



FRR



Overview

The development of a Friendly RestRoom

A user friendly restroom for elderly and persons with limited abilities



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Why a Friendly Restroom?

In Europe alone, 14,9% of the population is faced with problems as a result of getting older; in 2040, this will be 23%.

Our research has shown that 54% of the target users have difficulties in using the rest room

injuries from falling

balance problems

support

(un)dressing

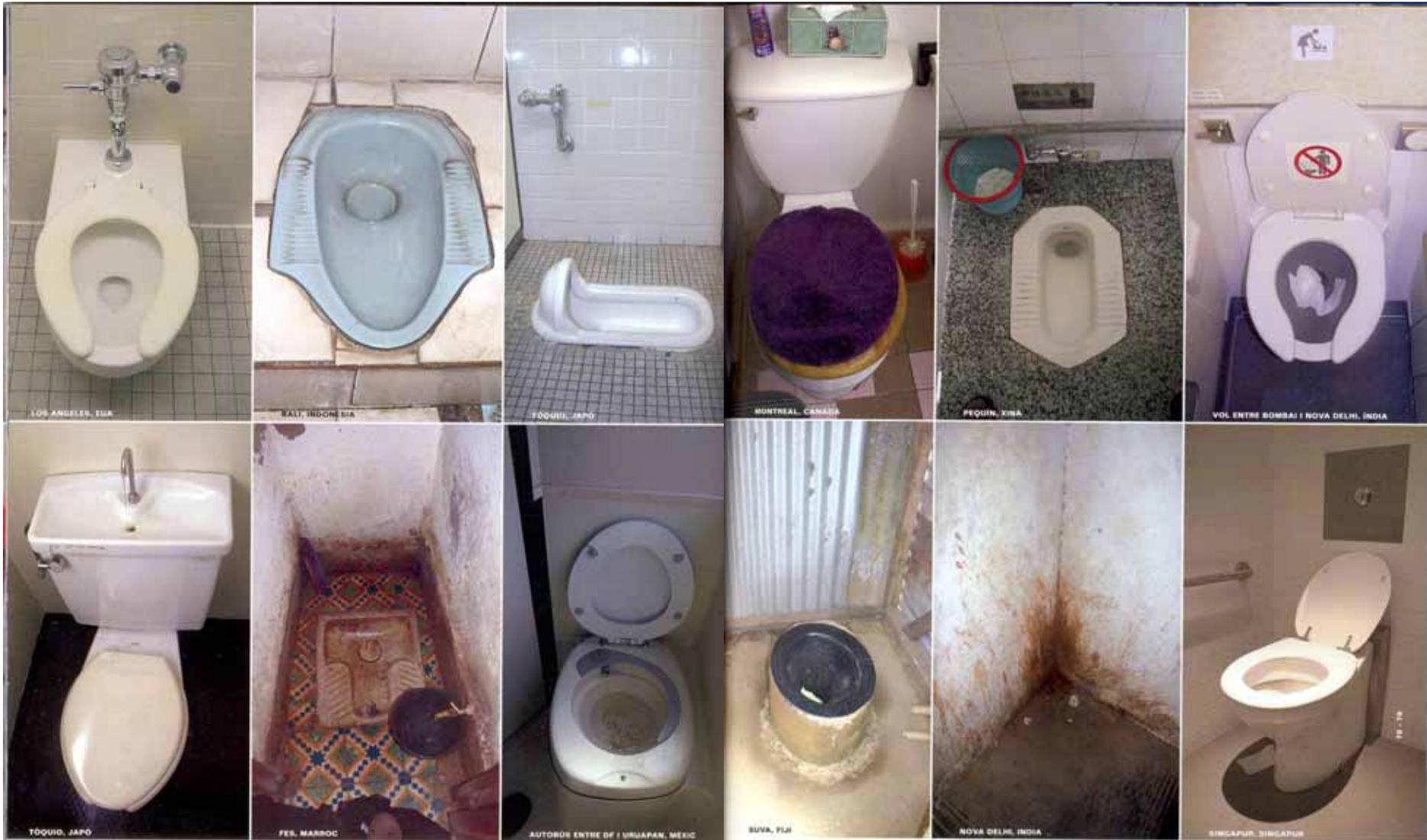
sitting down

