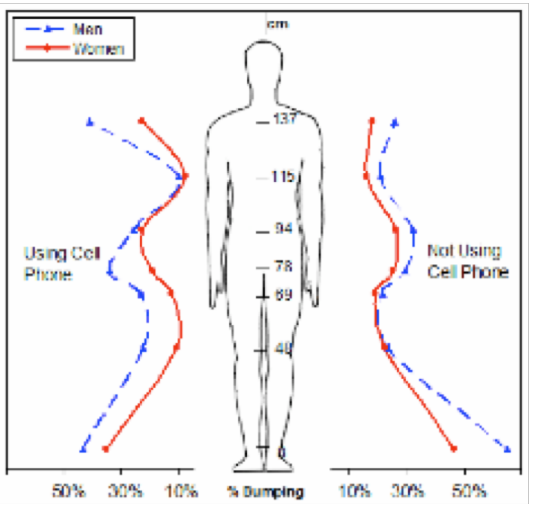
Auditory Displays

Was ist ein Auditory Display?

"The use of non-linguistic sound to represent information of all kinds" ("Sonification Report")

Special strengths:
- Providing information when visual attention is elsewhere
- Focusing the user attention
- Navigation, orientation (eg in menus)
- Relieving cognition through multimodality, • Increasing efficiency through redundancy
- Non-verbal sounds can work universally like icons (eg sound symbols in movies!)



Alerts, Notifications, Alarms

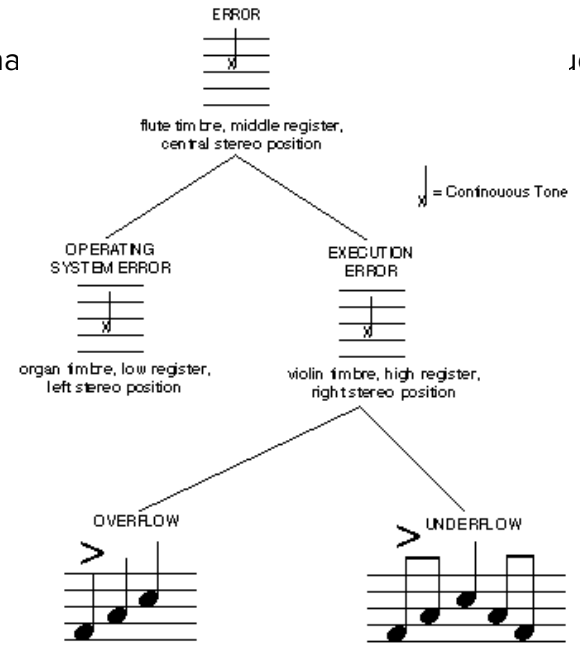
- Examples?
- Sound shows that something happened or will happen
- Little information included: "It burns", but not "850 degrees, 3rd floor" etc.
- Notification, Alarm,
- Statusinformation
- Processinformation
- Often not enough to cope with the increasing complexity of applications. Follow-up concepts are "Auditory Icons" and "Earcons"

Auditory Icons

- Icon = Abstract representation of a "real" object, refers to this by "similarity"
- Use of "everyday sounds"
- Based on auditory experiences
- Metaphorical, reference
- Examples
  - Camera
  - Trashbin
- Advantage: recognizability, association
- Physical Models (see paper jam)

