



IRIS Smart Home – »**I**ndependent **R**esiding
enabled by **I**ntelligent **S**olutions«.

Institute for rehabilitation, Ljubljana, SLOVENIA

Dom iRiS Partners Smart Home



Institute for rehabilitation, Ljubljana



University of Ljubljana, Faculty of electrical engineering, Ljubljana



SmartCom Ltd, Ljubljana



MKS electronic systems Ltd, Ljubljana



Institute SETCCE, Ljubljana



Government of Republic of Slovenia



Motivation

- Improving quality of life of disabled and elderly by turning home environment into a smart home environment
- Development of e-services and AAL environments requires digital homes that can be utilised by various user groups
- IRIS smart home is a demonstration facility where various user groups can test various solutions - This facilitates finding optimal solutions for independent living in their own home environment

- To enable greater independence to various user groups
- To lower the costs of home-care delivered by health-care professionals by utilisation of e-services
- To reduce needs of transferring into homes for aged or other institutions



Aspects of smart homes

- Home automation & energy control – domotics (opening/closing doors/windows, turning on/off lights, controlling heating/airconditioning)
- Information & communication technology (ICT) – digital home, multimedia, entertainment
- Working & productivity (PC based workspace)
- All aspects include utilisation of various assistive technologies – AT)



Specification of needs of various user groups

- The target user groups are very different according to their specific needs:
 - People with physical/mobility impairments,
 - Aged people,
 - Blind or sight impaired people
 - People with hearing impairments.

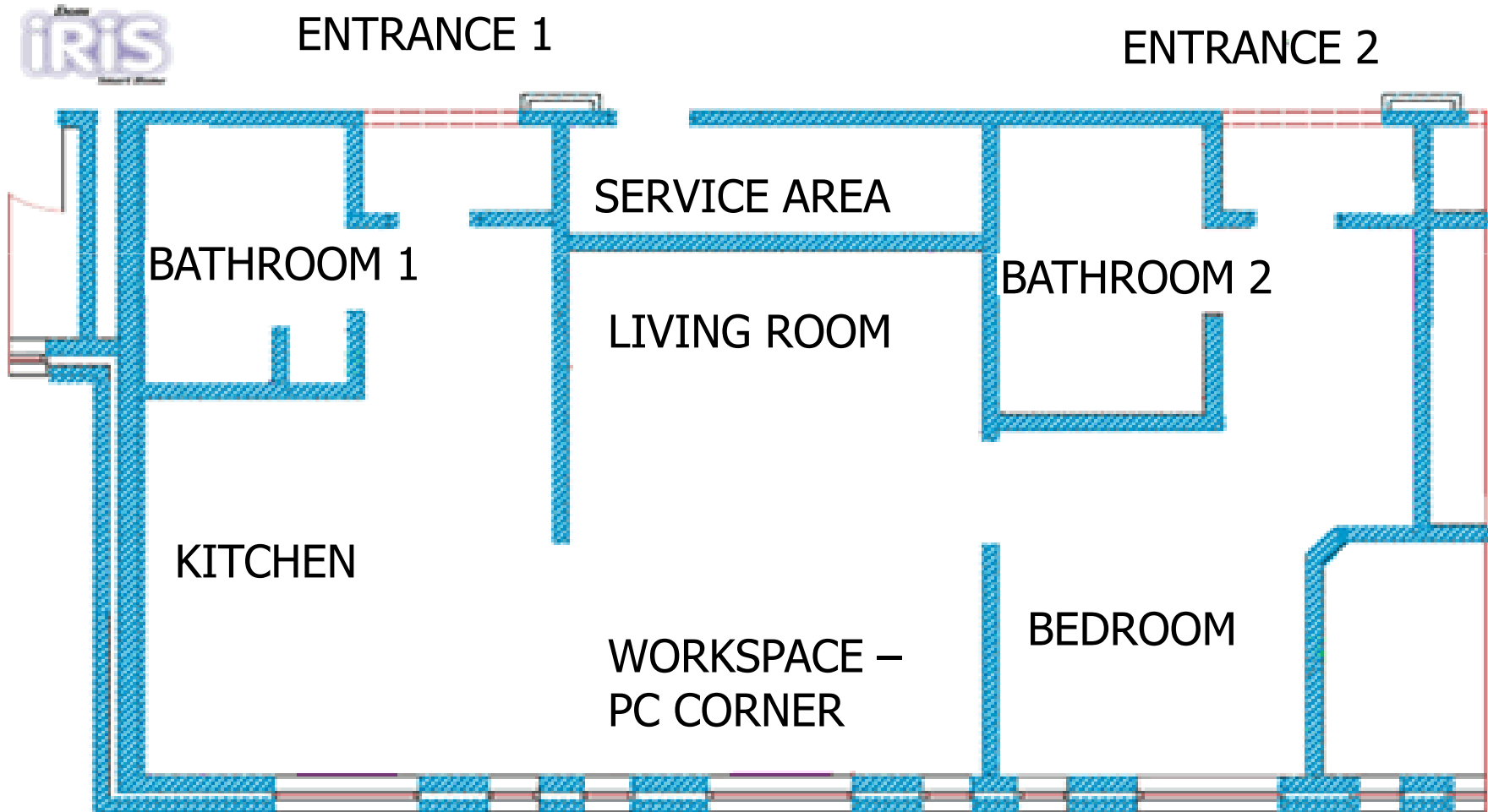


Broader societal context

- Activities toward sustained financing of operation, maintenance and upgrading of smart homes (medical councils, insurance companies)
- Financing of identified technological solutions for individuals (social and health-care politics, fonds, sponsors, etc.)