getting up

hygiene

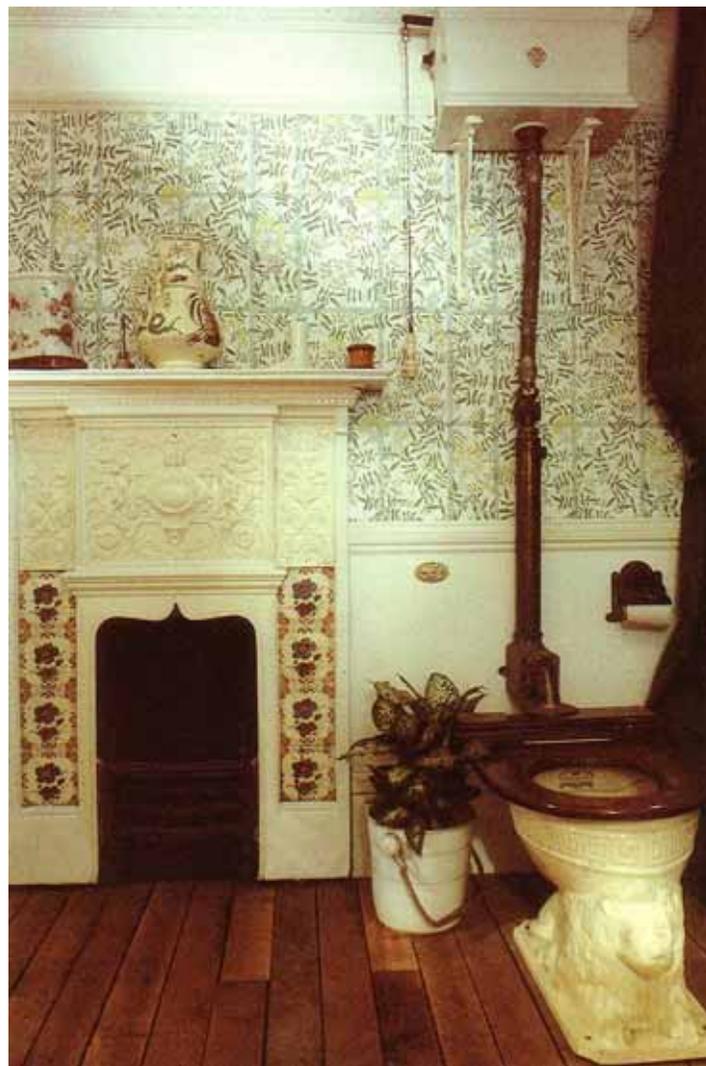
reaching





Past

We were so proud to have a toilet that we wanted it to be in our living room



‘Toilet in your living room’

Past



'Family toilet'

Present

'Typical Dutch toilet'



Future

'Toileting in public'



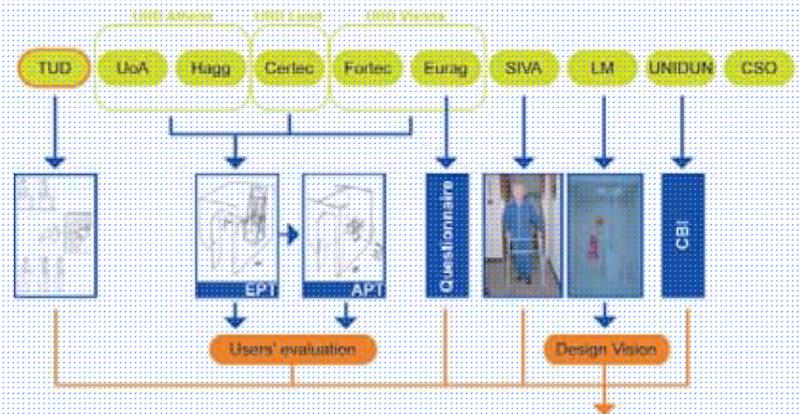
Objectives of the FRR project

Developing a user centered innovative smart toilet

Development of a "FRR new knowledge base"

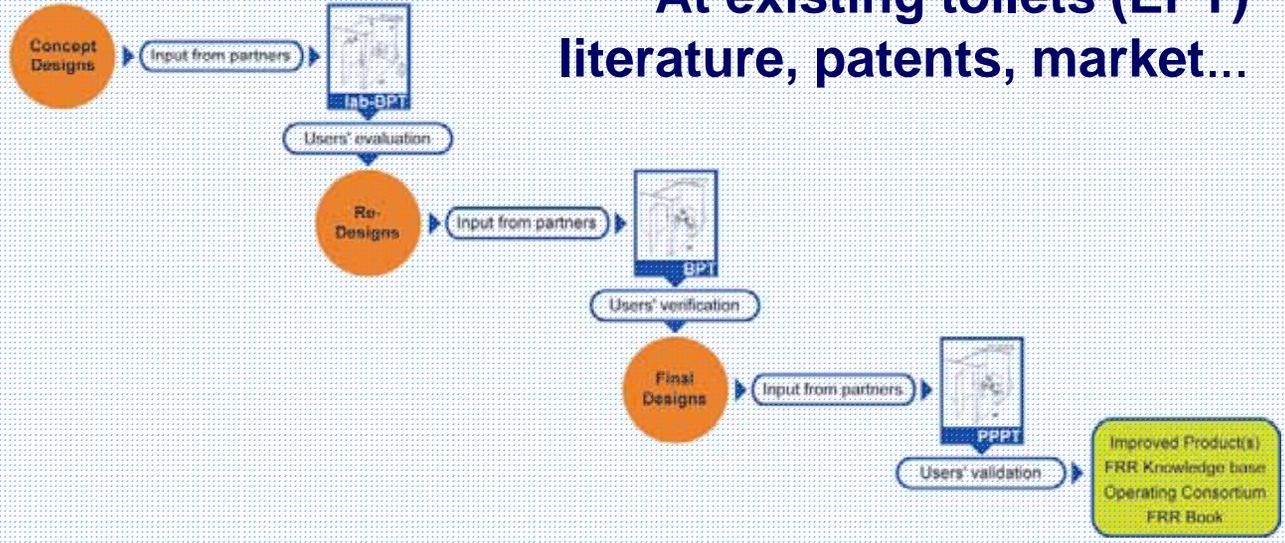
Establishment of an independently operating consortium

