

Advancing research & development in the area of accessible and assistive ICT

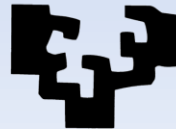
# CARDIAC-EU.ORG

## The Cardiac Roadmap on Future Research on Accessible User Interfaces

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Needs**

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## Cardiac

- A Coordination Action in R&D in Accessible and Assistive ICT
- It is developing a series of **roadmaps** for future R&D in the area of **accessible** and **assistive** ICT systems.
  - Technology Transfer of Assistive and Accessible ITC Systems
  - **Inclusive human-machine interaction**
  - Network-based applications

## Cardiac WP 3: Inclusive HCI

Work Package 3 objectives:

- To review recent advancements and current trends in R&D on inclusive HCI
- To identify recommendable methodologies and technologies and R&D gaps
- **To propose a short/medium/long term set of objectives for the achievement of inclusive HCI.**

## Expected contributions from WP3

**D3.2 Trends on inclusive user interface design.** This report will identify research and development that could benefit the development of inclusive human interfaces accessible for all people. February 2013.

- Suggestions on **main policies** for R&D in Inclusive HCI and Assistive Technology
- Proposals on **what technologies** need to be supported
- Plans on **what methodologies** have to be investigated
- Ideas on **what kind of tools** should be developed

## 2nd SDDP Seminar

- Donostia-San Sebastián. June 28-29,2011 (2 workdays)
- The Structured Dialogic Design Process (SDDP) supports the identification of potential mechanisms for a successful research road-mapping aimed to the inclusive HCI.

## SDDP2: 8 Invited experts

<b>Jon Azpiroz</b>	Vodafone (E)
<b>Stephan Carmien</b>	Fatronik (E)
<b>Simon Harper</b>	U. of Manchester (UK)
<b>Adamantios Koumpis</b>	ALTEC (Gr)
<b>Roberto Torená</b>	Technosite/ONCE (E)
<b>Ginger B. Claassen</b>	Siemens IT Solutions & Services (D)
<b>Gregg Vanderheiden</b>	Trace R&D Center (USA) <i>Via teleconference</i>
<b>Gerhard Weber</b>	Technical University Dresden (D)



Cardiac → WP3 → **SDDP2** → Results → Conclusions

## SDDP2: 14 CARDIAC members

<b>Julio Abascal</b>	University of the Basque Country (E)
<b>Gunela Astbrink</b>	GSA Information Consultants (AUS)
<b>Ilse Bierhoff</b>	Smart Homes (NL)
<b>Kjell Åge Bringsrud</b>	University of Oslo (N)
<b>Pier Luigi Emiliani</b>	Institute of Applied Physics (I)
<b>Cristina Espadinha</b>	Technical University of Lisbon (P)
<b>Rocío G. Robles</b>	Universidad de Sevilla (E)
<b>John Gill</b>	Gill Associates (UK)
<b>Helmut Heck</b>	Forschungsinstitut Tech. und Behinderung (D)
<b>Sifis Klironomos</b>	ICS-FORTH (Gr)
<b>Yiannis Louris</b>	Cyprus Neuroscience & Tech. Institute (CY)
<b>Leonor M. Pereira</b>	Technical University of Lisbon (P)
<b>Mary Nolan</b>	Central Remedial Clinic (IE)
<b>Patrick Roe</b>	Ecoles Polytechniques Fédérales (CH)

## Participation of experts from parallel initiatives

- **Study on Implications from Future ICT Trends on Assistive Technology and Accessibility** (EC - DG INFSO, Unit ICT for Inclusion). **Adamantios Koumpis**, ALTEC (GR)
  - The study explores the future of eAccessibility and will provide recommendations on future EC research policy priorities on eAccessibility.
- **eAccessibility Impacts** (EU - DG Information Society and Media, Unit ICT for inclusion). **Roberto Torena**, Technosite/ONCE (E)
  - Study on Economic Assessment for Improving e-Accessibility Services and Products