Smart home IRIS – Top view



Smart home IRIS – living room and PC corner



Dom
iRiS Smart home IRIS – kitchen
Smart Home





Smart home IRIS – bedroom with a lift system



Dom
iRiS Smart home IRIS – bathrooms
Smart Home



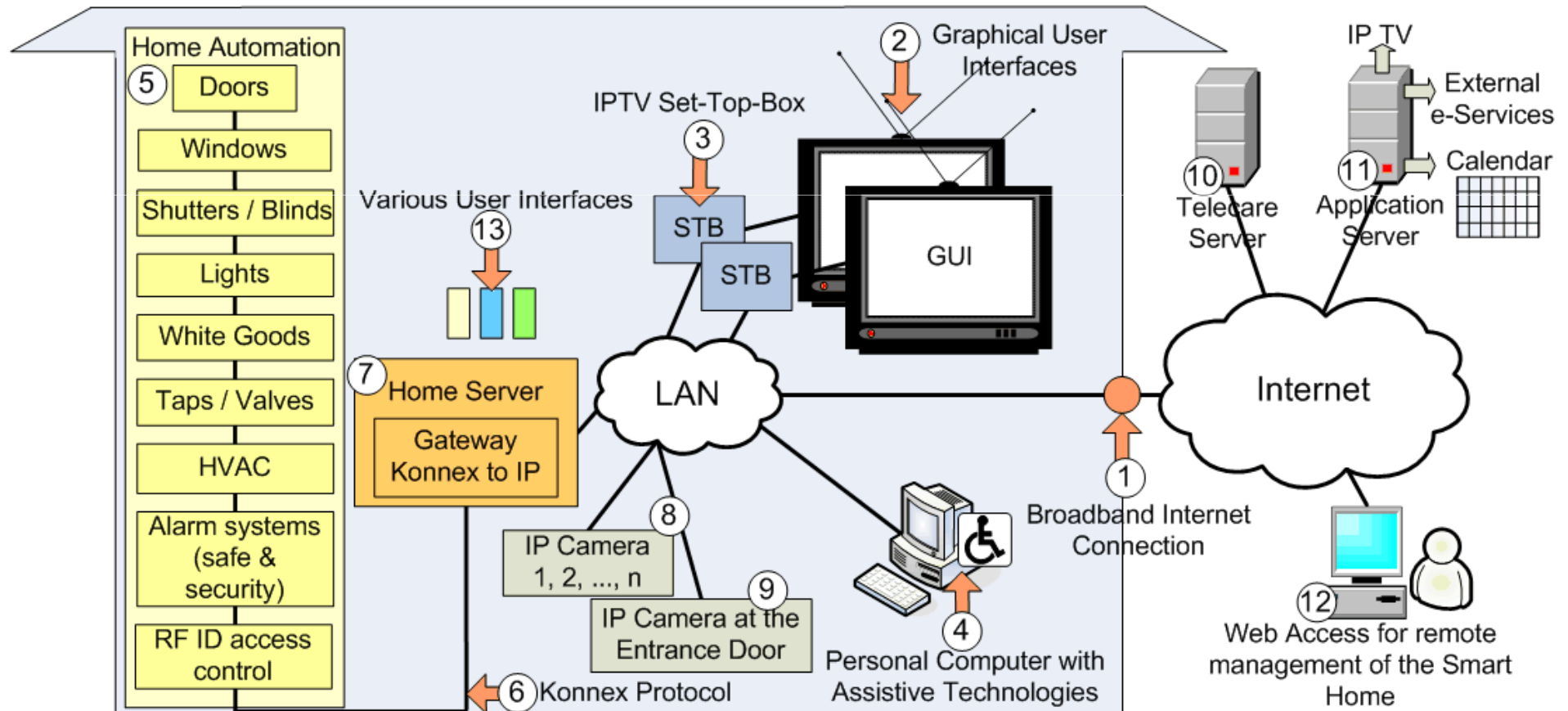


Smart home IRIS – bathrooms



Smart home IRIS – ICT

Dom iRiS Smart Home infrastructure





Convergent integration platform

BeeSmart

- Key aspect of home-automation systems and ICT services
- Remote access, total control through PC/TV and limited control through other interfaces
- Applications and services
 - Simple adding-on of new
 - Scalability of the existing
- Integration
 - On the level of networks
 - On the level of user interfaces

Convergent integration platform

BeeSmart



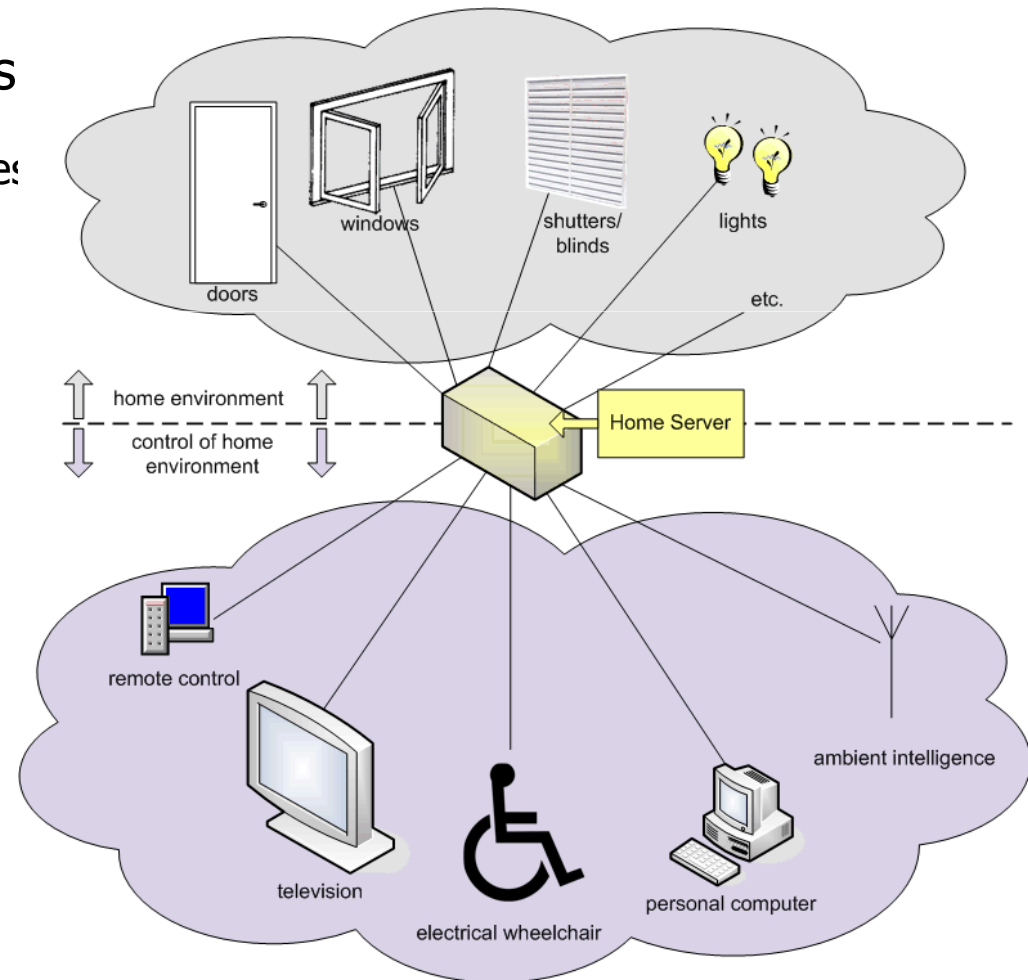
The image shows two side-by-side screenshots of the BeeSmart web interface in a Mozilla Firefox browser window. The browser address bar shows the URL `http://10.10.12.80/omniplay/client/`.

