TISYE1 – Systems Engineering – (Winter/Spring 2012)

Activity 1:

Mission critical interaction design

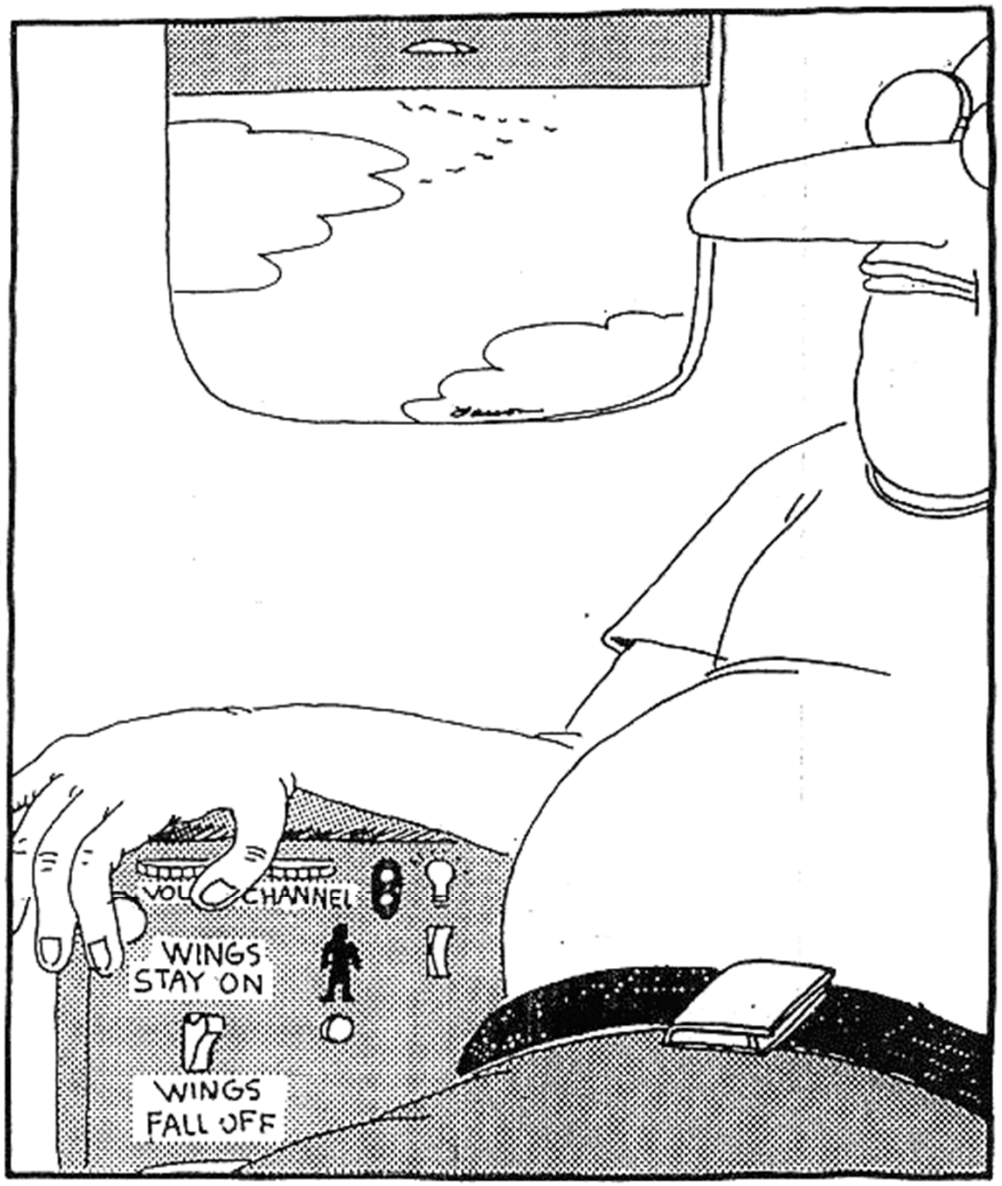
Rune Hylsberg Jacobsen

(Email: rhj@iha.dk; room 316E)