## SDDP2: Triggering question

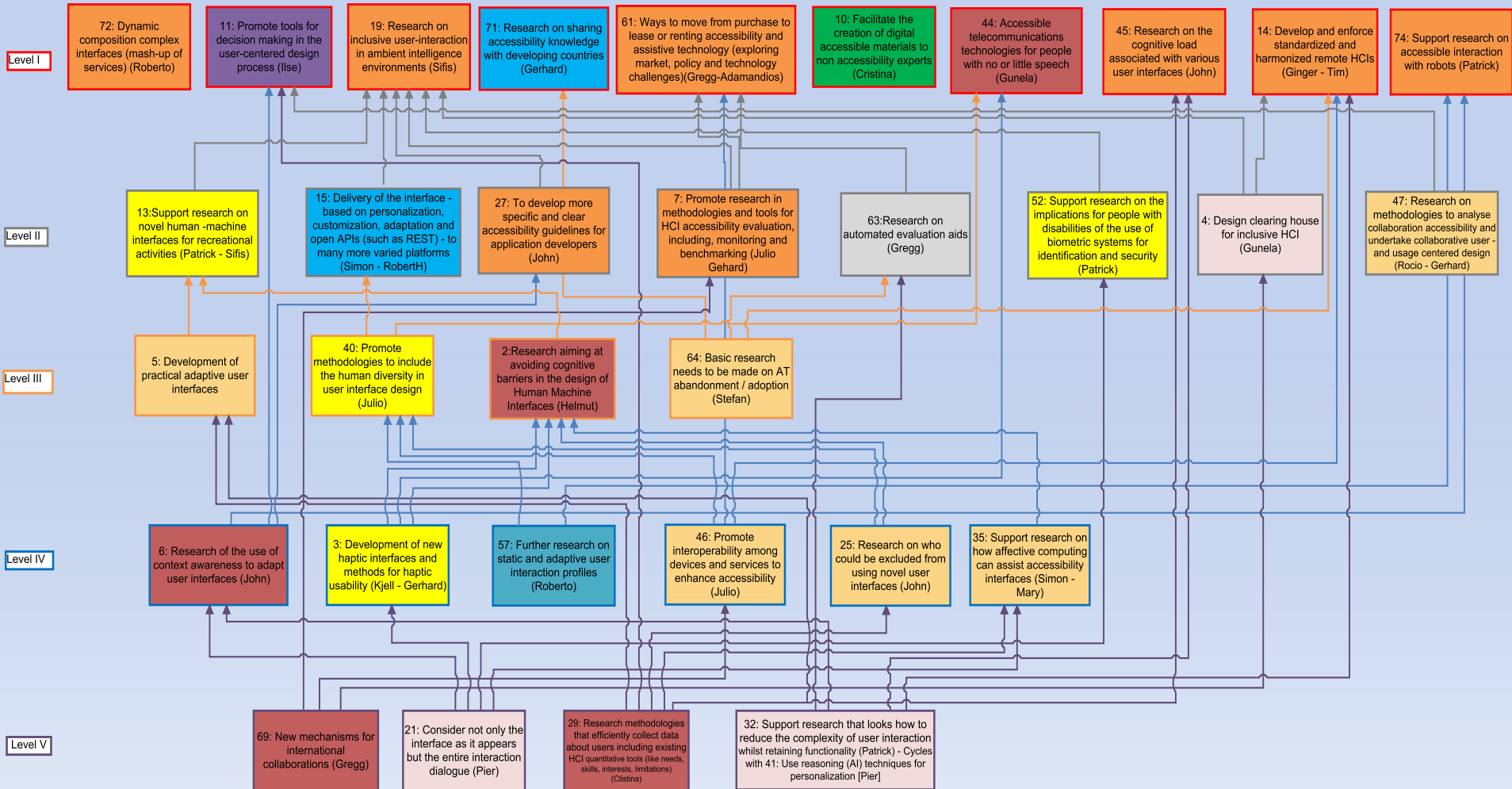
**Triggering question:** What type of research is missing that could facilitate development of inclusive HCI (and Assistive ICT)?