Left Screenshot: The main interface features a yellow navigation bar with icons for a monitor, a play button, a clapperboard, the iRiS logo, a lightbulb, a wrench, and a screwdriver. Below this, a sidebar on the left lists room names under the heading "Ambient": kopalnica1, dnevna soba1, kopalnica2, kuhinja1, delovna soba1 (highlighted), and spalnica1. The main content area displays "Okolje" and the date/time "feb 21. 2008, 11:09". A message reads: "Prosimo izberite sobo, ki jo želite upravljati."

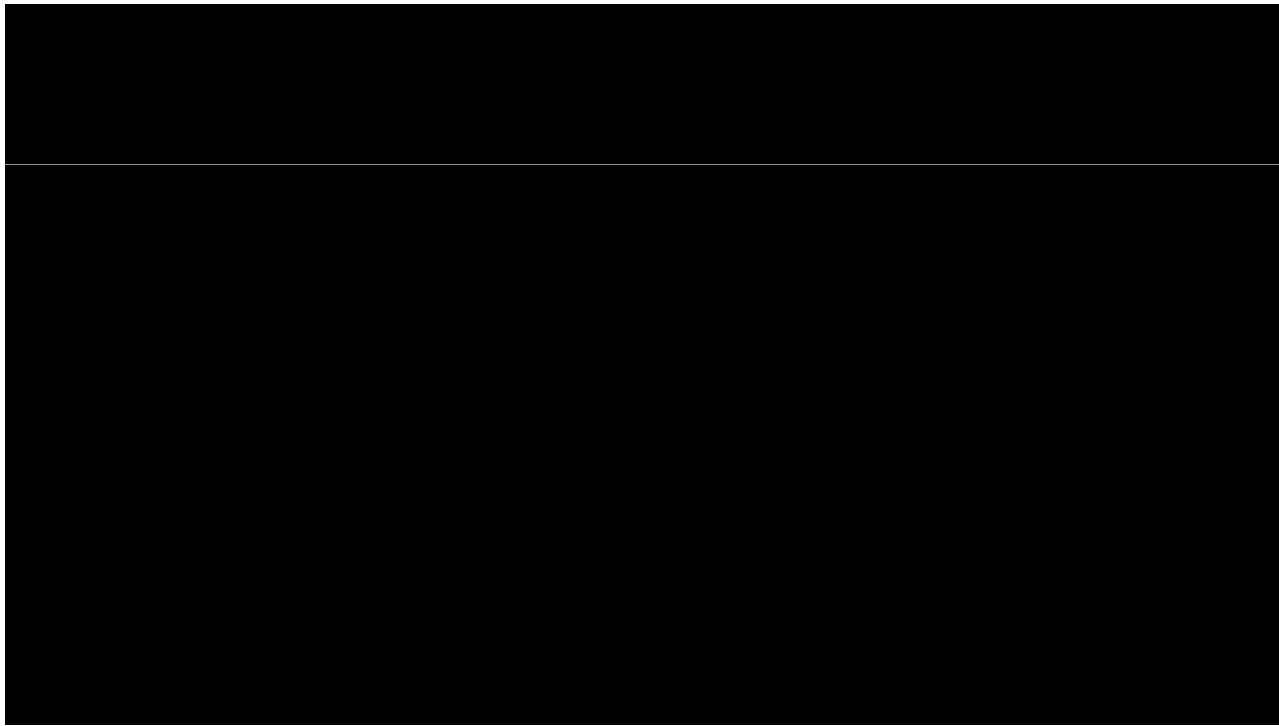
Right Screenshot: This screenshot shows a detailed control panel for a room labeled "soba56". At the top, there are navigation buttons: "Nazaj", "Nastavi napravo", and "Izberi napravo". The main control area is titled "Luč" (Light) and includes a switch labeled "Stikalo Vkl." (Switch On). Below the switch is a slider for "Jakost" (Intensity) ranging from 0 to 100, currently set at 30%. There are buttons for "Zapri" (Close), "Nastavi" (Settings), and "Izberi kontrolo" (Select control). At the bottom, there are four control buttons: "Okno" (Window) and "Senčilo" (Blinds) for two different light sources.

Control of living environment - domotics

- Control interfaces – controllers
 - Hardware and software that includes assistive technologies:
 - grafical (GUI)
- Control through:
 - TV
 - PC
 - Mobile device – remote controller
 - Adapted interfaces (assistive technologies), i.e. control panel of a wheelchair
 - grafical (GUI)
- Control with:
 - keys / joystick
 - voice
 - Eye-movements