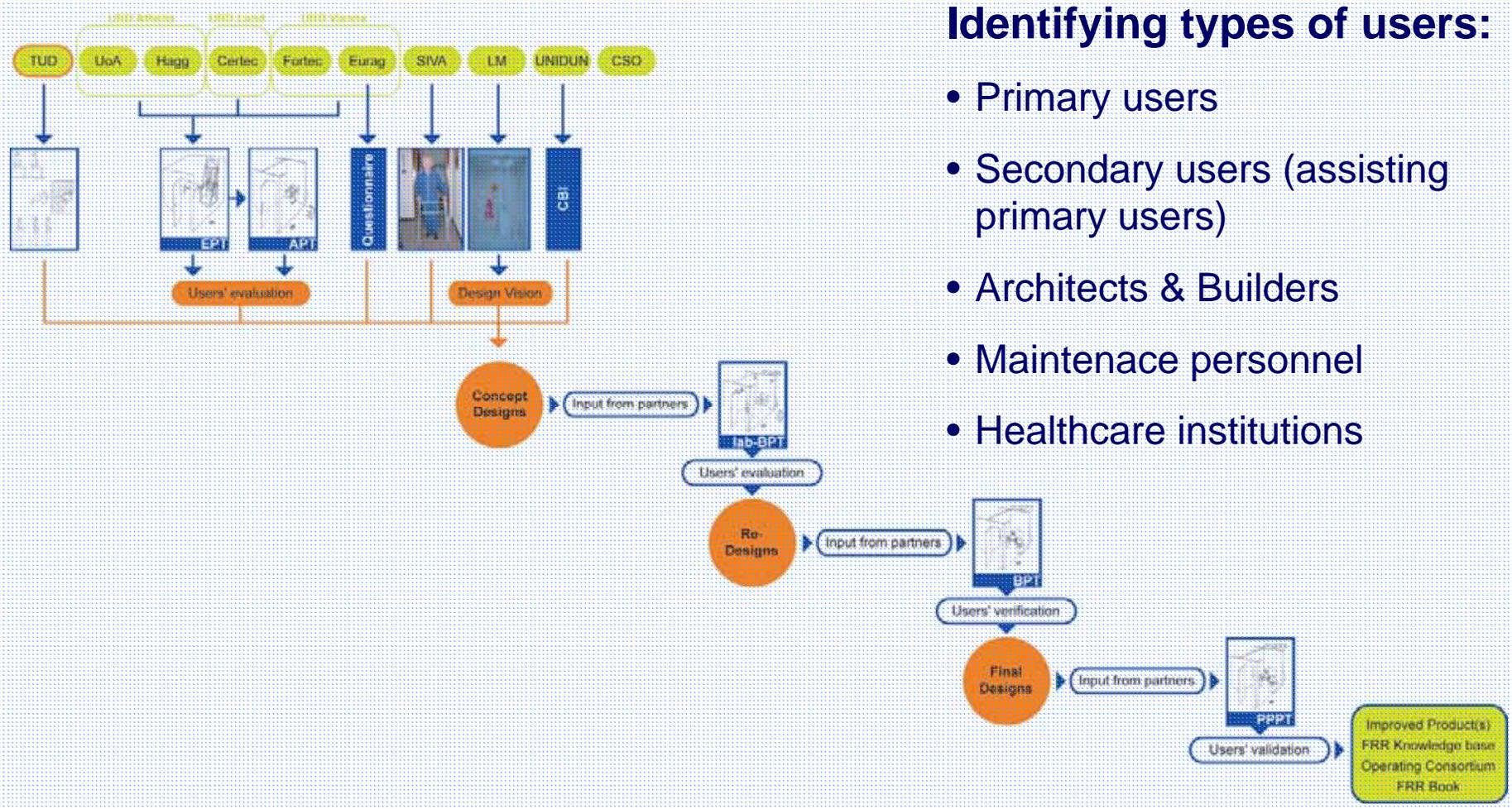
Publishing of project results in a book



...started by the partners doing **Research**

At existing toilets (EPT) literature, patents, market...





Interdisciplinary approach

Identifying types of users:

- Primary users
- Secondary users (assisting primary users)
- Architects & Builders
- Maintenance personnel
- Healthcare institutions

