Nomadic systems and ecomobility

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Nomadic devices: definitions

- Nomadic devices include all types of information and communication as well as entertainment devices brought into the vehicle by the driver to be used while driving (Nomadic device forum, eSafety Working Group 2009).

  - mobile phones, portable computers, Pocket PCs, PDAs, mobile navigation devices, iPods, DVD Players and future multi-functional smart phones

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Nomadic devices: some statistics about smart phones

- At the end of 2011, there were about 6 billion mobile subscriptions, estimates "The International Telecommunication Union" corresponding to 87 percent of the world population

Figure 1: Africa – Mobile Subscribers and Penetration (2002-2012)

Source: Blycroft Ltd.

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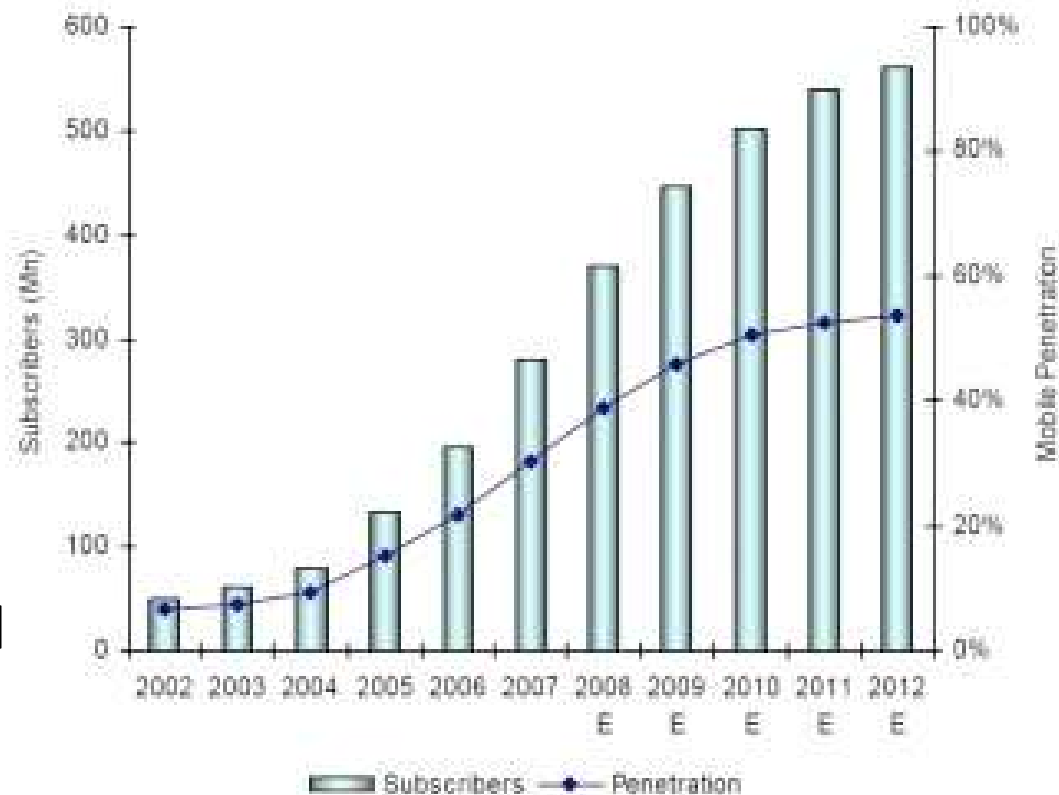
Nomadic devices: some statistics about smart phones

- Smart phone market grew 54.7% year over year in the fourth quarter of 2011 corresponding increase access to sophisticated services such as internet and geo-localisation

- Over 300,000 mobile applications have been developed in the last three years

- Japanese consumers are still more advanced in mobile behavior, using mobile Web, applications and email more than US or Europeans

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Nomadic devices: some statistics about mobile phone

- Use of mobile phone is growing among seniors, since 2000, with differences between countries (USA: 65%, Sweden & Germany: 62%, UK: 44%, France: 39%)