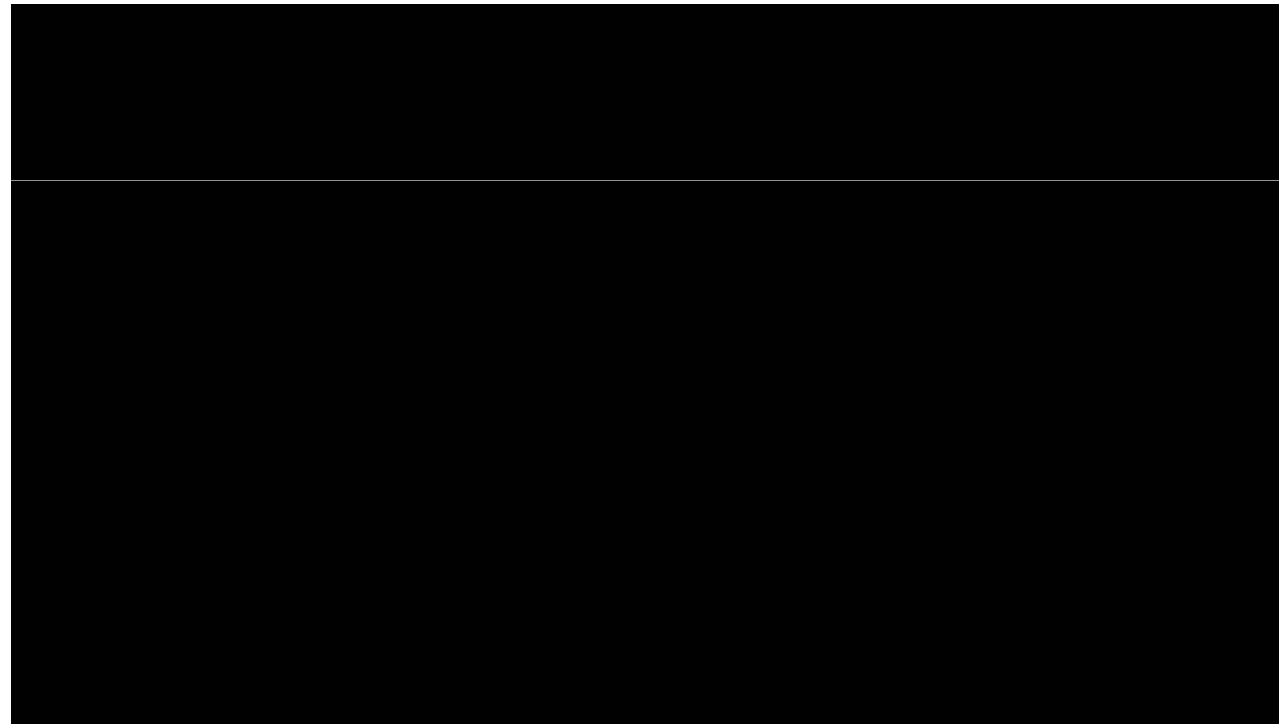
Control of living environment – domotics (through convergent platform Bee Smart)



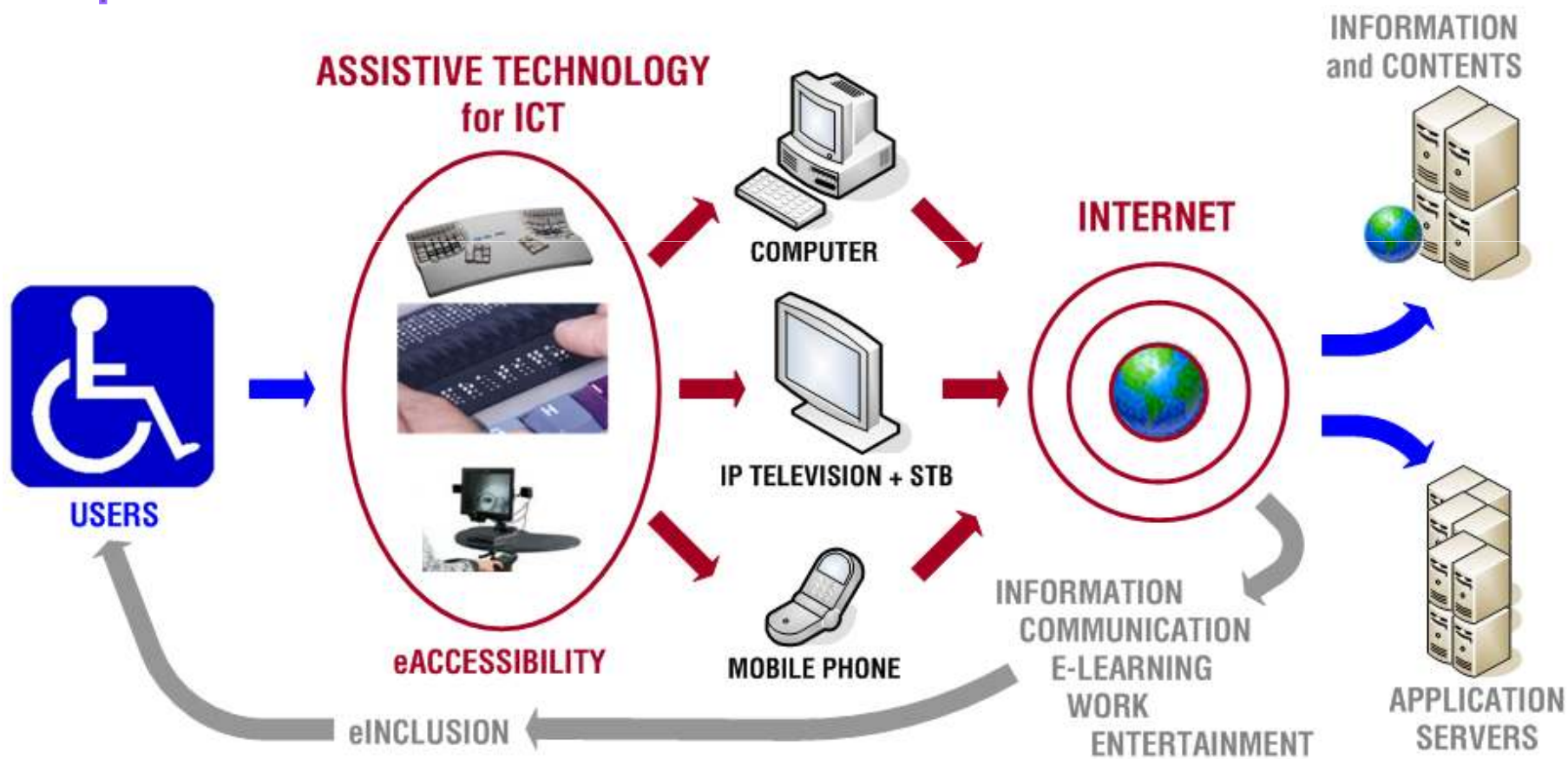
Control of living environment – domotics (through wheelchair control panel)



