

## Workpackage description

<b>Workpackage number</b>	<b>7</b>	<b>Start date or starting event:</b>					<b>M0</b>
<b>Workpackage title</b>	<b>Ambulant user interface for chronic disease management.</b>						
<b>Participant id</b>	<b>OMC</b>	<b>TUA</b>	<b>ICB</b>	<b>IPA</b>	<b>RCD</b>		<b>Total</b>
		<b>leader</b>			<b>K</b>		
<b>Person-months per participant:</b>	<b>2,0</b>	<b>48,0</b>	<b>2,0</b>	<b>2,0</b>	<b>2,0</b>		<b>56,0</b>

### Objectives

This work package aims at developing a scalable user interface for people suffering from chronic diseases. This interface will be able to communicate with (scalable) terminals (e.g. mobile phones, PDA's, PC's, and Virtual reality facilities) and will in the project be tested specific on the ANUBIS data-platform that is used to retrieve and store relevant information. Emphasis will be put on scalability and "fall-back procedures" with information under- and overflow, so the user can be confident in the information displayed.

The interface has a technical and a conceptual element. The technical element is "pure ICT-development", the conceptual element is aiming at injecting new possibilities into the user interface of ICT-terminals especially for "telling health related stories and knowledge" to the end-user. The computer are in it's present form, appearances, and interfaces very much suited for office and finance work, but less suited for supporting human behavioural related activities included decisions in a social and well-being of human's framework.

### Description of work

The motivation for this work comes from the observations of the severe constrains of deploying current information and communication technology in the healthcare sector as well as to the users of healthcare information outside the health care sector – the citizen, the relative, or the patient in ambulatory conditions outside clinical surroundings. A higher quality and more focused communication of data using ICT in ambulatory conditions will in theory promote self-care and health-trajectory risk management. In a number of chronic diseases, it is shown that self-care and focused advise improve patient quality life and diminishes the risks of contracting complications (e.g. the DCCT-study in diabetes – N Engl J Med 1993 Sep 30;329(14):977-86), but such activities require specialists, patient schools and are very labor intensive in retrieving the desired results, so it is beyond most routine healthcare-providers to incorporate this knowledge in the practice. When focus is on proactive risk management, wellbeing, and citizen-centered individuality in life-conditions the matter of life-coaching becomes even more complex and potential more expensive with the existing tools including the present employment of ICT.

We aim at developing a generic set of design elements for ICT – that can supplement the personal contact between healthcare professionals and patients and also promote proactive health- and well-being activities, lifestyle and motivation among citizens in general.

The state of the art concerning design of interfaces both within the hardware and the software section in the healthcare system shows a surprising lack of interest for what

concerns the actual topic field. The design of interfaces derives mostly from a rather direct and uncritical taking over of systemic thinking from the programmers and system architects way of thinking and doing, which puts the end-user, might it be the medical staff or the patient, in an unfortunate and inadequate position. Some attempts have been made in order to provide the end-user with an interactive tool concerning body and health for instance pain relieving and the art project: The Visible Human Project, which had a focus on the human anatomy.

But so far no one has taken into consideration that what is needed within the health care system is an appropriate variety of interfaces that puts the end-user in a position where she can, in a smooth and easy way, interact with the actual healthcare content without being disrupted by the form of hardware and the software technology.

It is the intention of this work package to deal with both hard- and software in order to deliver conceptual solutions for contextual user-centered solutions.

In order to round up and to frame the investigation some of the major conjectures and prejudices will be presented in the following.

One of the major reasons why the implementation of Electronic HealthCare Record (EHR) in the secondary sector has failed so far is due to fact that the interface is thought and developed by computer scientists, whom are trained to think systemically and are concerned with the efficiency and logic of the system as such. Various firms developing EHR interfaces in for instance Danish counties are using healthcare professionals (nurses and doctors) in developing interfaces, but these representatives are already too familiar with the programmatic and systemic thinking and doing of the system developers, hence confirming this systemic approach.

The body – both that of the clinical staff and that of the patient – is in all forgotten in the construction of interfaces. Reception and perception is overruled as is the situate negotiation between subjects and objects concerning the actual topic of the whole thing: the patient. Health, medicine and well-being is very visual and easy to relate to visual objects – but most interfaces in clinical systems are text-based.