Behavioural studies in the Restroom

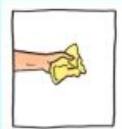


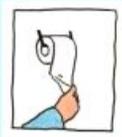
Computer Based Interviews

Female Users - Interview regarding body posture and cleaning habits



6. What means of cleaning do you prefer to use after defecating?

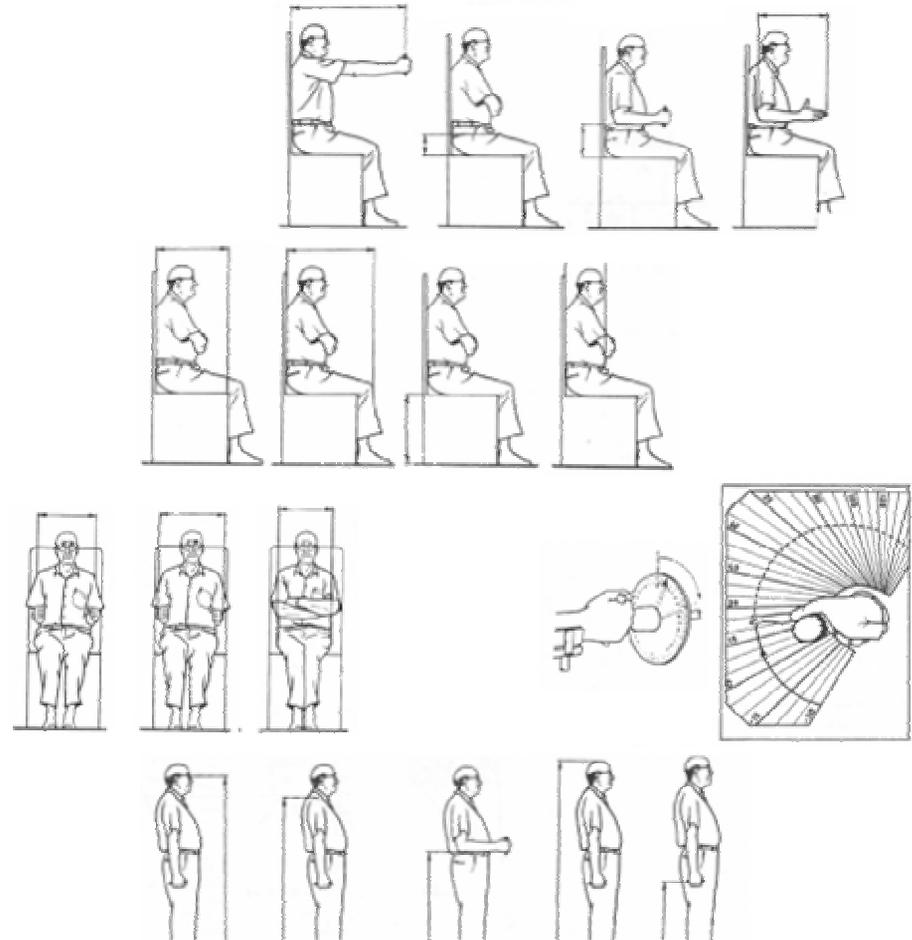
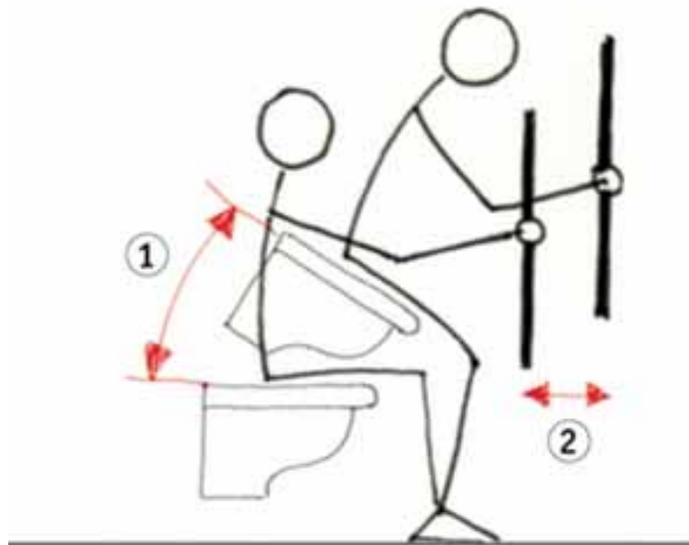
 towel or wet (toilet) paper
  hand shower or bidet

 dry (toilet) paper
 other

 water from bottle or cup

← →

Anthropometrics and Ergonomics



Problem analysis

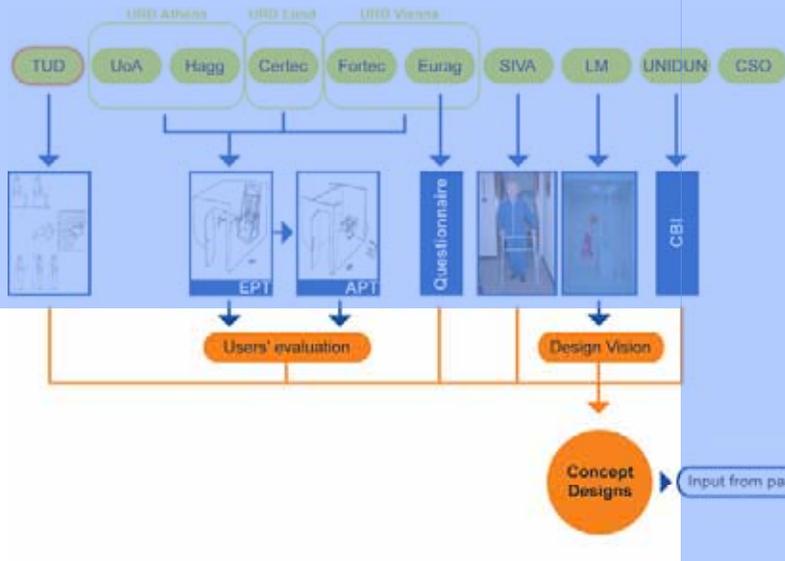
User handling/ interaction	Functions					
	1 finding restroom (detection)	2 under- standing if male or female	3 opening door	4 switching on light	5 closing door	6 locking door manually
A Walking/movement						
B Sitting down (dynamic)						
C Getting up (dynamic)						
D Standing (static/balance)						
E Sitting (static/balance, mobility joints)						
F Use of arm/hand						
G Seeing						
H Hearing						
I Speaking						
J Understanding (incl culture)						
K Fear (for safety)						
L Endurance (heart/lungs)						