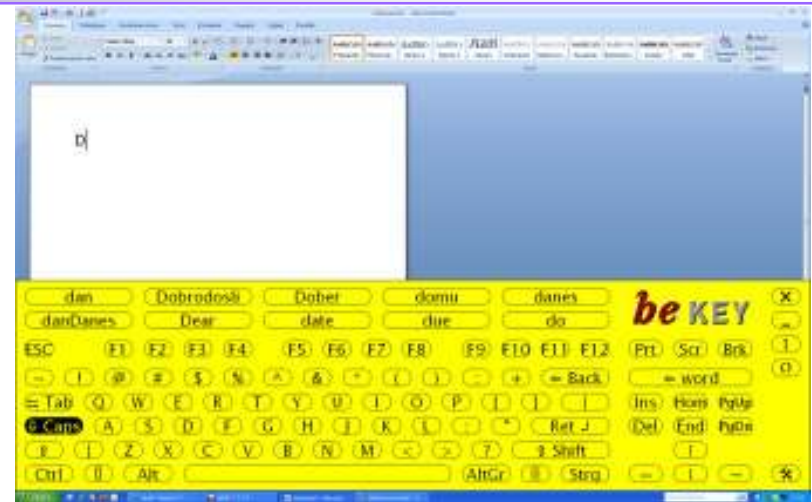
Control of living environment – domotics (through voice control device)



Smart home IRIS – e-Accessibility

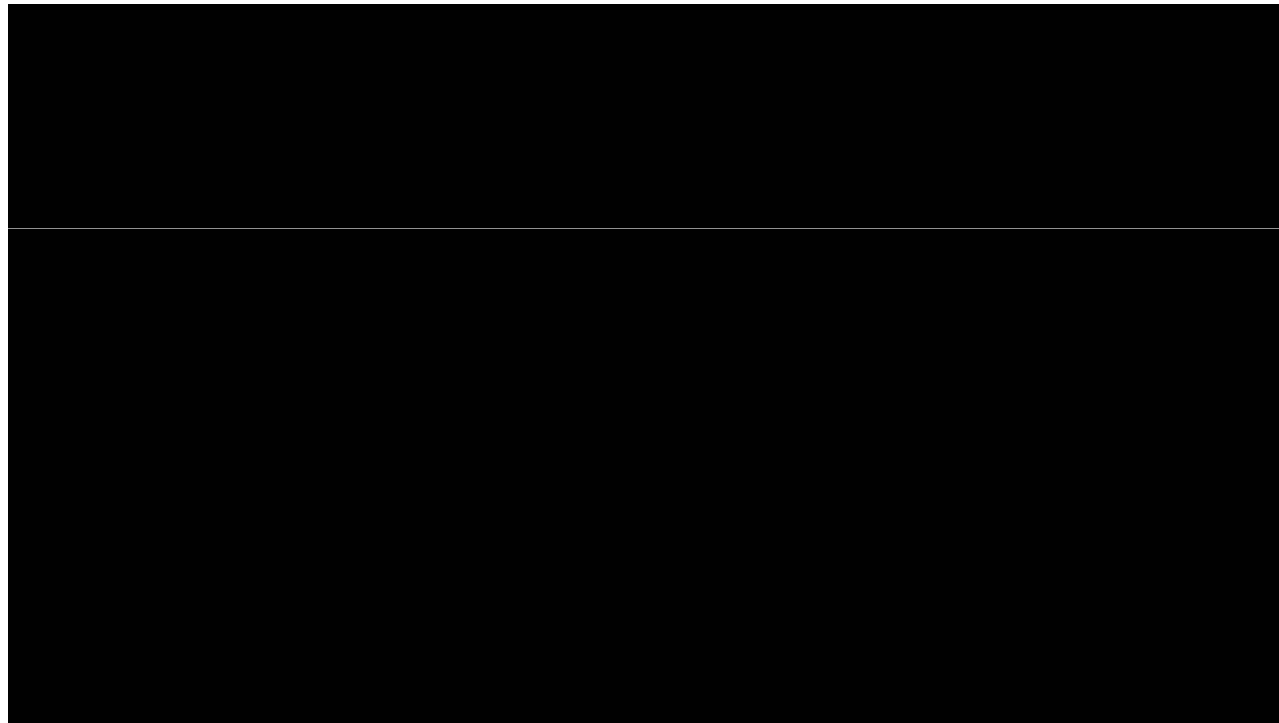


Dom iRiS Accessible PC



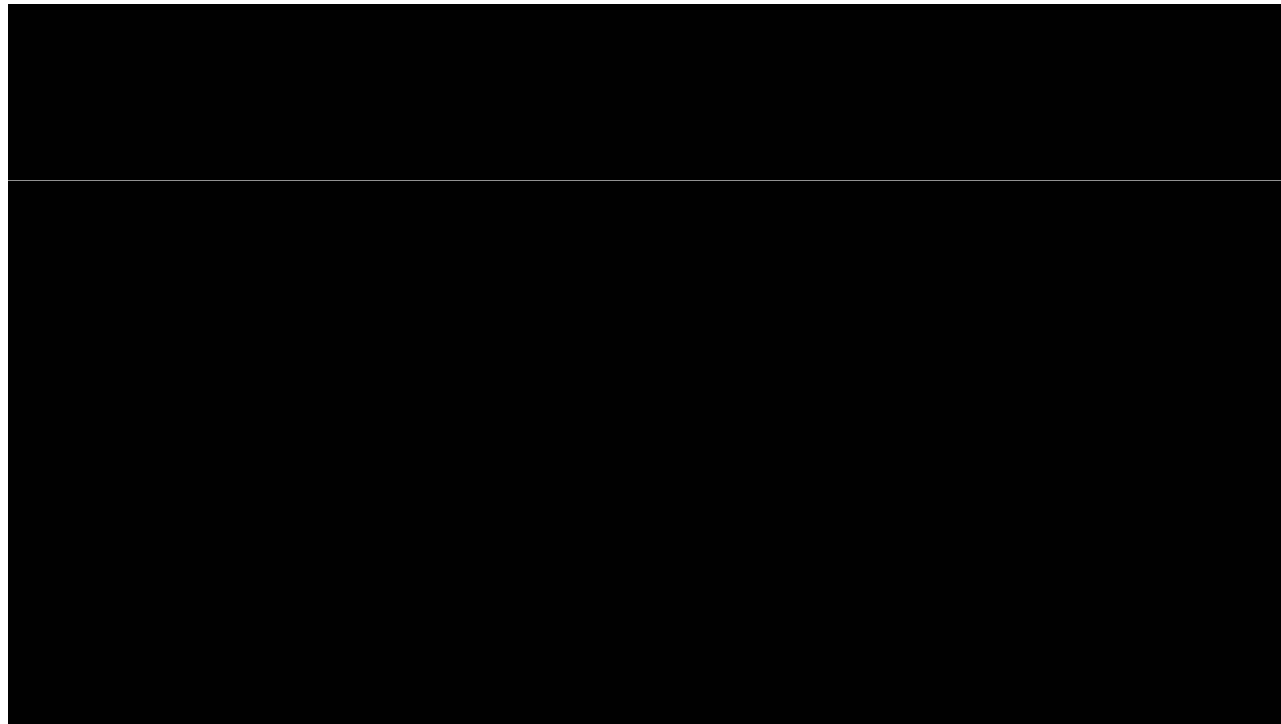


Accessible PC – light operated mouse (LOMAC)