- According to a study in UK, 49 % of seniors feel intimidated by mobile phone use (Lin & al., 2009)

- The % of people with a mobile phone is higher for the age group 65-74 years old than for the age group over 75 years old (Lin & al., 2009)

Chart 2. Percent of total telephone services spent on cellular phone service, by age group, Consumer Expenditure Survey, 2001–2007
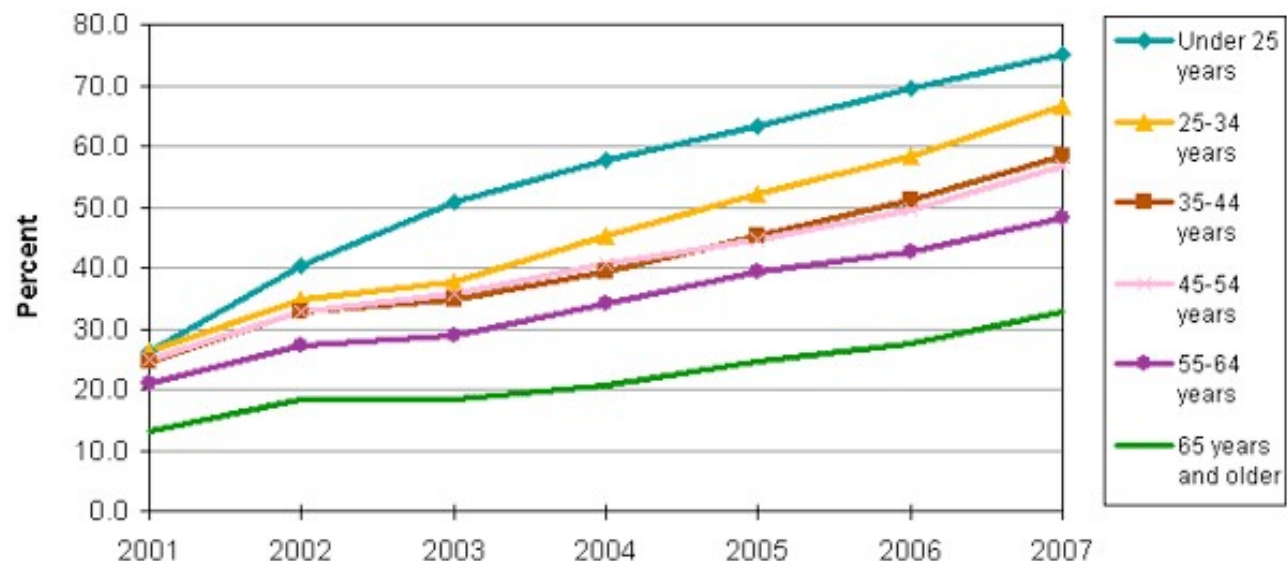
Nomadic systems for ecomobility

- Supporting the driver for **eco-driving** not
- connected to the vehicle (e.g. EcoGyser,
- Nomadic solutions)
- « **Encouraging** » the driver to take **public transport** thanks to precise information about parking location and availability, in addition to time table of bus/metro (e.g. optimodlyon)
- « **Encouraging** » the driver or the traveller to use self service **bicycle** thanks to real time information about station location and availability
- Setting easy and secure "**ride sharing**" services to federate trips between drivers and travellers (e.g.

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Support the driver for eco-driving

e.g. EcoGyser, 2009 (12 000 downloadings in 4 months)

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Support the driver for eco-driving

- User with a mobile phone GPS fitted with an accelerometer can estimate fuel consumption, kilometers driven, average speed and periods of acceleration and braking without a direct vehicle connection. Just selection of type of vehicle is required
- Awareness of driving style and personalised advices on real time. Driver is alerted to departures from eco-friendly driving patterns during the journey
- Information on real time or analysis afterwards on PC

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Support the driver for eco-driving

Features
- Estimated average CO2,
- Estimated total CO2,
- Average speed,
- Maximum speed,
- Odometer,
- Driving time,
- Acceleration time (soft, medium, hard),
- Deceleration time (soft, medium, hard) ,
- Real time advice (display and speak),
- Vehicle parameter by categories,