probable problem
 definitely problem

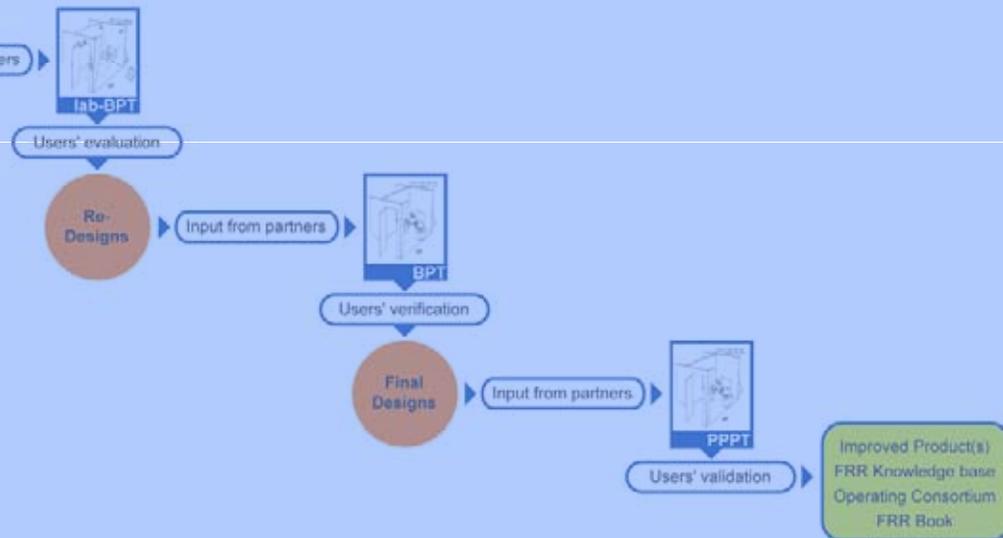
Process Tree

“Mathilde”