Accessible PC – Braille interface



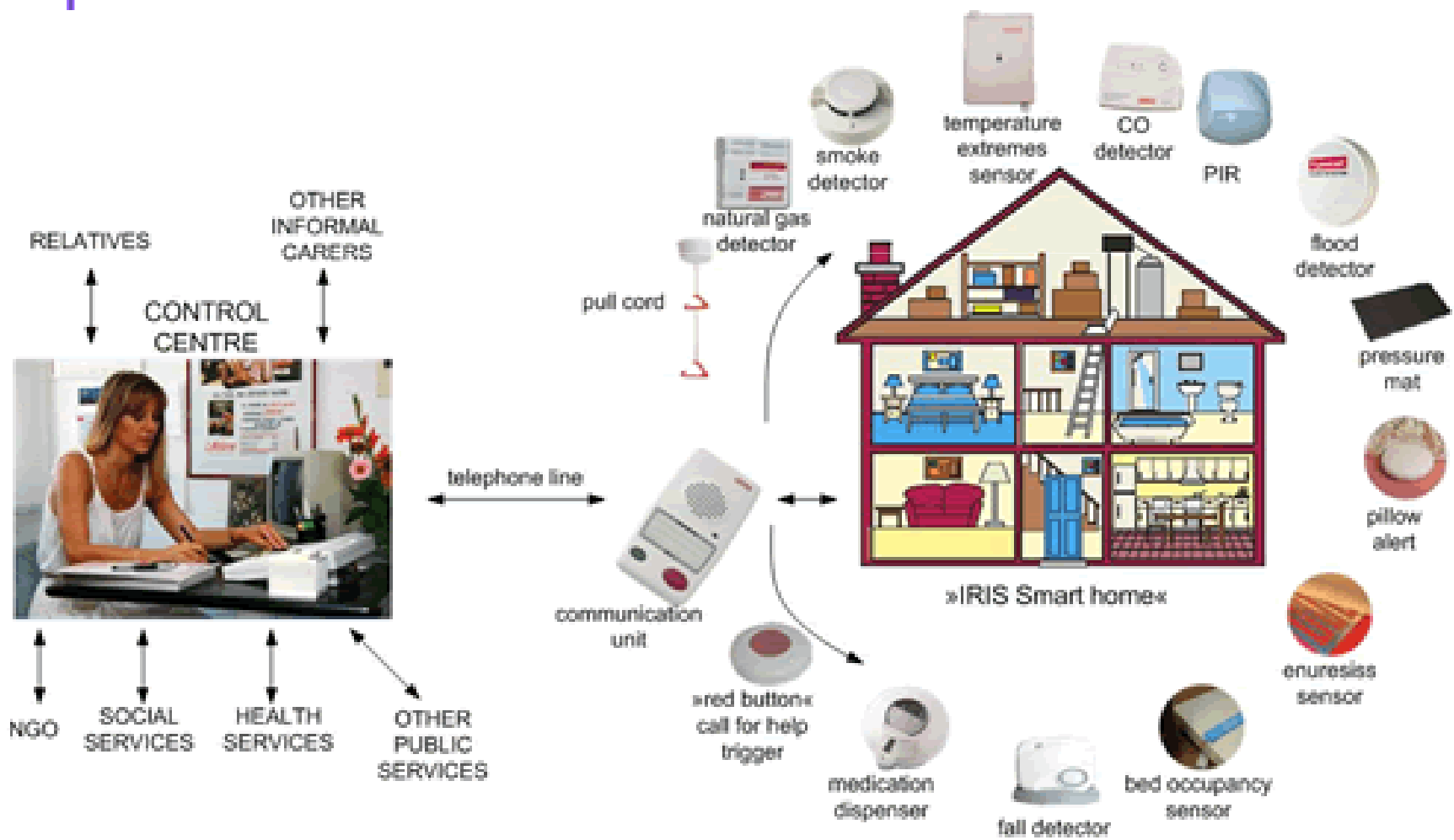


Smart home IRIS - e-Health

- e-Health on integration platform – scalable services
 - Web-based rehabilitation (form of telerehabilitation)
 - Telediagnosics
 - Tele-care
 - Calendars with reminders, with enabled remote access, various forms of alarms (visual, vibra, SMS etc.)
 - service »R U OK?«
 - NAP (ang. navigation, alarming and positioning)

