Project Number: 248294

VICON

Virtual User Concept for Inclusive Design of Consumer Products and User Interfaces

Deliverable Report

D4.2: Prototype of a reference product developed using Virtual User Model

Deliverable number	D 4.2
Deliverable title	Prototype of a reference product developed using Virtual User Model
Version	
Status within consortium	DRAFT: - FOR APPROVAL: X - APPROVED:
Due date of deliverable (month)	MONTH XX (1/3/2012)
Actual submission date	01/03/2012
Start date of project	01/01/2010
Duration of the project	30 months

Work Package	4
Task	4.2
Leader for this deliverable	DORO
Other contributing partners	Arcelik, UoB, FIT, NCBI, RNID
Author	
Quality reviewer	UoB
Deliverable abstract	This document contains a report with a description of two reference products developed using the virtual user model approach developed in the VICON project.

Project co-funded by the European Commission		
DISSEMINATION LEVEL		
PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

PROPRIETARY RIGHTS STATEMENT

Table of content

1 Introduction

The purpose of this deliverable is to introduce the two VICON reference products: mobile phone and washing machine (resp. Remote control), which were developed by the industrial partners DORO and ARCELIK[1] under the utilization of the VICON software framework.

2 Usage of the VICON Toolset

For the development of a reference product with the VICON toolset, generally the VICON sketch tool and VICON annotation tool (in combination with the CAD software Siemens NX) are sufficient. When an evaluation of the user interface is foreseen, the VICON evaluation tool is mandatory. For practical reasons, the preliminary reference products were developed by the design teams of the industrial partners DORO and VICON by utilizing the sketch tool and annotation tool. For the convenience of the designers, a description of both tools is provided.

2.1 Describing the VICON Toolset

Vicon toolset is a collection of software applications that product designers can use to integrate Vicon's "Virtual user model" led approach into their product design process. The toolset is designed to support designers during the **sketch phase** when the product is being conceptualized and during the **design phase** when the product is in the process of being visualized as a CAD model (designed with Siemens NX).

This section of the deliverable will first give a brief overview of the tools according to the phase in which they are to be used and then explain their usage.

2.1.1 Sketch Phase

In the sketch phase the designer will work with the Virtual User Model to get recommendations and guidelines regarding the design of a specified product.

2.1.1.1 Sketch phase tool

The sketch phase tool is a reference tool that designers can use to have a general overview of guidelines for the kind of product they want to develop. The sketch phase tool lets the designers

[1] It has to be noted that due to unexpected technical problems regarding a stable remote access to the VICON system hosted at UoB, it was not possible for ARCELIK to deliver the virtual prototype of the washing machine to the time of finalizing this deliverable. However, the design team at ARCELIK are doing their best to deliver a virtual prototype until the 23rd of March, 2012. Further details regarding progress will be reported comprehensively during the VICON review meeting on March 23rd, 2012.

extract recommendations based on task, environment, user model or a subset of these three criteria.

- **User model :**

User models represent sample user profiles characterized by disabilities. Currently there are a set of thirteen (13) pre defined user profiles that designers can use to sample recommendations. A typical user profile has a) demographic information, b) Known disabilities and c) information regarding ability to perform common bodily abilities quantified as thresholds etc.

Name	Gender	Hearing2kHz	Hearing1kHz	FieldOfVision	Grip
Trevor	M	15	5	1	1
Mark	M	30	25	2	2

Fig. 1: Possible information within a user profile

- **Tasks:**

Tasks are to be used in the evaluation phase when testing with virtual user models will commence. A task profile has description of a goal and a disability profile for which ability to perform the task is considered critical. In the figure below, the task: "Press the volume button up" has two disability profiles that are stated critical for evaluating a particular product i.e.: during evaluation of a product the tasks will be assigned to "virtual users" with disabilities stated against the former.

Name	Impairment	Description
Press volume up button	,VI1,MD2	V 7.4.3:User has to monitor the button while carrying out this task, D 7.4.3: User has press button so that it, and no other button, activates,
Check display	,VI2,	V 1.2.2:User check/reads the display to determine status/softkey functions, etc,

Fig. 2 Task profiles

- **Environment :**

Environment profiles serve as the surrounding context within which users might interact during product usage.

