

## TUISTER: a Tangible UI for Hierarchical Structures

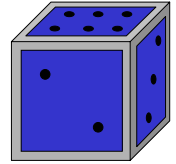


Andreas Butz, Antonio Krüger, Markus Groß,  
Saarland University, Saarbrücken, Germany  
[butz,gross,krueger]@cs.uni-sb.de  
w5.cs.uni-sb.de, www.fluidum.org



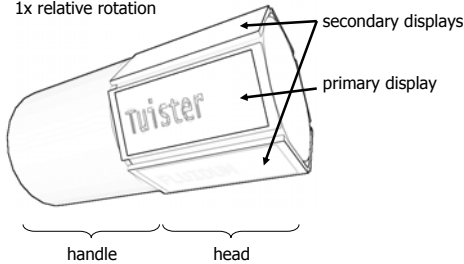
## Initial Idea

- Build a TUI with built-in display
  - Orientation sensitive
  - Direct feedback
  - Standalone operation
- Technical problems
  - No square OLED displays
- Cognitive issues
  - Different ways to any side
  - Action history?
  - Display orientation?

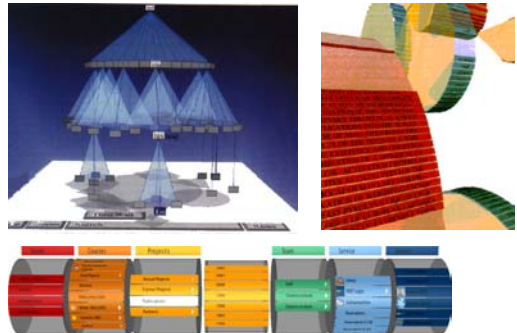


## Conceptual design of TUISTER

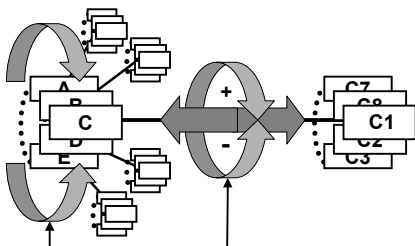
sensors for orientation:  
3x 1D magnetic  
2x 2D gravity  
1x relative rotation



## Intuition: Cone/Lyber trees



## Browsing Hierarchical Menus

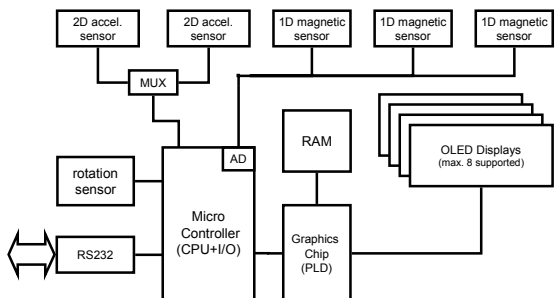


dominant hand:  
choose menu entry  
metaphor: choice dial

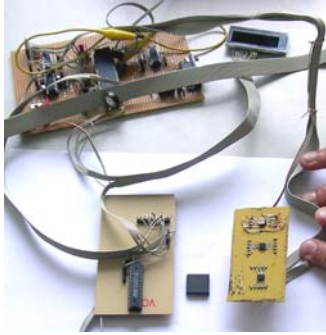
non-dominant hand:  
go up/down one level  
metaphor: (un)fasten a screw



## Functional Diagram



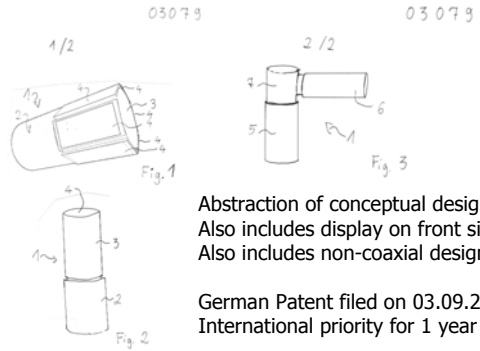
## Current Prototype



experimental circuit boards  
electronics fully functional  
PLD programming finished  
Serial cable connection

FLUIDUM

## Patent Filed Last Week

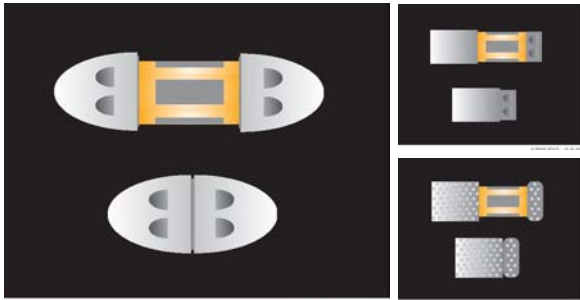


Abstraction of conceptual design  
Also includes display on front side  
Also includes non-coaxial designs

German Patent filed on 03.09.2003  
International priority for 1 year

FLUIDUM

## Design Alternatives



FLUIDUM

## Immediate Commercial Potential



Integration of DAB Radio with MP3 player as a TUISTER  
Head displays for choice of senders/songs  
Handle rotation for volume (??)  
Whole device orientation for (control) on/off (??)

FLUIDUM

## Outlook and Discussion

- Further applications
  - Browsing tables (columns: screw metaphor?)
  - Browsing 2D graphics (maps)
- Mechanical design
  - Free rotation <-> clicking
- User studies needed
  - Metaphors really intuitive?
  - Learning curve
  - Speed of usage
  - Motor memory



- [w5.cs.uni-sb.de](http://w5.cs.uni-sb.de), [www.fluidum.org](http://www.fluidum.org), [butz@cs.uni-sb.de](mailto:butz@cs.uni-sb.de)
- IUI '04 workshop: Multi User Ubiquitous UI [www.MU3I.org](http://www.MU3I.org)

FLUIDUM