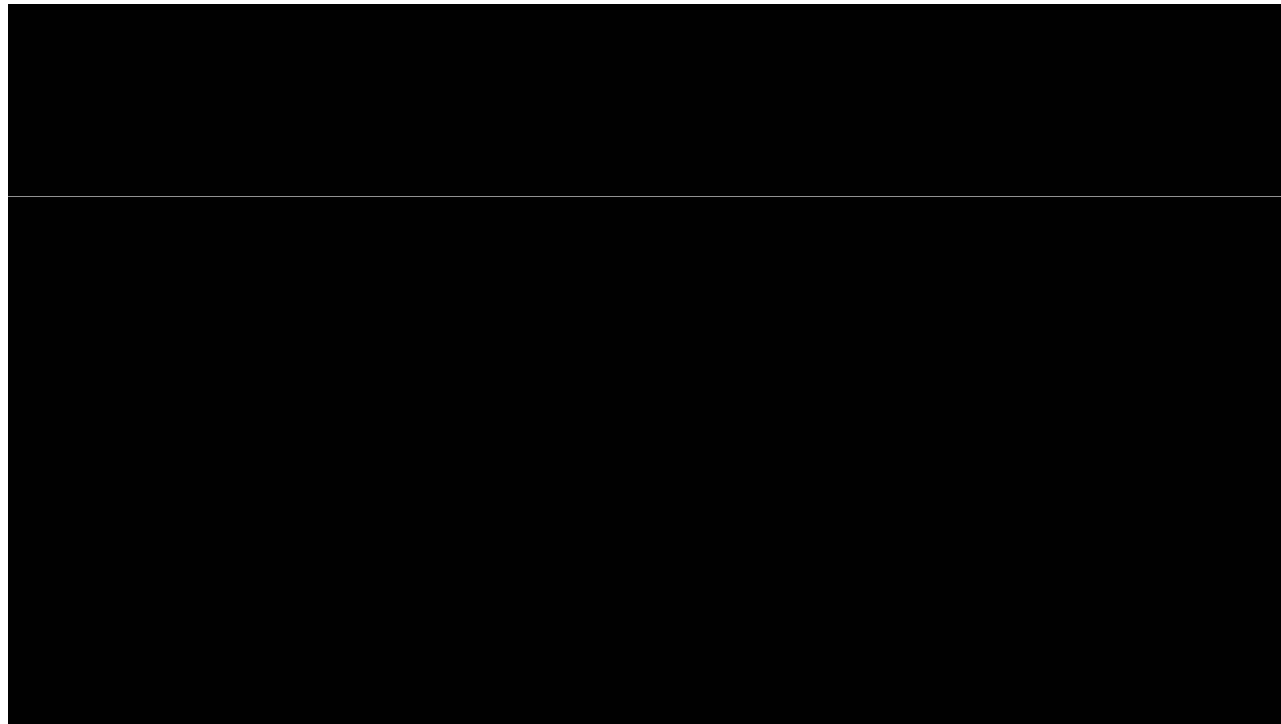


Smart home IRIS - telecare



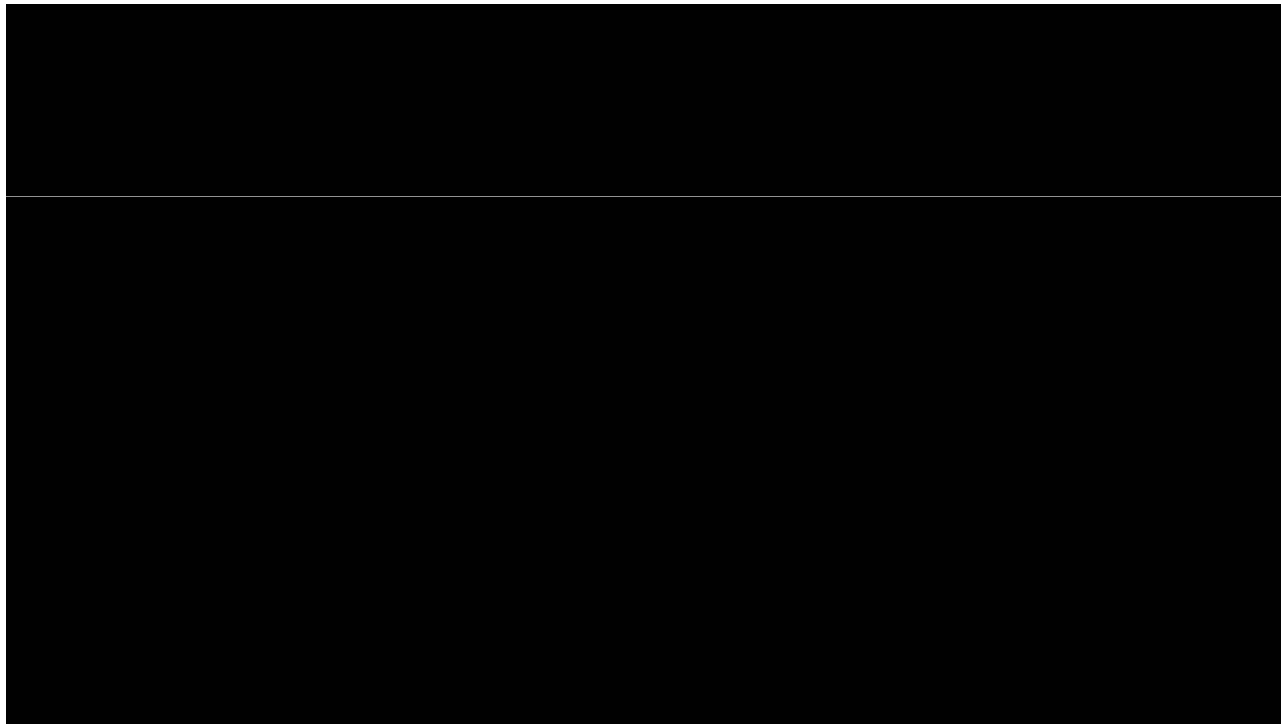


Smart home IRIS - telecare

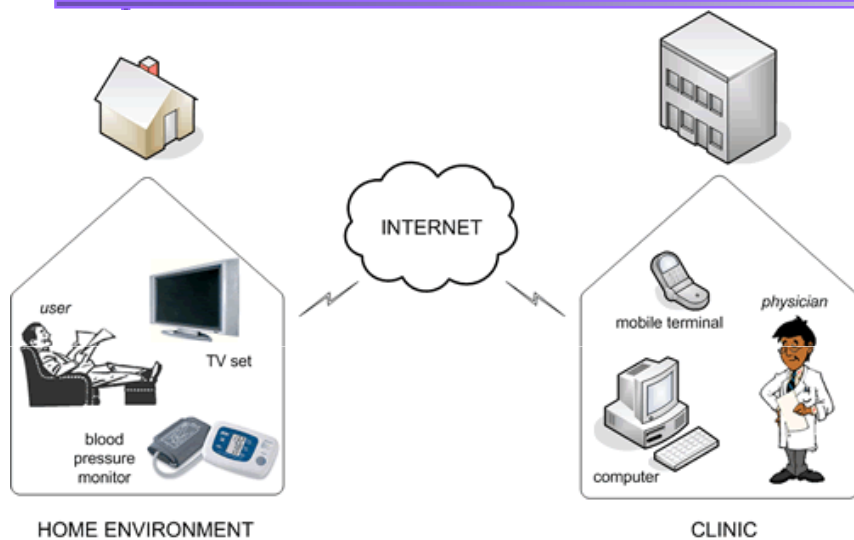




Smart home IRIS - telecare



Dom iRiS Smart home IRIS - telemedicine



MOJ KRVNI TLAK (stran 4 od 6) **LIFE**

Datum in čas	Sistolični	Diastolični	Utrip
03.12.07 ob 15:01	131 mmHg	79 mmHg	87/min
02.12.07 ob 14:59	159 mmHg	86 mmHg	80/min
01.12.07 ob 14:58	152 mmHg	71 mmHg	72/min
30.11.07 ob 14:57	144 mmHg	79 mmHg	88/min