Name	Lighting_level	Clear_space_Left	Window	Room_type
Kitchen	2	0,8	1	3

Fig. 3 sample environment attributes

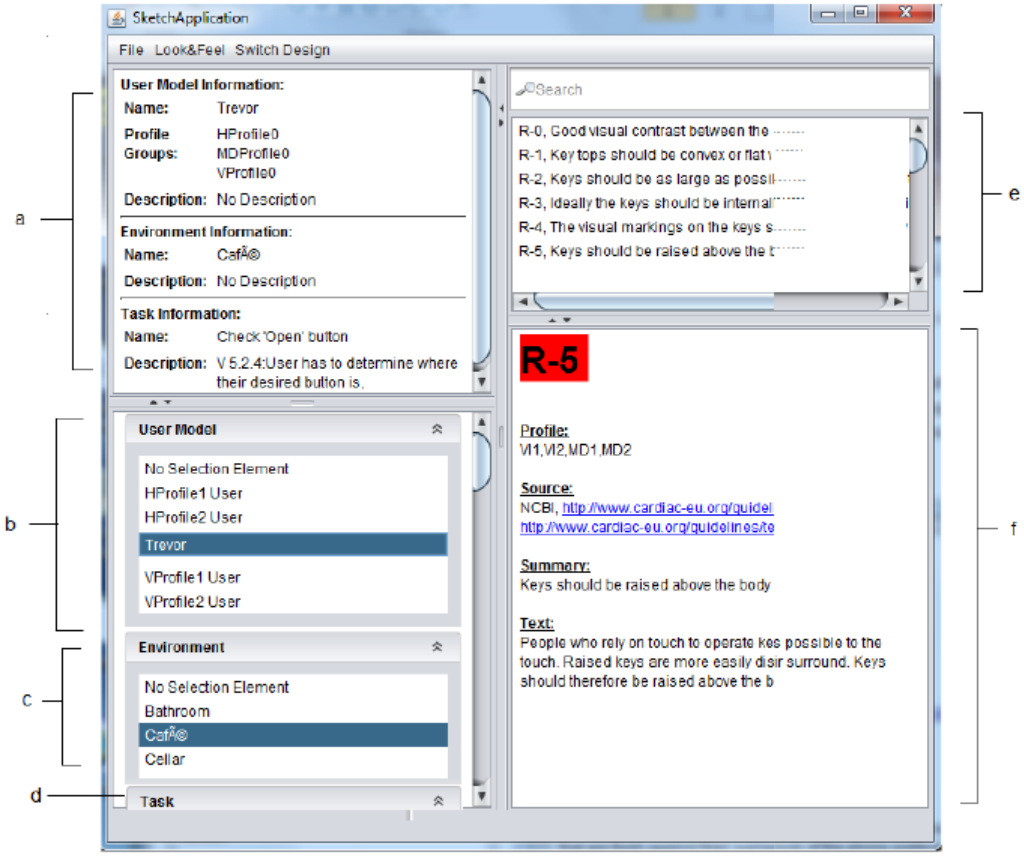

Fig. 4 The sketch phase tool

Usage

The sketch phase tool displays recommendations in field f (figure 4) based on the criteria chosen in fields b, c ,d or a subset of these. Fields labeled : b,c and d list user profiles, environment profiles and task profiles respectively. Field 'a' sums up and displays the choices that the user makes in the fore mentioned fields and gives a detailed overview of the criteria for recommendations retrieved.

In the figure above user profile 'Trevor', task profile “Check open button” and “Café” is chosen as the environment profile as search keys for retrieving recommendations.

2.1.2 Design Phase

2.1.2.1 The "Vicon Interface" tool

The Vicon Interface tool maps recommendations from the knowledge base to elements within NX models. The repository has a set of thirty pre-defined component types that designers can use to annotate their models. By declaring a particular model element as a type-of one of the pre-defined components, designers can get recommendations from the system. Figure 5 presents the location of the Vicon button in Siemens NX. To see the button, you need to change the working role in Siemens NX to “VICON Toolset”.

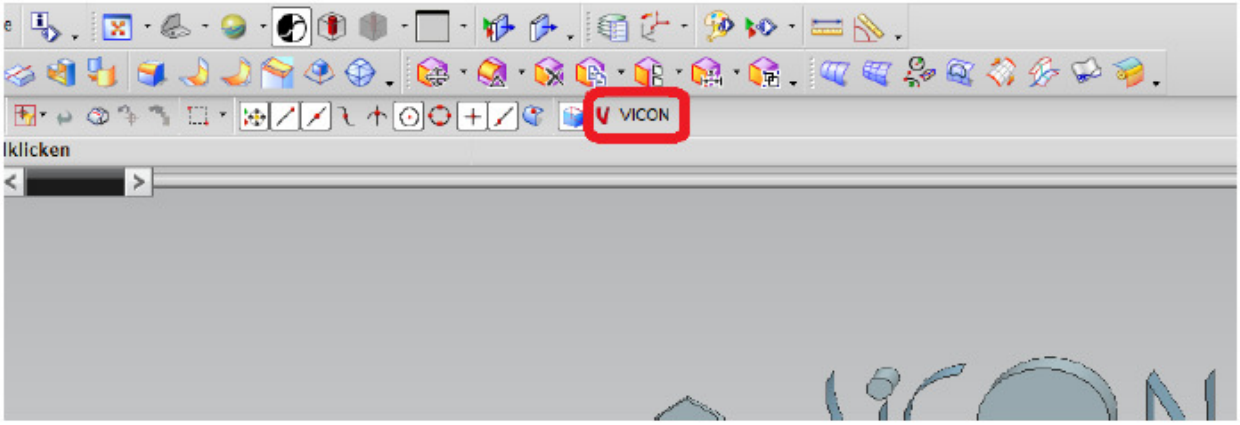

Fig. 5 NX toolbar with button to activate the Vicon Interface tool

The analysis tool set is comprised of an annotation tool and a recommendation-viewing tool.