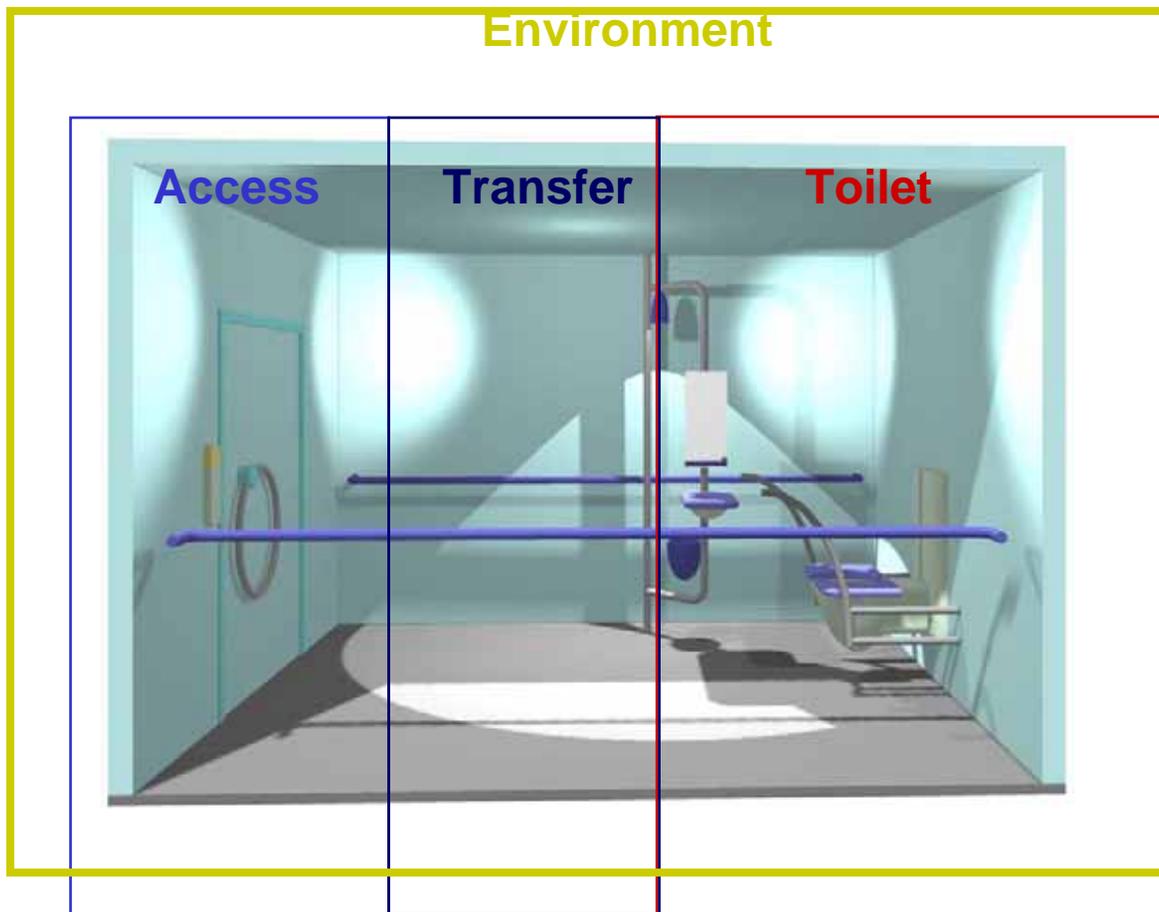


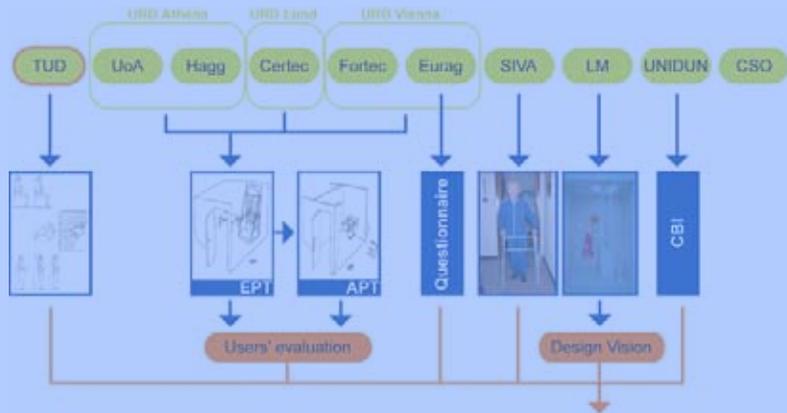


...which resulted in the first **Concept Designs...**

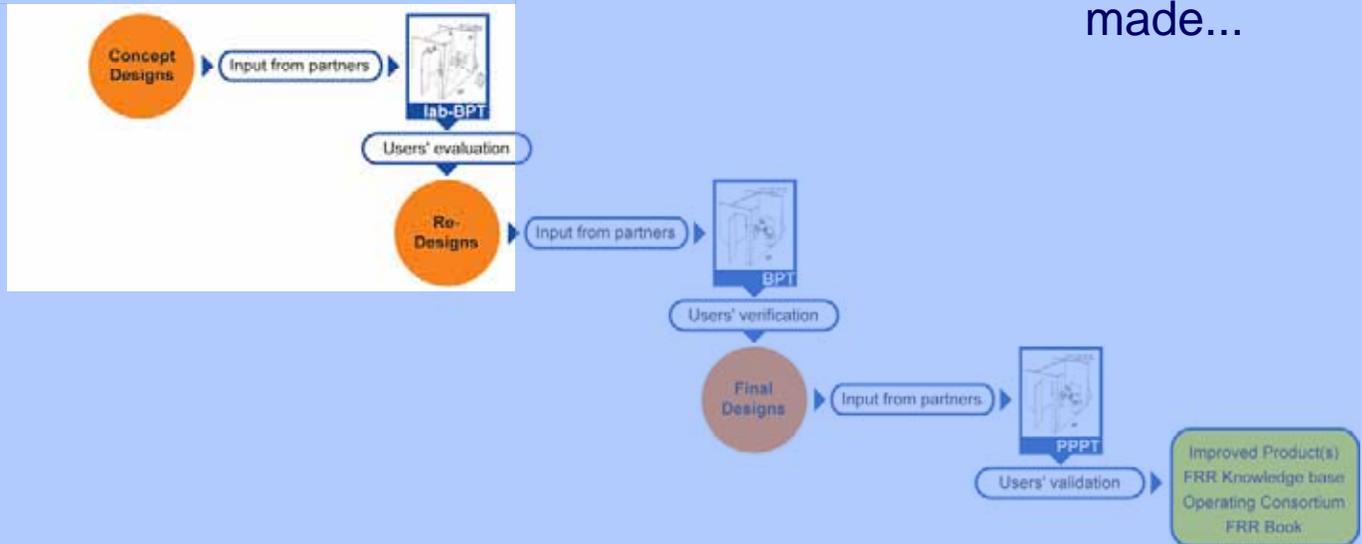


Four areas of use

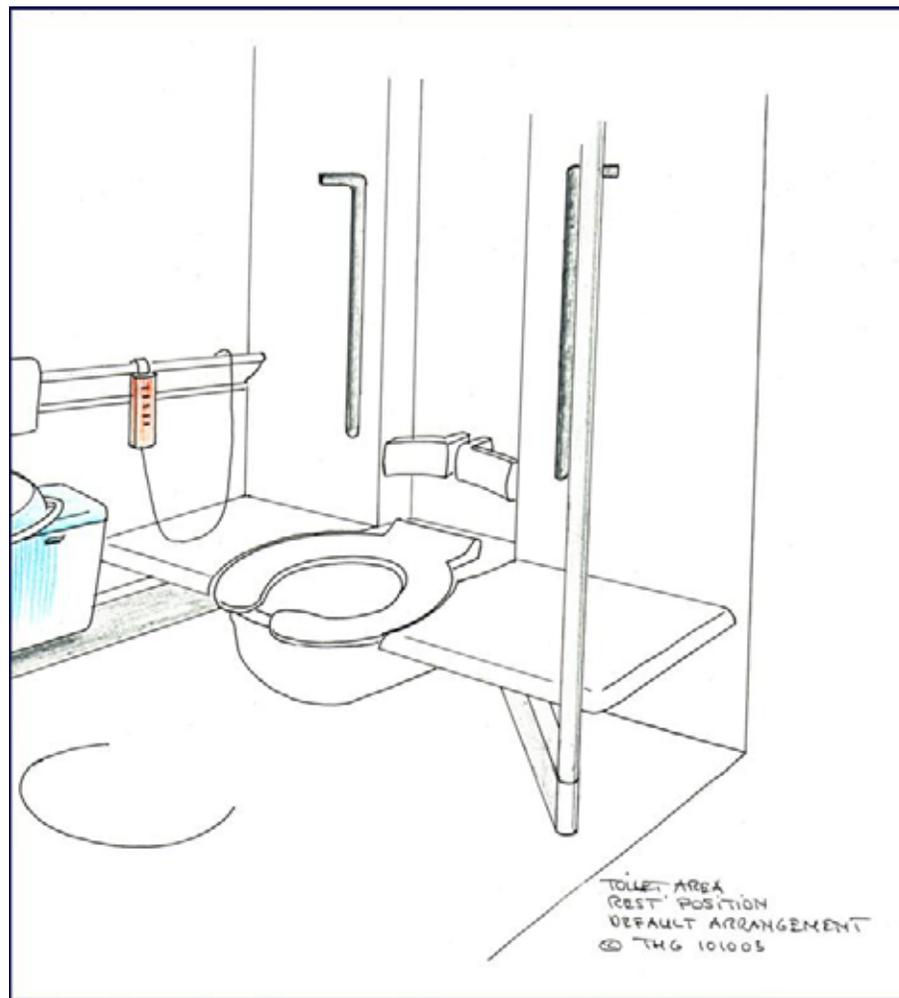