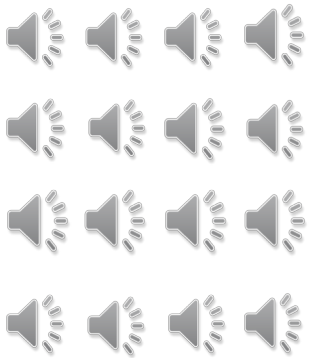
Earcons

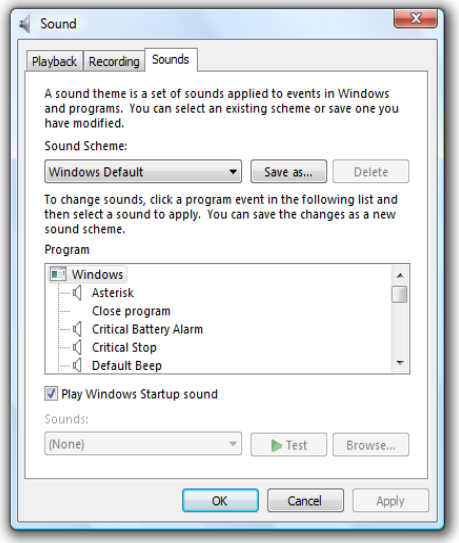
- Earcons: abstract, tonal, often synthetic sound events, "musical" (1, 2, 3)
- Guidelines the creation: (siehe auch http://www.dcs.gla.ac.uk/~stephen/earcon_guidelines.shtml)
  - Tone: multiple harmonies, different instruments
  - Pitch: unsuitable for absolute determination as the only parameter. Helps in identifying when complex and even combined with rhythm.
  - Rhythms are most effective when the number of notes differs.
  - If rhythms are too similar, even different tones can not be optimally distinguished.
  - Duration must be matched to interaction sequence
  - Volume usually unsuitable for differentiation, except for foreground / background. Limit dyna udibility



Ex1: Systematics

- Comprehensive and flexible infrastructure for employing sounds
- Ensuring minimal consistency with styleguide
- Skins and sound schemes ensure minimal consistency and quality while providing customizability
- Examples
  - Logon
  - Battery critical
  - General notification
  - Print complete





Ex2: Systematics, Branding

- All functional sounds are complex and detailed and share common design quality.
- Every sound is a “brand” sound
  - “Whilst composing these sounds the most important thing was to create a strong character and personality for the evolving brand and medium.” (http://www.soundtree.co.uk)

- Examples:
  - Sign in
  - Incoming message
  - Ringtone
  - File send error

Version 5

Ex3: Emotionalisation, Welcome

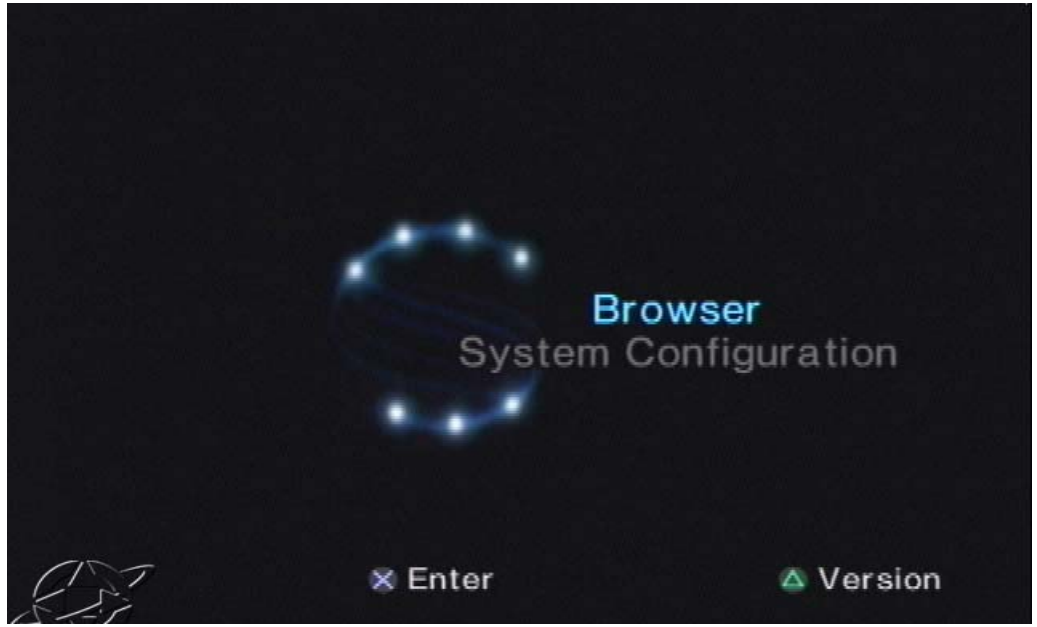
- Sounds and animations associated with the device or service activation
- May be used to “bridge” loading / update processes
- General user expectation from game consoles, adopted by Google TV, Apple TV and others