- **Annotation tool :**

The tab labeled “Annotation” activates the annotation tool. The annotation tool (figure-6) lists all elements of an active NX model in a drop down list (figure 6 a). At the bottom of the list possible annotations are given (figure 6b). Once an element is chosen from the elements’ list, it can be annotated by selecting any of the radio buttons with the desired annotation.

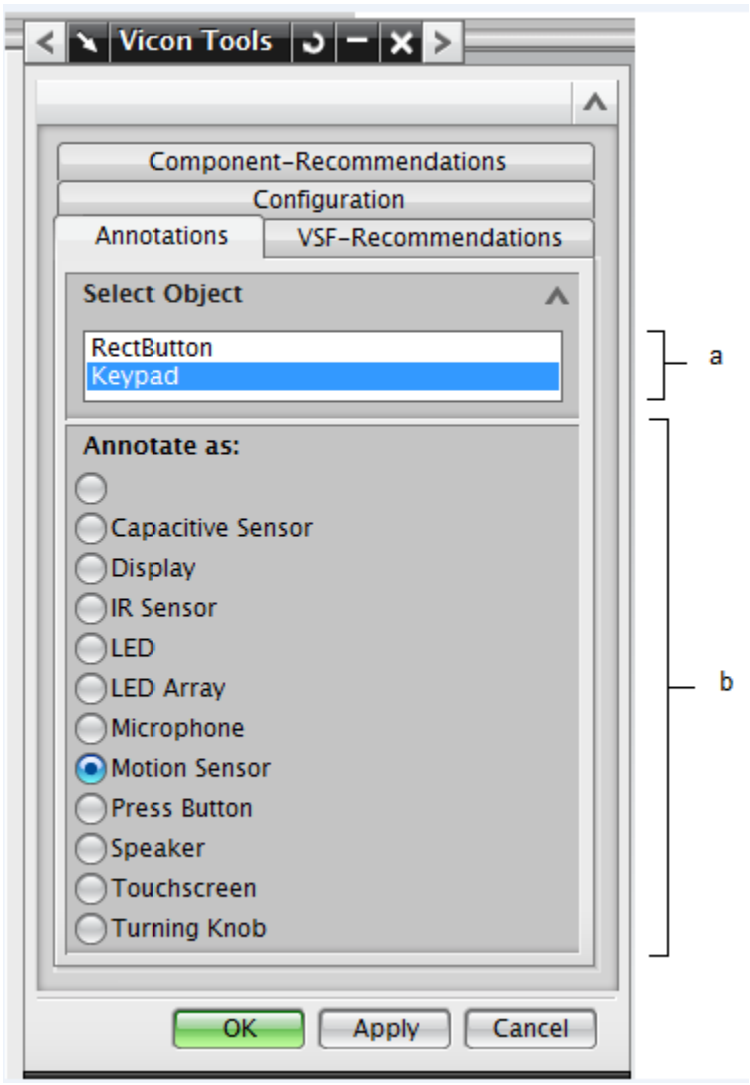

Fig. 6 The annotation tool

Figure-6 shows the annotation tool displaying information regarding the active model and the possible annotations for the elements within. The apply button commits any changes made to the model with the annotation tool.

- **Recommendation Viewer :**

The tab labeled “Component Recommendations” activates the recommendation viewer.