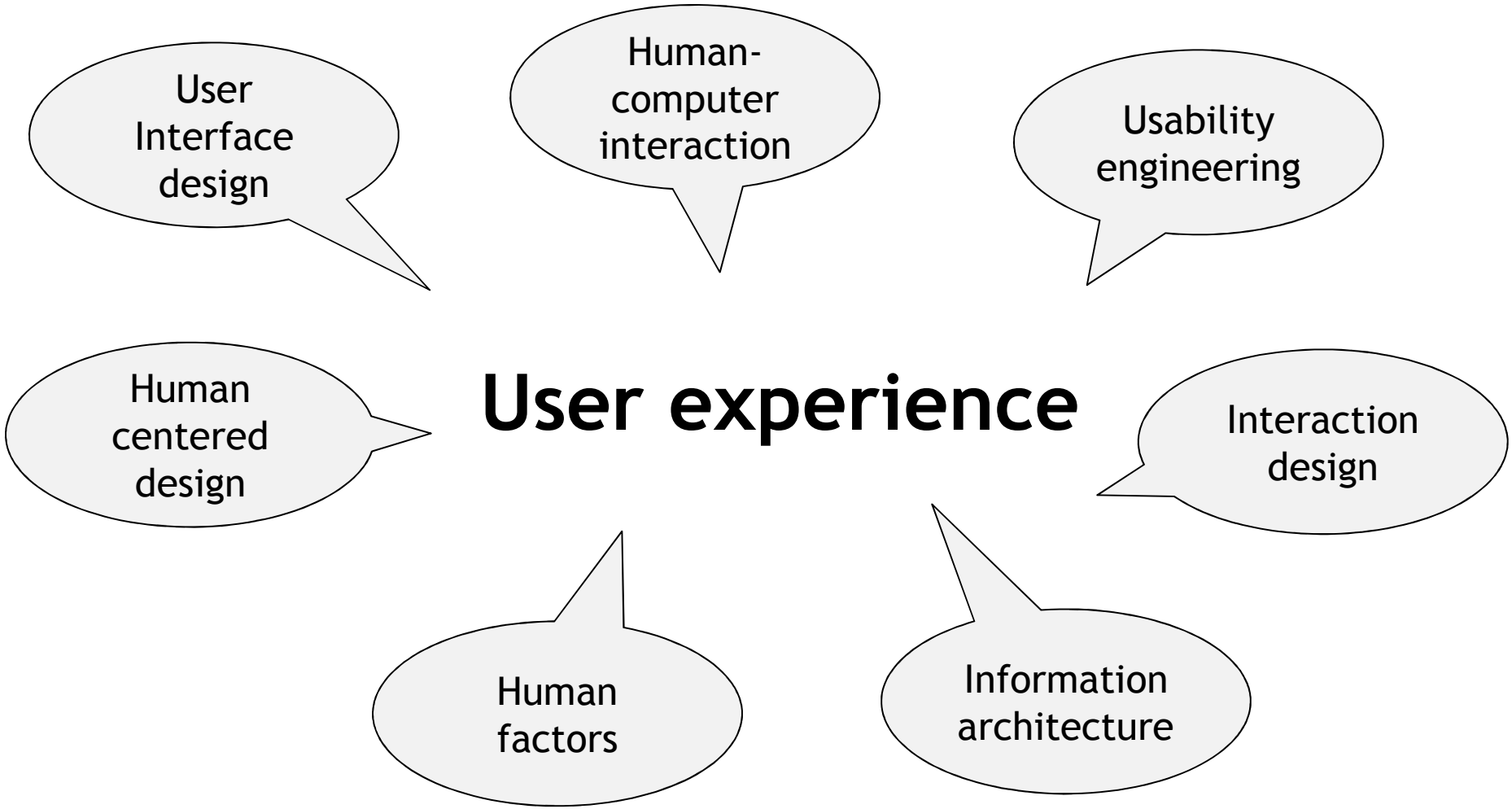
AARHUS SCHOOL OF ENGINEERING

Mission critical areas

- Healthcare
- Military
- Transport
  - Personal transportation
  - Transportation management
  - Industrial (aviation, construction …)
- Space exploration
- Intelligence community
- Emergency services
  - Police, fire rescue, paramedics etc.
- Energy management
  (renewable, conventional, nuclear …)



Fumbling for his recline button,
Ted unwittingly instigates a disaster.