- Examples:
  - Apple Boot Sound legacy
  - Apple TV Welcome Movie
    -> elaboration of boot sound

Ex4: Atmosphere

- Long and subtle background atmosphere

- Functional sounds (menu navigation) embedded in a sonic environment



Ex5: Diversity, Design Refresh

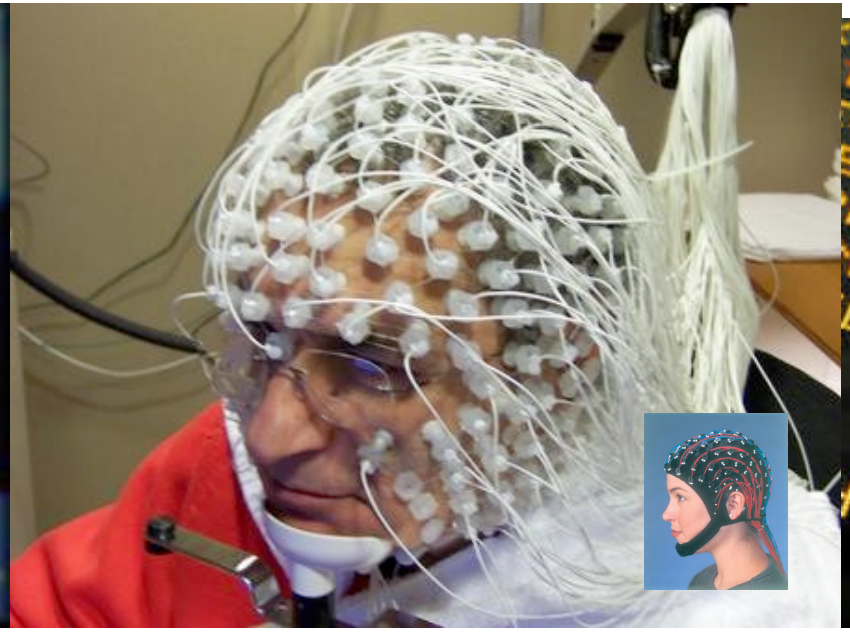
- Comprehensive sound use
- Startup and functional sounds with variations
- Sound redesign for significant updates

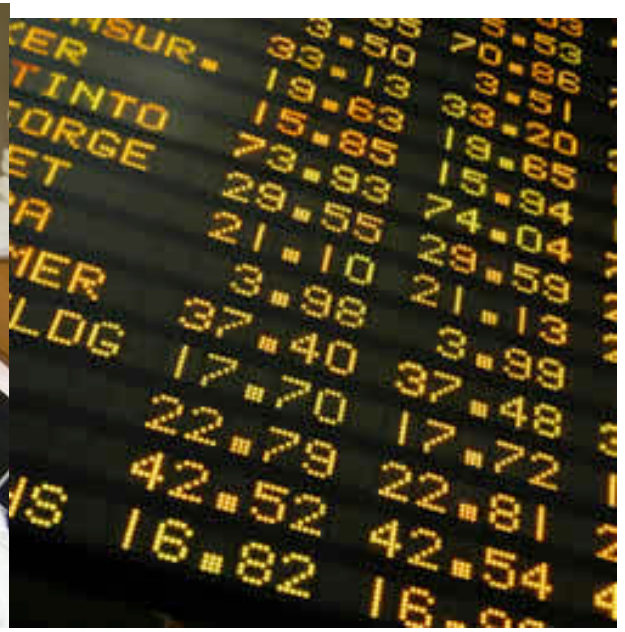
Before update

After update

Sonification: Data-based sonification

- Data-based sonification: data relationships are mapped to tonal parameters. "Auditory Graphs"
- Up to 8 parallel streams can be displayed!
- applications in medicine, biometrics, geology, economic analysis, scientific presentation in general ...





Sonification: Data-based sonification

Examples

- Listening to the Mind listening (Konzert, ICAD 2004) eg Dribus
  http://www.icad.org/websiteV2.0/Conferences/ICAD2004/concert.htm
- Ben Cohen: Nuclear Warheads
- Guillaume Potard's Iraq Body Count
- More example: http://www.sonification.de/publications/paper-media.shtml