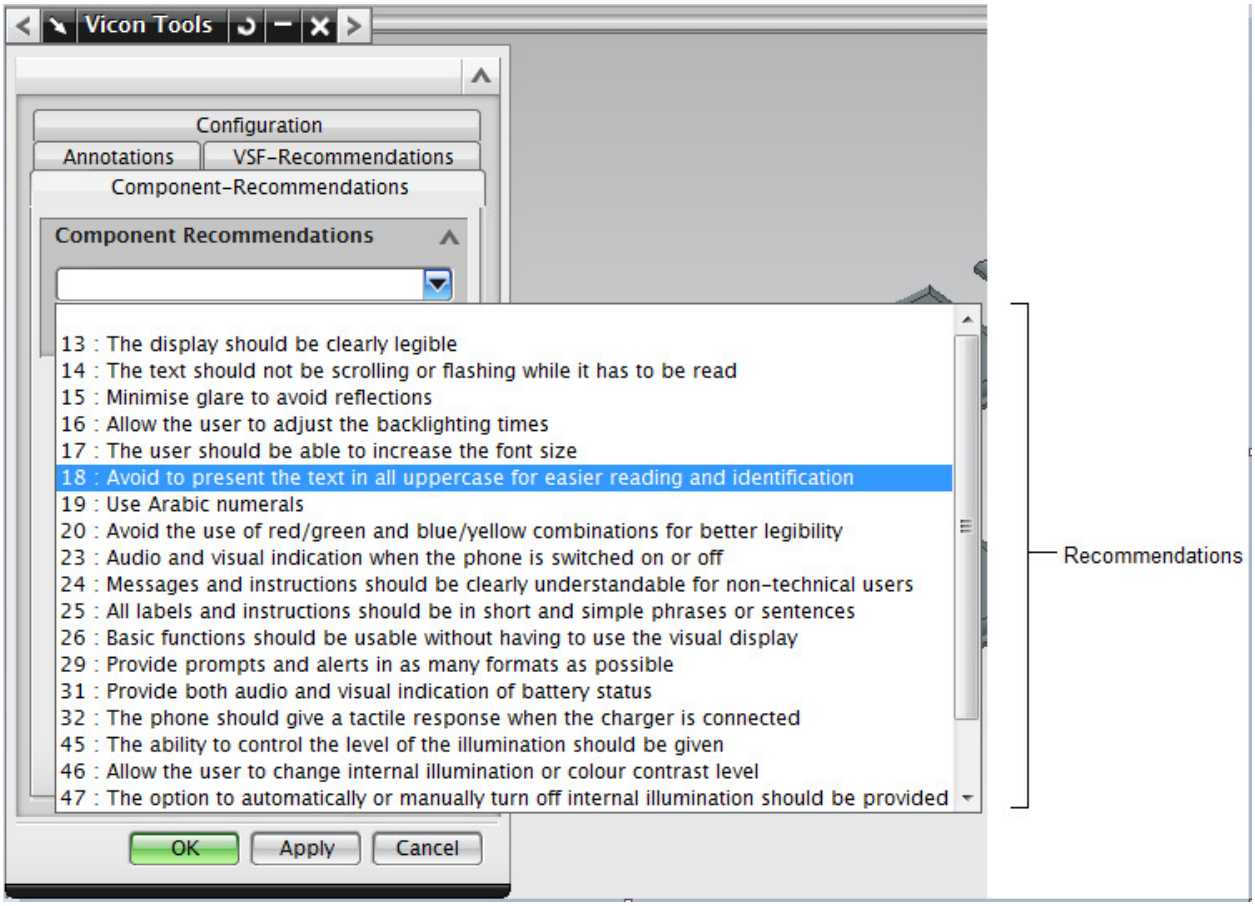

Fig. 7 The Recommendation Viewer

The recommendation viewer lists summaries of the recommendations applicable to any previously annotated elements (see Figure 6) within the active model.

Upon selecting a particular recommendation, the corresponding text is displayed for viewing (figure-8).