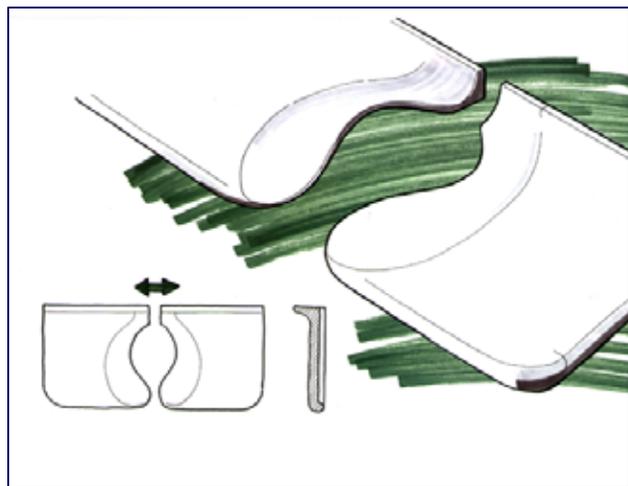


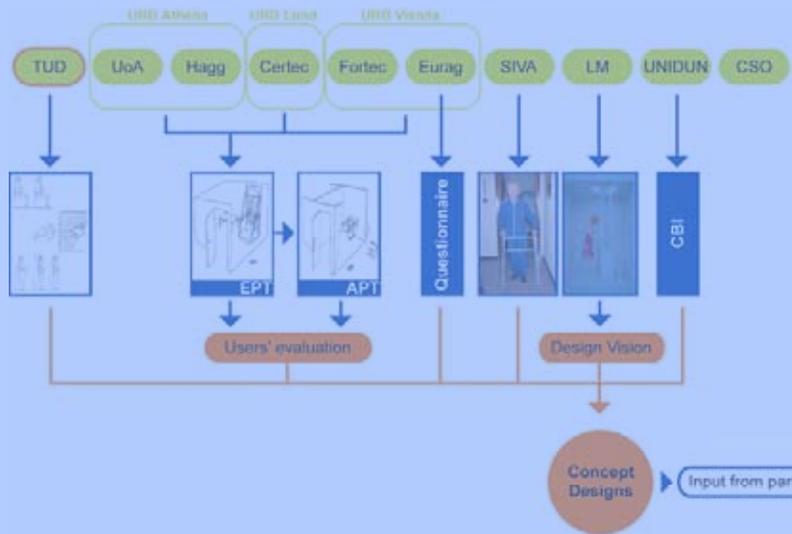


...which were developed into a **Laboratory Prototype (APT)** tested by users, after which **Re-designs** were made...