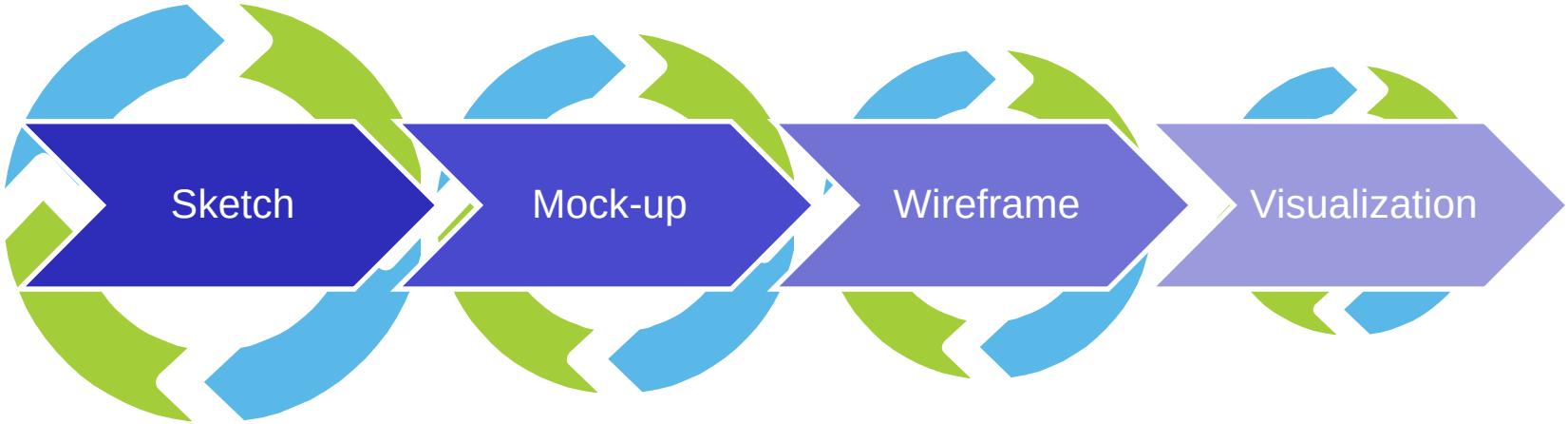


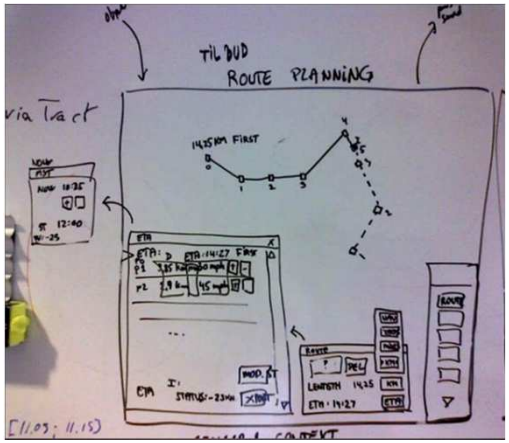
"a person's perceptions and responses that result from the use or anticipated use of a product, system or service“ (ISO 9241-210)

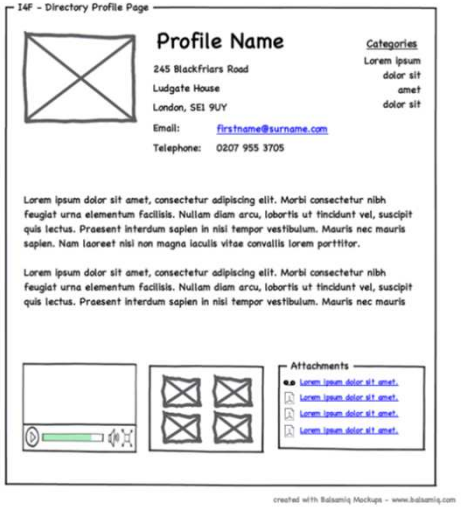
Key success factor of user experience

- **Usability**
  - Maximize user efficiency, effectiveness and satisfaction by using of the systems
- **Graphical design**
  - Produce a readable, available, transparent and attractive visual design and layout of the user interface
- **Internationalization**
  - Strengthen the capacity of the system in different linguistic contexts
- **Accessibility**
  - Handling and strengthening the usability of the system in diverse physical environments or in relation to any physical handicap of the user.
- **Training**
  - Educating users in completing their task in the system.
- **Documentation**
  - Optimize the availability of documentation for the system.
- **…**