An important research question has to be posed and solved, which in the end might present the real achievement of this investigation. How do we design and initiate a user interface, which do not force the systemic approach upon the users? We suggest that the challenge can be met by changing the approach to the design of the user interface at the very outset.

It is well known that he systemic approach strive to guide a programmer at a particular task with only the relevant details of the whole setup by the introduction of a great deal of transparency for what concerns the actual technical construction of other parts of the system.

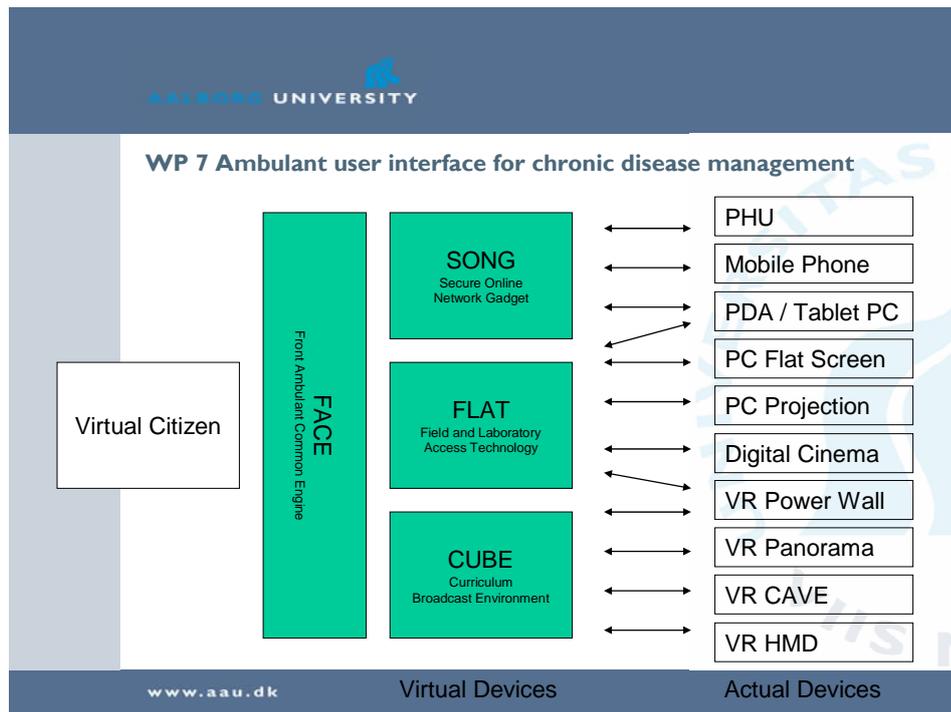
The problems arise when the same logic is used to isolate the “user interface layer” and get an immediate and user-friendly solution that hides away the technical aspects and the reasons why remains black boxes, where it is impossible for you as an organization, staff or patient to penetrate in order to detect logics and connections in the system.

This development can be detected within the automobile industry, where computers aid the design and chips are governing the use and maintenance in detail and everything is hidden in black boxes. As a user you cannot repair your vehicle or study the features in order to



WP7-T2	FACE Technical Specification
WP7-T3	FACE FLAT Demonstrator
WP7-T4	Interim Delivery (D1)
WP7-T5	FACE SONG Demonstrator
WP7-T6	FACE CUBE Demonstrator
WP7-T7	FACE Integrated Demonstrator
WP7-T8	Final Delivery (D2)
WP7-T9	Quality Review and Improvement.

**Milestones<sup>17</sup> and expected result**



**WP7 Work Package Overview**

The virtual citizen is the “feeding system” to this work package and the connection to the ANUBIS platform

		M1		M2		M3		M4		M5		M6		M7		M8	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
									0	1	2	3	4	5	6	7	8
															2	2	2
															1	2	3
																	4

**WP7 Mile Stones {project month time-line}**

**WP7-M1 FACE Conceptual Framework**

At the M1 milestone we expect to have a comprehensive description of the conceptual framework for the Front Ambulant Common Engine (FACE) which is the core part of the ambulant user interface. The FACE is ambulant in the sense that it is targeted at ambulant patients for chronic disease management and it is also ambulant in the sense that it is

<sup>17</sup> Milestones are control points at which decisions are needed; for example concerning which of several technologies will be adopted as the basis for the next phase of the project.

scalable to a wide range of actual devices. The FACE component is expected to implement a generic model for a mythological universe and the SONG, FLAT and CUBE (described below) components is expected to implement the scalable communication mechanism for user interaction. At the M1 milestone we also expect to have substantial parts of a sample mythology outlined. A favourite candidate at the time of writing is inspired by the Australian aboriginals' walk-about tradition. On a walk-about you cross a continent guided by aural song lines handed down from the ancestors of the tribe.