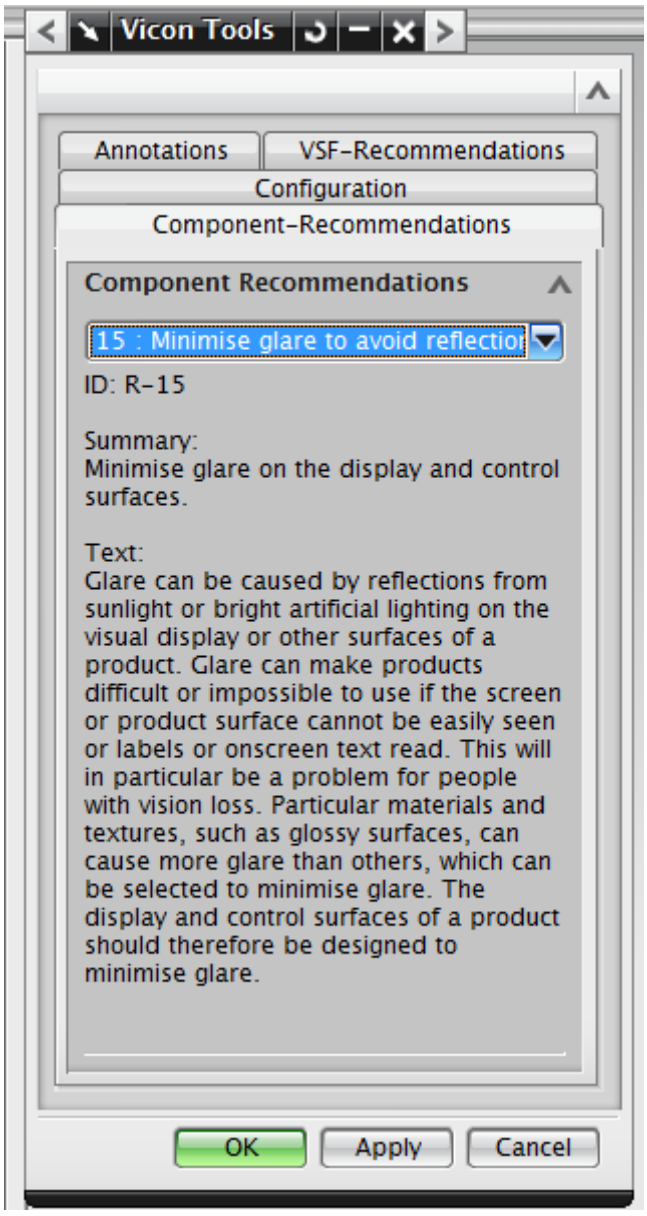

Fig. 8 ***The Recommendation Viewer***

- **Loading a VSF file**

The "Open VSF" button (figure 9) can be used to specify and view a VSF file (from the sketch phase).

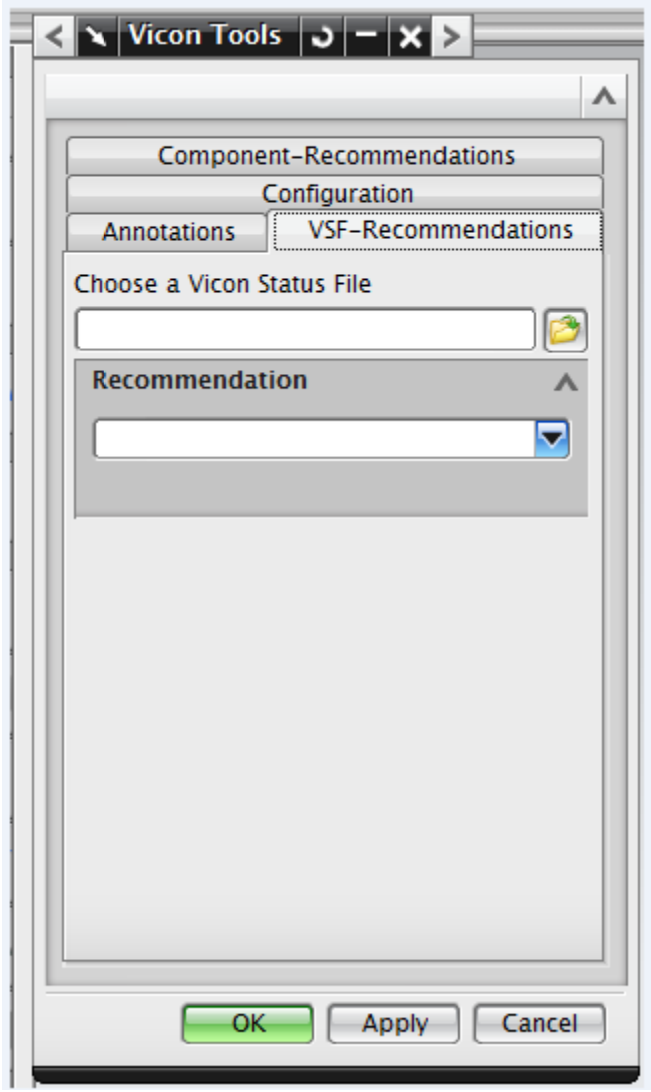

Fig. 9 Loading a VSF file

3 Mobile Phone developed by Doro

The VICON persona mapping to an existing DORO mobile phone is illustrated below.

