Strip’TIC
Exploring Augmented Paper Strips For Air Traffic Controllers

Christophe Hurter, Rémi Lesbordes, Catherine Letondal, Jean-Luc Vinot, Stéphane Conversy
Observations and participatory design workshops

- Initial study
  - September 2010
  - Prototype V0

- 2nd phase
  - March 2011
  - Prototype V1

- 3rd phase
  - August 2011
  - Prototype V2
  - September 2011
  - Workshop: Brainstorming and video prototyping with 5 controllers
  - Workshop: Brainstorming and video prototyping with 2 controllers

- 3 rounds of 2-hour training sessions with 6 controllers
- 1 workshop: validation of video brainstorming low-fi prototype design walkthrough
- 2 test sessions per session, 21 controllers, Questionnaires
- Observations in a control center

- Workshop: Brainstorming and video prototyping with Strip TIC 5 controllers
- Workshop: Brainstorming and video prototyping with Strip TIC 2 controllers
(slightly a-) synchronous collaboration

• 2 controllers with different responsibilities
  – planner: anticipation, overall organisation, coordination with adjacent sectors
  – tactic: decisions, communication with pilots

• communication
  – handwriting, signs or even drawings on strips, and on digital paper notepads
  – audio context
  – non verbal
    • strips layout
    • gestures (strips layout, writing, pointing on the screen)

• asynchronous+synchronous collaboration:
  – need to manage interruptions or rely on peripheral awareness
interactive paper and writing properties to support these needs

• tangible language of paper
  – strips layout
  – gestures for positioning and re-arranging strips
  – holding items in stand-by (Terrenghi et al 2007)

• writing
  – rich communication in physical space
  – persistence
  – almost « embodied » (= gestures): speed, pressure, ...
physical/digital design

• design of hybrid systems features: how to choose between virtual and tangible?
• interactions with strips:
  – physical strips: efficiency, awareness, flexibility
  – virtual strips:
    • added information, anticipation
    • transient situations, e.g. ungrouping sectors:
      – virtual strip duplicated in 2 locations
      – but virtual strip unpaired indicates this « special state »
collaborative building of a shared « picture » of the context

• « picture » of the context (Harper&Hughes 1991)
  – not only visual, also causal
  – built on recent history and anticipation of the near future
  – knowledge of how this history is built (causality)

• controller’s task= kind of programming
  – visualization: display of a set of task requirements
  – scheduling highly temporal (delays, alarms, …)

• time support:
  – timeline
  – replaying recorded past interactions
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Strip’TIC: Stripping Tangible Interface for Controllers
perso.tls.cena.fr/hurter/StripTic/StripTic.html
"AF1234 turn 20° right"