1. 75 ideas generated in response to the TQ
2. Ideas clarified and discussed
3. Interactively clustered into 18 categories
4. The most important 50 selected (voted).
5. Influence map: 33 ideas in the form of the Tree of Influence comprised of 5 levels
6. Discussion/reflection on the influence map and agreed that the arrows made sense
7. CARDIAC to identify the most influential research that is missing to facilitate development of inclusive HCI



# Cardiac → WP3 → SDDP2 → Interpretation → Conclusions

## SDDP2: Tree of influences



## SDDP2: Clusters

<i>Field #</i>	<i>Title</i>	<i># of answers</i>
1	Ubiquitous computing beyond HCI	6
2	Overcoming cognitive load	5
3	Innovative user interfaces	12
4	Accessibility resource materials	10
5	User modelling and adaptive user interfaces	11
6	Design methodologies and tools	5
7	Knowledge sharing	2
8	Design for all	4
9	Interoperability/URC	3
10	Human Factors	11

**Advanced methodologies and tools to overcome accessibility barriers**

**Technological advancements**

**Collaborative actions to overcome accessibility barriers**

**User centred design**

## Detected main areas of work

- **User centred design:**
  - Human factors
  - Overcoming cognitive load
  - Design for all
- **Collaborative actions to overcome accessibility barriers:**
  - Knowledge sharing
  - Accessibility resource materials
- **Technological advancements:**
  - Ubiquitous computing
  - Interoperability/URC
  - Innovative user interfaces
- **Advanced methodologies and tools to overcome accessibility barriers:**
  - Design methodologies and tools
  - User modelling and adaptive user interfaces



## Level V: General R&D policies

- **Holistic approach to inclusive HCI**
- **Decrease complexity and effort of user interaction**
- **Adopt user modelling techniques to tailor the interaction**
- **Promote open technologies and worldwide collaborations**

*21: Consider not only the interface as it appears but the entire interaction dialogue.*

*32+41: Support research that looks how to reduce the complexity of user interaction whilst retaining functionality. Use reasoning (AI) techniques for personalization.”*

*29: Research methodologies that efficiently collect data about users including existing HCI quantitative tools.”*

*“69: New mechanisms for international collaborations.”*

# Cardiac → WP3 → SDDP2 → **Interpretation** → Conclusions

## Level I: Specific R&D actions

14: Support research on novel interfaces for musical instruments

44: Promote the definition or adoption of a common/standard middleware as accessible interoperability framework

71: Research on sharing accessibility knowledge with developing countries

69: New mechanisms for international collaborations

71: Research on sharing accessibility knowledge with developing countries

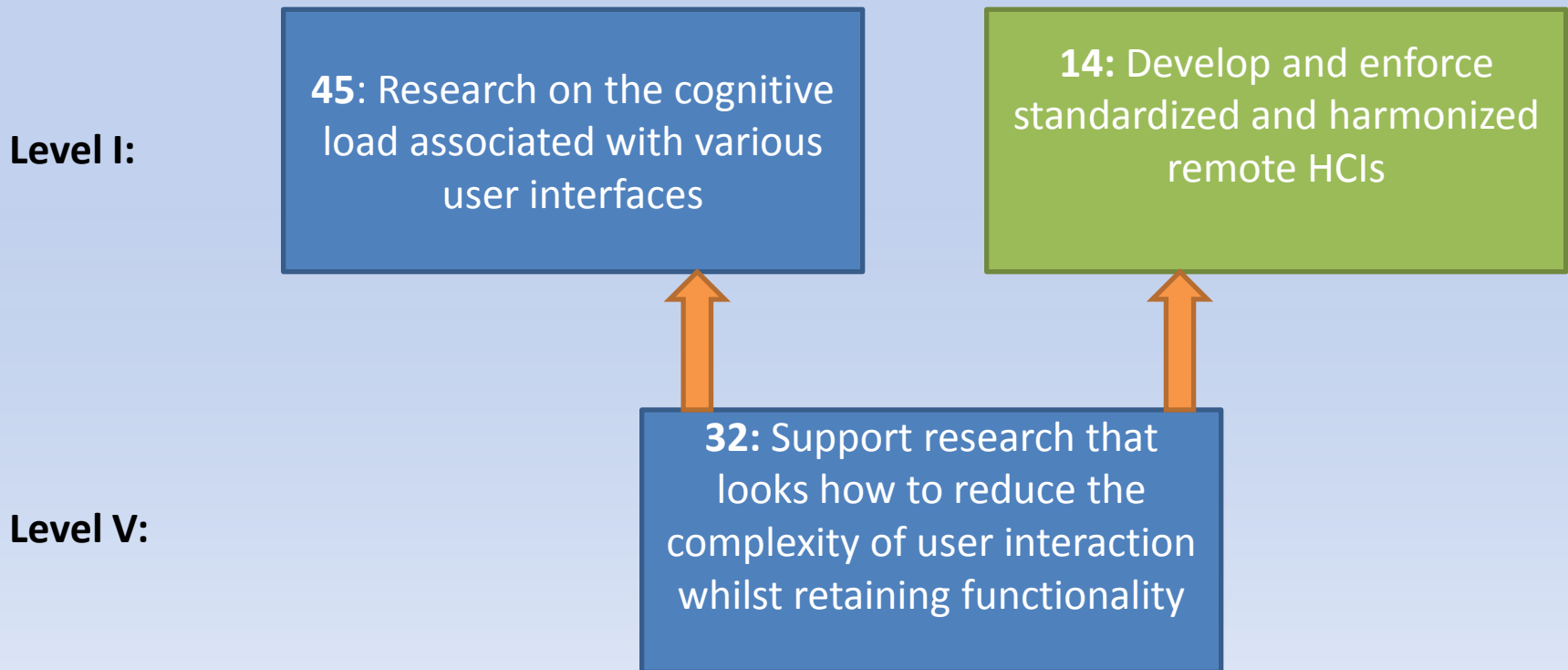
10: Support research on gathering further understanding of user behaviour and interaction with machines