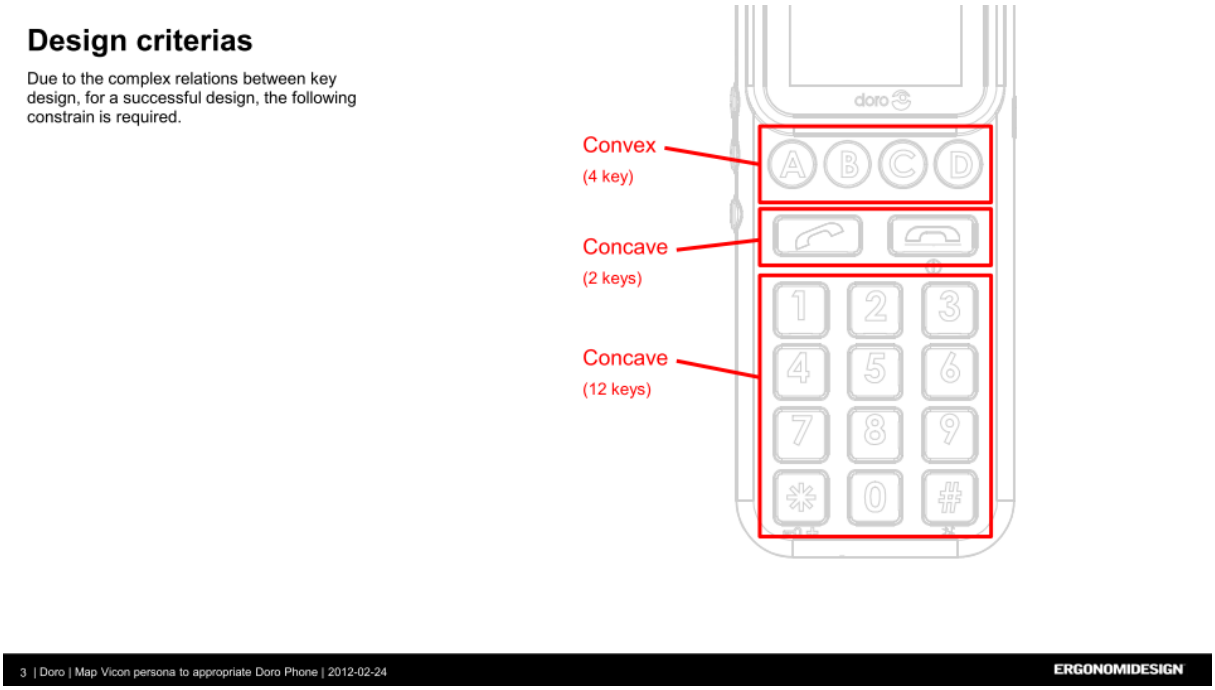

Fig. 10 Mapping of VICON design criteria to mobile phone

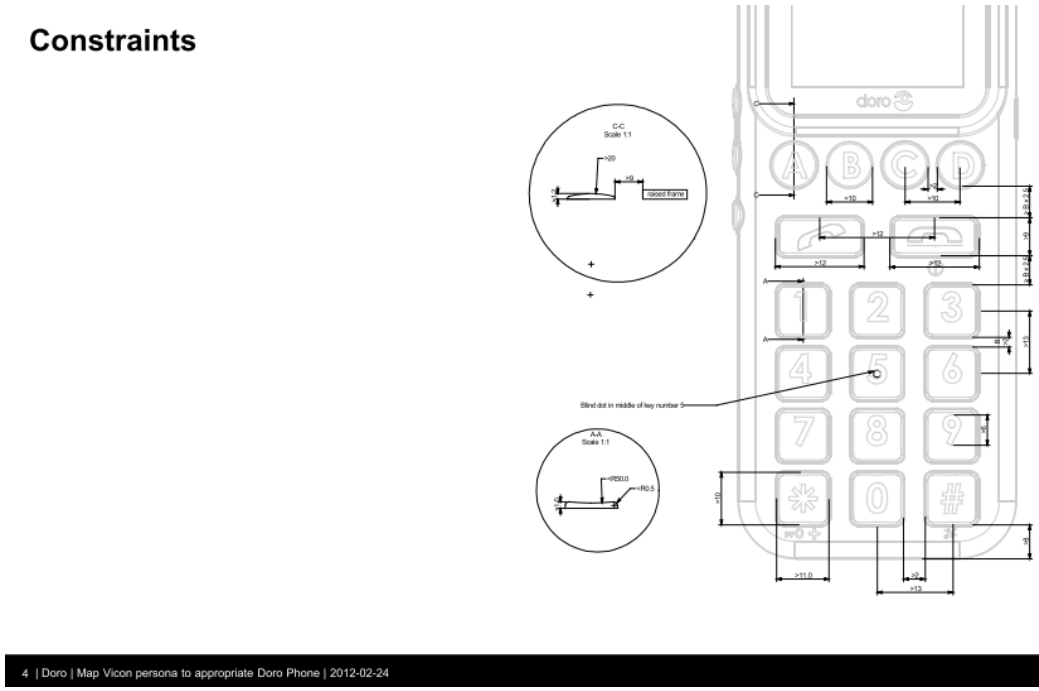

Fig. 11 physical design constraints

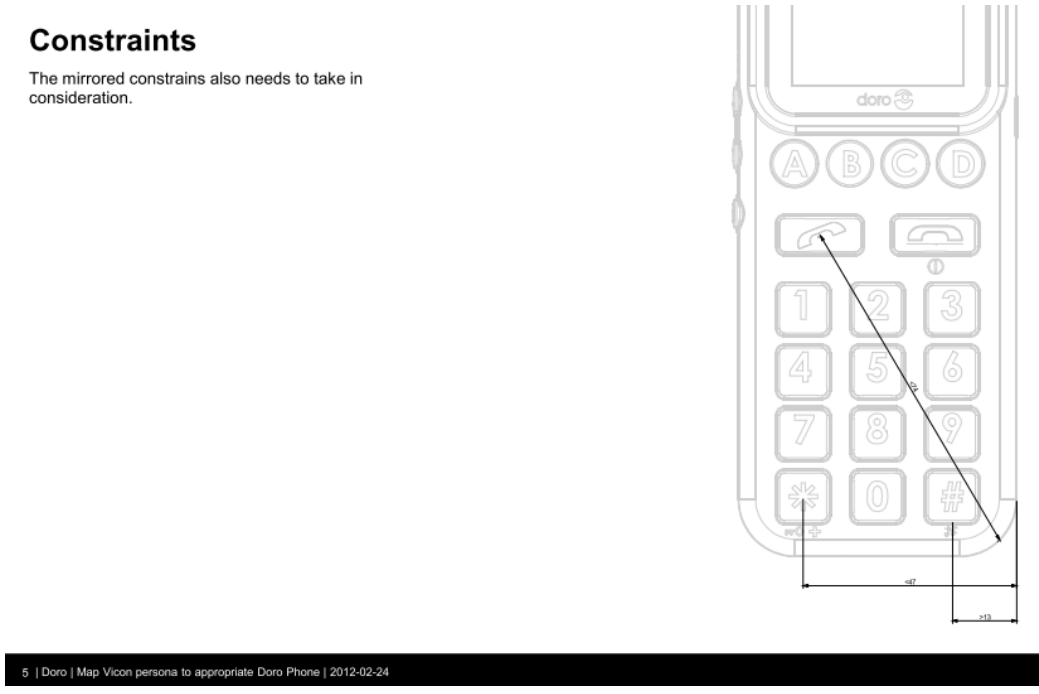

Fig. 12physical design constraints

4 Washing Machine developed by Arcelik

Please refer to footnote 1 on p. 4.

5 Conclusions

The comprehensive feedback of the design teams were captured in a special questionnaire, addressing the suitability for the task, self-descriptiveness, conformity with expectations, suitability for learning, controllability, error tolerance, and suitability for individualization. The feedback of the designers provides a valuable basis for ensuring a continuous improvement of the VICON toolset during the runtime of the VICON project.

5.1 Questionnaire

The objective of the questionnaire is to evaluate the usability and the functionality of the VICON toolset and to propose suggestions for improvement. Focus is upon the standalone “VICON Sketch Application” and the “VICON Annotation Tool”, integrated within the CAD-Software Siemens NX.

In the questionnaire, the requirements of the ISO/Norm 9241/110 will be concretised through descriptions. For each answer, a seven rated scheme is used, from very negative ("---") to very positive ("+++"). Individual ratings are to be done for each question, making use of the provided rating scale. Here is an example:

	---	--	-	+/-	+	++	+++	
The Vicon software is bad.						x		The Vicon software is good.

Finally, in order to pinpoint weaknesses concerning the items in the questions, the designers are asked to write down aspects of the software which, in their opinion, are necessary to improve: When possible, a specific example should be provided where it cannot be agreed, accompanied by suggestions for improvements.

Results of the questionnaire were documented in an external document (Excel File), which is available on the VICON repository.

The following provides an overview of the questionnaire:

Suitability for the task

Does the Vicon software help to complete your task without burderning you?

	---	--	-	+/-	+	++	+++	
The Vicon software is complicated to use.								The Vicon software is easy to use.
The Vicon Sketch Application provides insufficient information (for eg. the types of impairments (user-profiles), recommendations, environments or tasks) for inclusive product design so that the task can be managed efficiently.								The Vicon Sketch Application provides sufficient information (for eg. the types of impairments (user-profiles), recommendations, environments or tasks) for inclusive product design so that the task can be managed efficiently.