#### **WP7-M2 FACE Technical Specification**

At the M2 milestone we expect the concepts to be matured and stable. We also expect the concepts to have been transformed into a technical specification suitable for the implementation of the demonstrators FACE FLAT, FACE SONG and FACE CUBE. Essential is the "fall-back-procedures" that strive to give all content a meaningful representation at the actual device in question.

#### **WP7-M3 FACE FLAT Demonstrator**

At the M3 milestone we expect to finish the Field and Laboratory Access Technology (FLAT) Demonstrator. It is a proof-of-concept prototype showing the ambulant user interface in action at conventional technology available for health professionals and home users, such as a tablet PC with occasional wireless connection to large wall displays.

#### **WP7-M4 Interim Delivery (D1)**

At the milestone M4 we expect to screen the film "Use Scenarios for Personal Healthcare Units" (working title) for the clinical advisory board. The film is the interim deliverable D1 which is expected to use video prototyping techniques to extrapolate the FACE FLAT Demonstrator results to full fledged chronic disease management scenarios. The film is expected to initiate a debate at the clinical advisory board which can sharpen the visions for the coming demonstrators. The film is also essential to the on-going dissemination process at all project partners.

#### **WP7-M5 FACE SONG Demonstrator**

At the M5 milestone we expect to be able to showcase the Secure Online Network Gadget (SONG) Demonstrator. It will be a working prototype of a Personal Health Unit (PHU), probably based on a current available mobile phone. This demonstrator is the point-of-no-return in the WP10 storytelling. The FACE SONG-lines ambulant interface is expected to feature aural guidance of the same nature as the song-lines used by the Australian aboriginal on a walk-about. The song-lines constitute a soundscape, - a virtual aural landscape conveying the wisdom from the ancestors at every crossroad you reach. The limited screen real estate of the PHU is expected to provide simple visual cues, much like GPS navigation units used in cars. Years of research on traffic guidance favoured aural interfaces over visual displays and we expect the same to be the case in everyday interaction with the PHU and other devices.

#### **WP7-M6 FACE CUBE Demonstrator**

At the M6 milestone we expect the Curriculum Broadcast Environment (CUBE) Demonstrator to be realized making it possible for the test user to dive into the knowledge landscape using Virtual Reality (VR) technology and 3D sound. At a first glance it might seem contradictory to include VR in an ambulant and ambient interface as VR today is widely conceived as a "heavy" and immersive technology. But this is actually the transient demonstrator making the FACE future-proof. While the SONG is convenient in the daily

routines (“Hi, stop eating/drinking/smoking/buying that junk and head for a dance”) it will not provide sufficient bandwidth for serious learning, warning or investigation. In an early implementation of the SONG a sample statement could be “Please, go to the nearest CUBE to work on XYZ”. A CUBE could in that scenario be an ID-photo-booth-at-the-train-station-like installation at the health centre. But looking ahead we will probably see mobile devices capable of mixing realities; meaning you will be able to overlay virtual (aural and visual and ...) information on the actual reality. So looking at the work package overview illustration it seems smart to think of the “actual device” range as a circle. What we in the horizon of this project will show in a CUBE in the form of a VR CAVE or a head mounted display (HMD) is in-a-not-so-far-future available in the PHU. It is well known – if not documented – that music and sound cues can provide a very direct link to earlier experiences. So the CUBE is very important in the initiation and learning phase of the user, because this very rich experience environment is expected to be able to “encode” the soundscape into the mind so it is possible for the user to recall it from the SONG environment.

**WP7-M7      FACE Integrated Demonstrator**

At the M7 milestone we expect everything from the WP and the project to communicate at a prototype level including interfacing with Webservices, ePatient databank, eLearning, and signal processing.

**WP7-M8      Final Delivery (D2)**

M8 is the final milestone and we expect to showcase the FACE Integrated Demonstrator and screen the film “Making Faces” (working title). Together they comprise the D2 deliverable. The film is expected to communicate the documented result of the project to a wider audience and draw a perspective for future deployment.