11: Promote tools for decision making in the user-centred design process

74: Support research on accessible interaction with robots

## From policies to actions

### Direct way



## The way from policies to actions

Multilevel

Level I:

Level VI:

Level V:

74: Support research on accessible interaction with robots

6: Research of the use of context awareness to adapt user interfaces

57: Further research on static and adaptive user interaction profiles

32: Support research that looks how to reduce the complexity of user interaction whilst retaining functionality

21: Consider not only the interface as it appears but the entire interaction dialogue

## Generating an R&D roadmap

- Analysis of the SDDP2 results (Raw data have to be understood and interpreted)
  - Better understanding of each answer
  - Meaning of each path in the tree of influences
  - Generation of a matrix of application areas (~ clusters) with R&D paths.
- Validating the SDDP2 results with:
  - Consultations to specific non-European experts
- Enriching the SDDP2 results with:
  - Data from other EU prospective projects
  - New review of the state of the art (in USA and Japan)
- Report with specific recommendations

## Validation: Non European experts

- Three non European experts consulted
  - **Prof. Albert Cook.** University of Alberta (Canada),
  - **Prof. Jonathan Lazar.** Director of the Universal Usability Laboratory. Towson University (USA)
  - **Prof. Zhengjie Liu.** Director of the Sino-European Usability Center. Dalian Maritime University (China)

## Non European experts consultation

	Short term ( <5 years)	Medium term ( 5-10 years)	Long term ( >10 years)
Specific technologies			
Methodologies			
Tools			
Standards, Norms, Guidelines, etc.			
Others (social ethical issues, collaboration frameworks, etc.)			

## Non European experts: conclusions

- Analysis and comparison of their answers with the SDDP 2:
  - There is a large **general coincidence** in the general **objectives** and **approaches** with the ones expressed in the SDDP.
  - There are some new ideas that should be included in our roadmap.
- The answers from these three experts were extremely valuable to **validate and complete our approach.**

## Enriching: Other European initiatives

- BRAID European Project.
- AALIANCE Ambient Assisted Living Roadmap.
- Inclusive eServices for all: Optimizing the accessibility and the use of upcoming user-interaction technologies. ETSI EG 202 848 V1.1.1, 2011.
- Accelerating the development of the e-health market in Europe. EC. 2007.
- Inclusive E-Services for All: Identifying Accessibility. ETSI Specialist Task Force (STF) 377 on “Inclusive eServices for all: Optimizing the accessibility and use of upcoming user interaction technology”.

## Issues raised in relation with standardization

- User Interface Accessible Design **guidelines**
  - From experts
  - For designers of **mainstream** devices & services
- Standards for interoperability in Aml/AAL affect HCI
  - E.g.: Standard **middleware**: URC/UCH
- User modelling:
  - **UIDL**: User Interface [abstract/formal] Specification Languages
  - **Extensible** and **shareable** user models (ontologies)

## Summarizing

- SDDP2 allowed to identify the main gaps in inclusive HCI R&D
  - Other sources are taken into account (parallel initiatives)
  - Validation(Non-European experts consultation)
- Road-mapping:
  - CARDIAC is preparing a short/medium/long term set of objectives for the achievement of inclusive HCI.
- We will appreciate any contributions
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