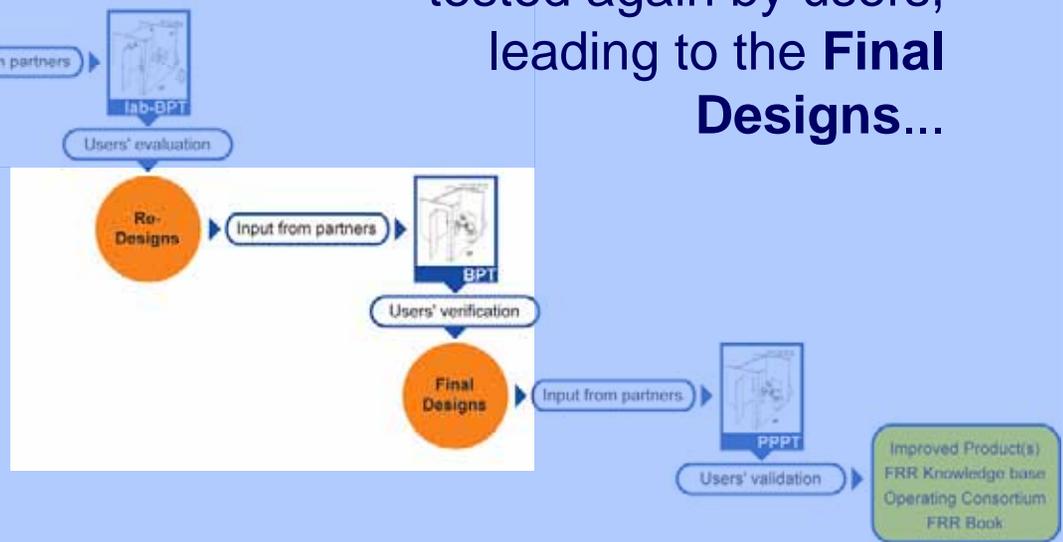


Design sketches

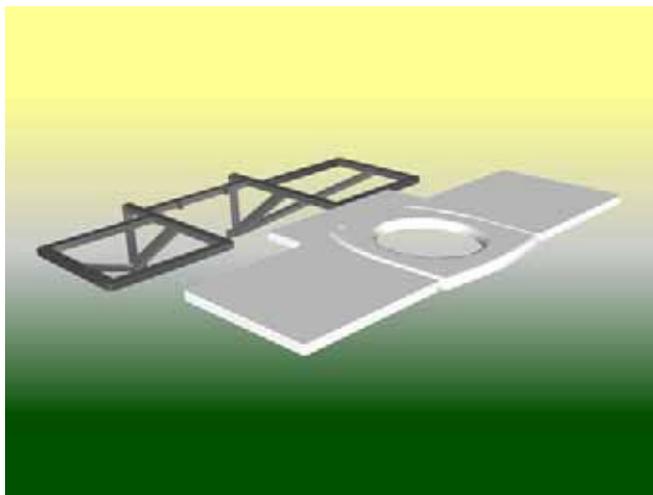


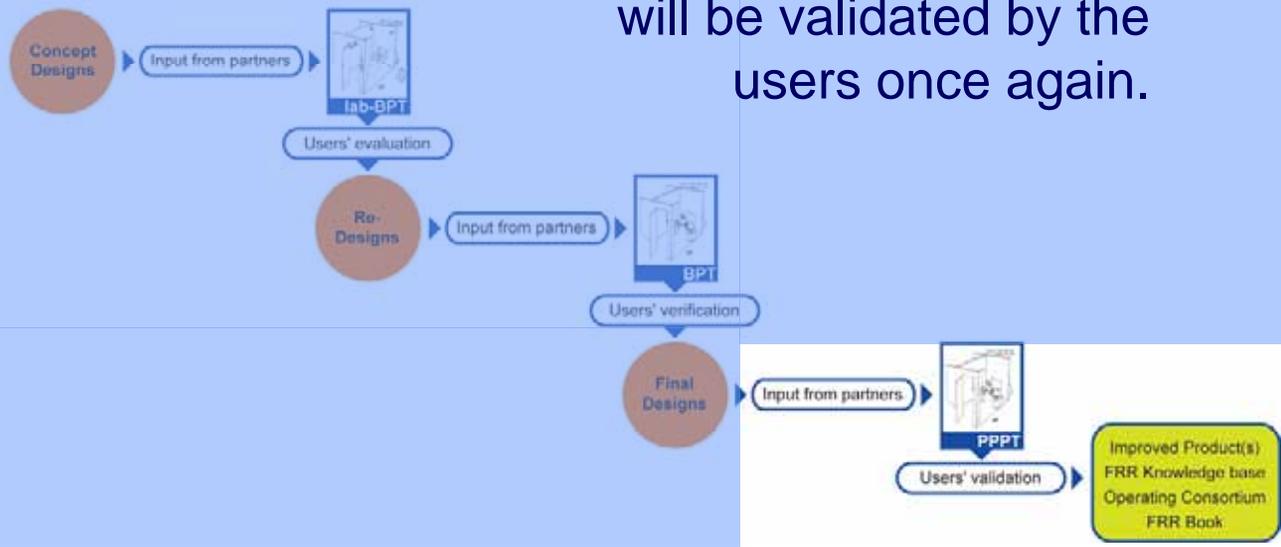
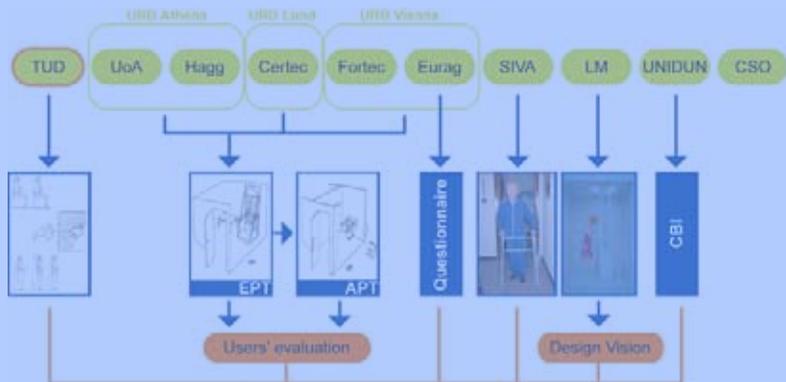


...which were developed into a **Bèta Prototype (BPT)**, tested again by users, leading to the **Final Designs...**



Building Bèta prototypes





...which were developed into a **Pre-production Prototype (PPT)** which will be validated by the users once again.

The pre-production prototypes and FRR-container



Results

255 person tests, 316 toilet-sessions in Real Life Test

Knowledge about variations in human characteristics and behaviour in a toilet environment

Knowledge about the variation in product specifications and the effect on human behaviour

Pre-Production Prototype (RehaCare Fair Nov. 2004 Düsseldorf Germany)

1 patent request and 3 model protection requests

The FRR book to be published in 2005

Why a Friendly Restroom?

Because it will improve the Quality of Life for many elderly and disabled people in Europe.



Thank you!

www.frr-consortium.org