Smart home IRIS - telemedicine

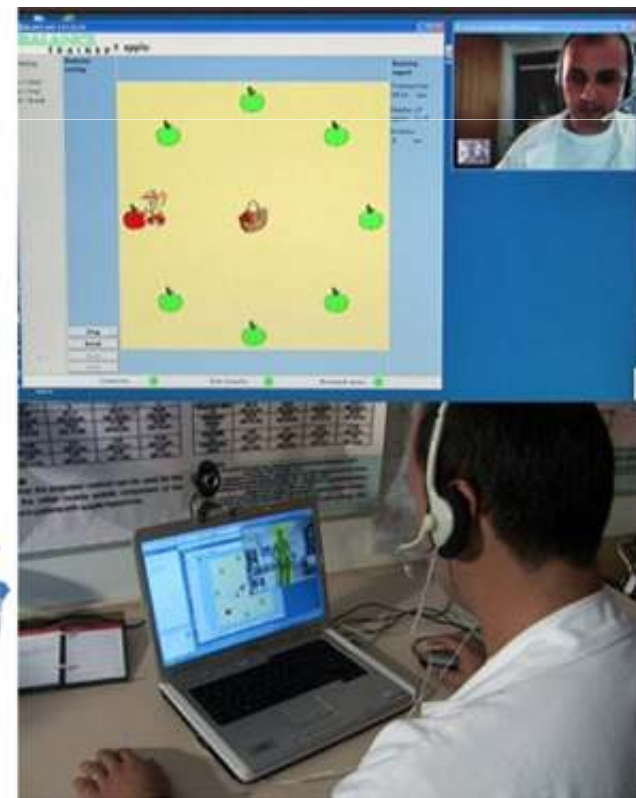
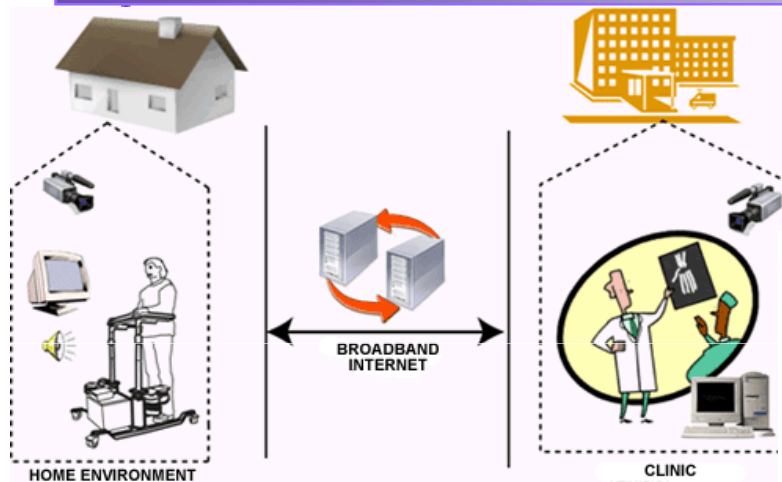


Dom
iRiS Smart home IRIS - telemedicine
Smart Home



Smart home IRIS - telerehabilitation

Dom
iRiS
Smart Home





Smart home IRIS - telerehabilitation



Set of services: e-Services

- Accessibility of e-Services through integration platform
 - e-Education
 - E-CHO
 - e-Shopping
 - Accessible web shops

Mercator

Izdelki Iskanje Priljubljeni Košarica Izhod

DISTRIBUCIJA: Izberite

ČAS DOSTAVE: 07.05.2008 12-14

NASLOV ZA DOSTAVO: kongresni trg 15, Ljubljana

PAKIRANJE: Škatla

PLAČILO: Gotovina/Ob prevzemu

DOVOLI ZAMENJAVO:

ORIGINALNI RAČUN:

Users in Smart home IRIS

- Interdisciplinary approach
 - Physician – specialist of PMR (clinical examination, evaluation of cognitive and sensory-motor abilities, ...)
 - OT – evaluation of abilities to perform various daily activities
 - Rehabilitation engineer – ICT and AT aspects (evaluation and training)



Users in Smart home IRIS

- Referral to Smart home IRIS
- Interview with the user/relatives (COPM – Canadian Occupational Performance Measure), clinical evaluation
- Evaluation of independence in performing various daily activities (FIM – Functional Independence Measure, AMPS – Assessment of Motor & Process Skills),
- Determination of limitations, goals and treatment plan
- Selection and evaluation of AT and ICT, study of users own living environment and recommendations for adaptations
- Data analysis and final selection of the most appropriate AT, ICT
- Application of the selected AT, ICT with proper training and education



Users in Smart home IRIS

- 96 treated clients in the period from january – september 2008
 - TBI, MS, Parkinson: 9
 - Stroke: 4
 - SCI: 33
 - Amputations: 12
 - Rheumatoid arthrithis & trauma: 16
 - Cerebral palsy: 8
 - Muscular dystrophy: 9
 - Blind & sight impaired: 5



Users in Smart home IRIS

- Referral
 - Physician: 11
 - OT: 47
 - Self-initiated/relatives: 26
 - Others: 12

Users in Smart home IRIS

- Type of difficulties/goals:
 - Non-functional home/working environment: 60
 - Control of domotics: 19
 - Accesibility and control of PC: 28
 - Communication problems: 5
 - ADL (higiene, bathing, cooking, feeding): 43

Users in Smart home IRIS

- Service offered:
 - Demonstration, advising, informing: 93
 - Testing of AT, ICT and other facilities: 41
 - Derivation of adaptation plan of home environment: 3
 - Training in use of selected AT: 2



Research in Smart home IRIS

- “test-bed” for new technologies, services, user interfaces, ...
- “test-bed” for emerging telerehabilitation technologies – tele-therapy rehabilitation platforms and services
 - Ambient intelligence
 - Smart-homes technologies
 - Assistive technologies
 - AAL (ambient assisted living)
 - e-accessibility and e-inclusion