Phases in interaction design

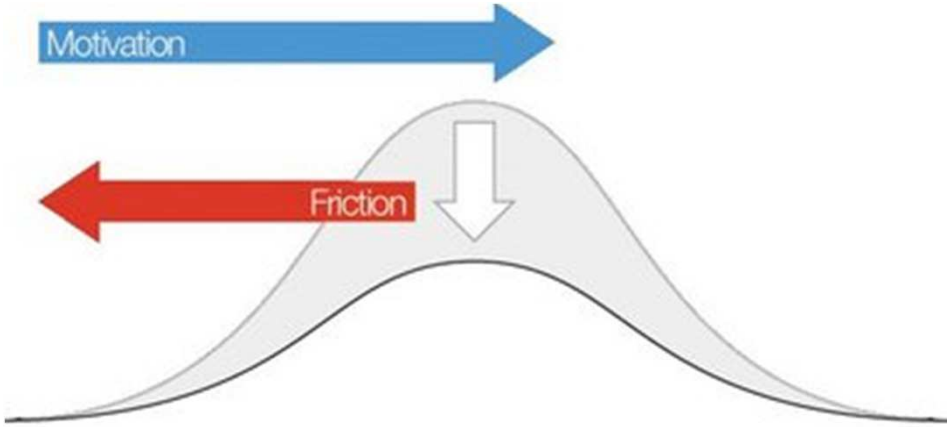






AARHUS SCHOOL OF ENGINEERING

Designing for usability vs. motivation



- **Friction** can stop any user who otherwise had the momentum to complete a certain task.
- **Motivation** pushes the user forward and adds even more momentum to the game. If correctly motivated, users will be positively satisfied and be able to easily jump the hurdles set up by friction

Anders Toxboe, *Designing for usability vs. motivation*,
ui-patterns.com/blog/Designing-for-usability-vs-motivation

Ways to reduce Friction

- Reduce number of steps or layers
- Reduce number of elements
- Apply Fitts' law (human movement in human-interaction design)
- Visual design
- Reduce cognitive load
- Automate
- Improve performance

Exercise

Exercise: Mission critical interaction design

- Make an interaction design for a touch screen system for one person that monitors the tunnel under the Great Belt.
  - What subsystems/sensors are needed?
  - How are these subsystems shown and how does the user interact with them?
    - How is status shown?
    - How are alarms shown?
    - How does the user interact with the system and its alarms?
  - Consider states, touchablity, number of displays etc.

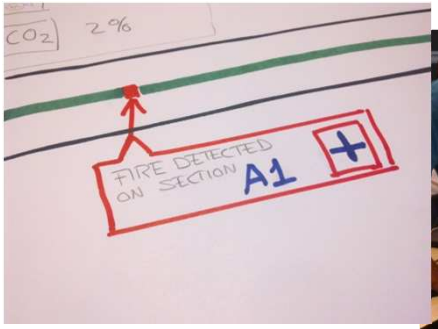
Surveillance system for the Great Belt tunnel

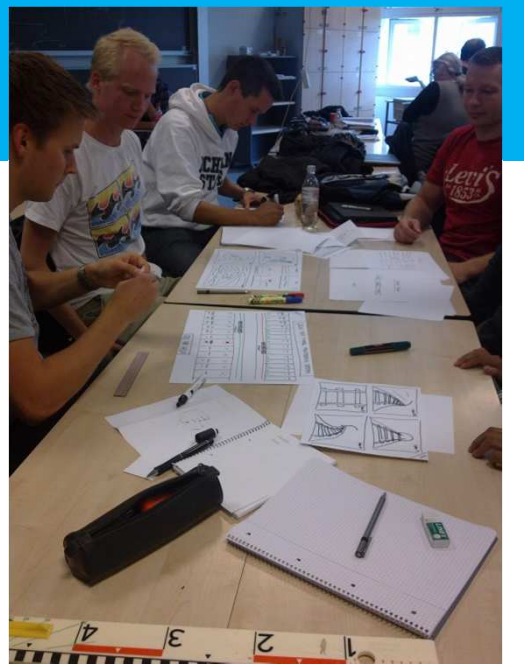
Sensor subsystems:

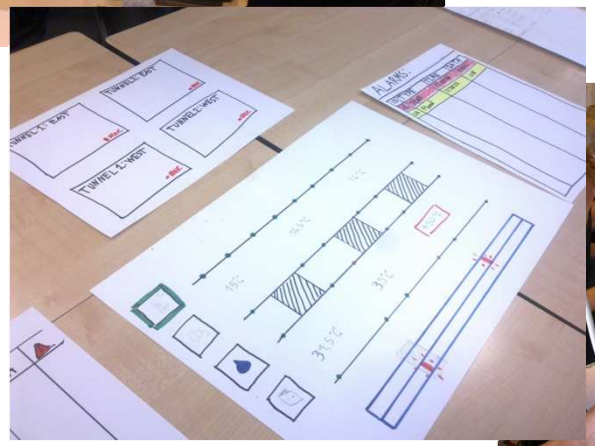
- Movement detection (Where are the trains?)
- Fire sensor
- Video cameras
- Fan status, fan control
- Gas detection sensor (CO2, explosive gasses)
- Chlorine gas
- Door sensors
- Water (floor and ceiling) -> Fire distinguishing and automatic pumping

Collaboration via Danish Emergency Management Agency (Beredskabet)

Interaction design at ASE in 2010







AARHUS SCHOOL OF ENGINEERING

References

- *Universal Principles of Design*, by William Lidwell, Kritina Holden, and Jill Butler, Rockport publisher, 2003.