The Vicon Sketch Application does not provide a wide choice equipment/ user profiles/ environments/ tasks.								The Vicon Sketch Application provides a wide choice of equipment/ user profiles/ environments/ tasks.
The recommendations of the Vicon Sketch Application for inclusive product design are unnecessary. They complicate the inclusive design process.								The recommendations of the Vicon Sketch Application for inclusive product design are helpful. They ease the inclusive design process.
The "Component Recommendations" of the Vicon tools are unnecessary. They complicate the inclusive design process.								The "Component Recommendations" of the Vicon tools are helpful. They ease the inclusive design process.
It is very time consuming to go through the recommendation list.								It takes a short time to go through recommendation list.
Please describe a specific example where you cannot agree with the above statements and please provide suggestions for improvement.								

Self-Descriptiveness

Does the Vicon software provide sufficient explanations and are they comprehensible?

	---	--	-	+/-	+	++	+++	
The Vicon software provides a poor overview of the features.								The Vicon software provides a good overview of the features.
The type of colors, the terms or abbreviations in the menu are poorly used and incomprehensible.								The type of colors, the terms, or abbreviations in the menu are well used and comprehensible.
The description of the information in the Vicon Sketch Application (for eg. User profiles, recommendations, environments, tasks) are incomprehensible.								The description of the information in the Vicon Sketch Application (for eg. User profiles, recommendations, environments, tasks) are comprehensible.
In the Vicon Sketch Application, you cannot see the importance of a recommendation (red/yellow/green) without clicking on each recommendation.								In the Vicon Sketch Application, you can see the importance of a recommendation (red/yellow/green) without clicking on each recommendation.
If I need information of a specific operation/ use option/ funtion/ feature, it is difficult to retrieve.								If I need information of a specific operation/ use option/ funtion/ feature, it is easy to retrieve.
Please describe a specific example where you cannot agree with the above statements and please provide suggestions for improvement.								

