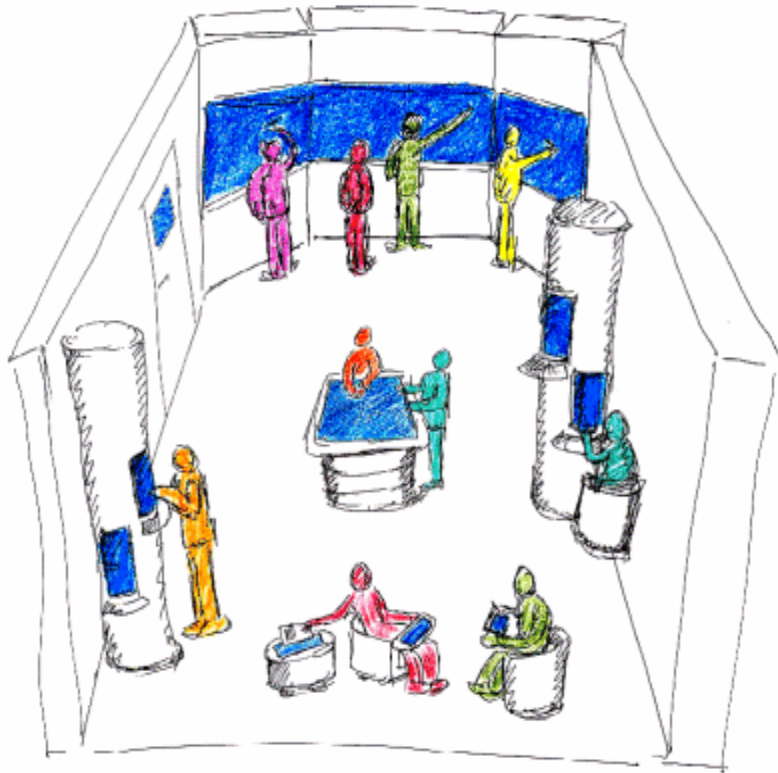
- A project team enters the room. The "room senses" the members of the team, compares this list to previous users of the room and identifies a team and the project discussed at the last meeting.

- The content and the structure of the information is displayed again on the different roomware components (e.g., the DynaWall, the InteracTable).

- A generalization of this idea results in what GMD calls *attentive, active, and adaptive rooms or environment* .

The InteracTable

- The current stand-up version of the InteracTable is built as a vertical rear-projection unit with a touch-sensitive display surface.

- Inside the table, an LCD beamer projects a high-resolution image of 1024x768 pixels to the top of the table.

- The integrated wireless network provides the InteracTable with a high degree of flexibility

The DynaWall and two CommChairs

- The size of the DynaWall opens a new set of human-computer interactions.

- It is possible that information objects can be taken at one position and put somewhere else on the display or thrown from one side to the opposite side.

- Dialog boxes always appear in front of the current user(s). User interface components are always at hand, etc.