Conformity with user expectations

Does the Vicon software have a consistent and understandable structure that meet your expectations and conform with your habits?

	---	--	-	+/-	+	++	+++	
The Vicon software has an inconsistent structure and is difficult to orientate.								The Vicon software has a consistent structure and is easy to orientate.
The "Apply Recommendation" of the Vicon Tools has an unpredictable processing time.								The "Apply Recommendation" of the Vicon Tools has a predictable processing time.
The execution of a function of the Vicon tools does not work as expected.								The execution of a function of the Vicon tools works as expected.
The Vicon software does not make it clear whether an input has been carried out.								The Vicon software makes it clear whether an input has been carried out.
The messages of the Vicon software do not appear at the same place.								The messages of the Vicon software appear at the same place.
Please describe a specific example where you cannot agree with the above statements and please provide suggestions for improvement.								

Suitability for learning

Does the design of the Vicon software allows you to work in well and does it provides help when you want to learn new features?

	---	--	-	+/-	+	++	+++	
The Vicon software requires much time to learn.								The Vicon software requires little time to learn.
The Vicon software cannot be familiarised once learned.								The Vicon software can be familiarised once learned.
The Vicon software is difficult to learn without prior knowledge, help or manual.								The Vicon software is easy to learn without prior knowledge, help or manual.
The accompanying user guides are incomprehensible and not helpful.								The accompanying user guides are comprehensible and helpful.
Please describe a specific example where you cannot agree with the above statements and please provide suggestions for improvement.								

Controlability

Can you affect the way you work with the Vicon software?

	---	--	-	+/-	+	++	+++	
The Vicon software does not allow me to store intermediate results and continue at the same point later without any loss.								The Vicon software allows me to store intermediate results and continue at the same point later without any loss.
The Vicon software does not allow easy switching between menus or screens.								The Vicon software allows easy switching between menus or screens.
The Vicon software does not allow termination of an ongoing process.								The Vicon software allows termination of an ongoing process.
Please describe a specific example where you cannot agree with the above statements and please provide suggestions for improvement.								

Error tolerance

Does the Vicon software allows you to achieve the intended work result in spite of incorrect entries with little or no correction?

	---	--	-	+/-	+	++	+++	
The Vicon software delivers poorly understandable error messages.								The Vicon software delivers understandable error messages.
The Vicon software does not provide specific troubleshooting information.								The Vicon software provides specific troubleshooting information.
The Vicon Tools cannot be integrated into a CAD-Software flawlessly.								The Vicon Tools can be integrated into a CAD-Software flawlessly.
The Vicon Tools are not bug-free.								The Vicon Tools are bug-free.
The Vicon Tools are unstable and keep crashing.								The Vicon Tools are stable and do not crash.
Please describe a specific example where you cannot agree with the above statements and please provide suggestions for improvement.								

Suitability for individualization

Can you customise the Vicon software according to your individual needs and requirements with little effort?

	---	--	-	+/-	+	++	+++	
The Vicon softwarre cannot be customised according to my personal and individual way of execution of work.								The Vicon software can be customised according to my personal and individual way of execution of work.
I cannot customise the screen display of the Vicon Sketch Application with the "Switch Design" and "Look & Feel" functions according to my individual needs.								I can customise the screen display of the Vicon Sketch Application with the "Switch Design" and "Look & Feel" functions according to my individual needs.
Please describe a specific example where you cannot agree with the above statements and please provide suggestions for improvement.								

6 References

[1.] Vicon Consortium. (2010). Deliverable 1.1 - End user and environment field study.

[2.] Vicon Consortium. (2010). Deliverable 1.2 - Survey of Design Frameworks and Tools.

[3.] Vicon Consortium. (2010). Deliverable 1.3 - Virtual Humans in a human-centred design process - a critical review.

[4.] Vicon Consortium. (2010). Deliverable 1.4 - Functional and system requirements.

[5.] Vicon Consortium. (2010). Deliverable 1.1 - End user and environment field study.

[6.] Vicon Consortium. (2010). Deliverable 1.2 - Survey of Design Frameworks and Tools.

[7.] Vicon Consortium. (2010). Deliverable 1.3 - Virtual Humans in a human-centred design process - a critical review.qweqw

[8.] Vicon Consortium. (2010). Deliverable 1.4 - Functional and system requirements.

[9.] Vicon Consortium. (2011). Deliverable 3.1 - System Architecture and Interface Specification.