Support the driver for eco-driving

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Support the driver for eco-driving

http://www.youtube.com/watch?v=KPv0hT3DAIs

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Encouraging use of public transport & self service bicycle

- *Increase in the complexity of urban trips and extension of the transport network in urban area*

Necessity for public transport operators and local authorities to propose efficient services of information to travelers

- *Widespread among population of powerful technology of information and communication*

Opportunity to communicate accurate information on real time

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The French project Mobiville

To set up a multimodal information service available on mobile phone in the French city of Lyon

« door to door » information on Public Transport modes (tramway, bus, trolley & underground) and real time

localization of the bus stops and the underground entrances on cartographic background in relation to the pedestrian in the urban area

localization of Velo'v stations and their capacity

orientation of the pedestrian from address to Public Transport first stop and from last stop PT to final destination

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Encouraging use of public transport

- An example: optimodlyon

- Improve mobility of persons through high level services using Information and Communication Technology (ICT)

- Encourage transfer from car use to public transport/bicycle use

http://www.optimodlyon.com/#

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"ride sharing" services

Several mobile applications of ridesharing

- planned in advance ridesharing

- instant ridesharing (automatic updating of ridesharing offers all along drivers routes)

- mixing navigation and integrated billing system.

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"ride sharing" services: examples

- – CARPAL (smartphone and PayPal password)
  http://www.youtube.com/watch?v=W9Z6w71115c

- – buzzjourney
- – http://www.youtube.com/watch?NR=1&feature=endscreen&v=V1nqrL2-wzg

- – Togetthere Mobile car pooling
- – http://www.youtube.com/watch?v=chsJ9nj-bkA&feature=related

- – AVEGO real time Ride sharing
- http://www.youtube.com/watch?feature=player_embedded&v=P58Ug6JpdRU
- http://www.youtube.com/watch?v=UVV151apvww&feature=relmfu

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Design of nomadic device: a challenge

- As a mobile device carried out everywhere, the design has to match with a great variability of contexts, including only one hand use in some cases

- The users population, age and cultural background is highly diversified

- Interaction with the mobile has to be enough intuitive and user friendly that it did not require any training

- Mobile phone has small size screen with consequences on legibility of display

- Inputs are challenged by the small size of the buttons and/or the sensitivity (too much or not enough) of the tactile screen

*16% had difficulty reading something on their phone because the screen was too small*

10% had difficulty entering a lot of text on their phone

(Survey in April 26 to May 22, 2011 among a nationally-representative sample of Americans)

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Design of nomadic:
the concept of ergonomic mock-up

Design interface and dialogue based upon ergonomic guidelines
For example: The Ten Usability Heuristics, by Jakob Nielsen (1994)

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognize, diagnose, and recover from errors
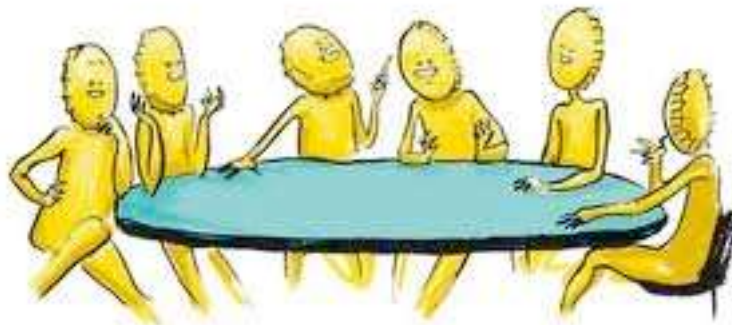- Help and documentation
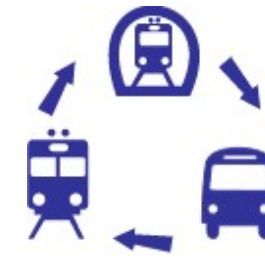
Use of standardized
pictograms in transport

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Design of nomadic:
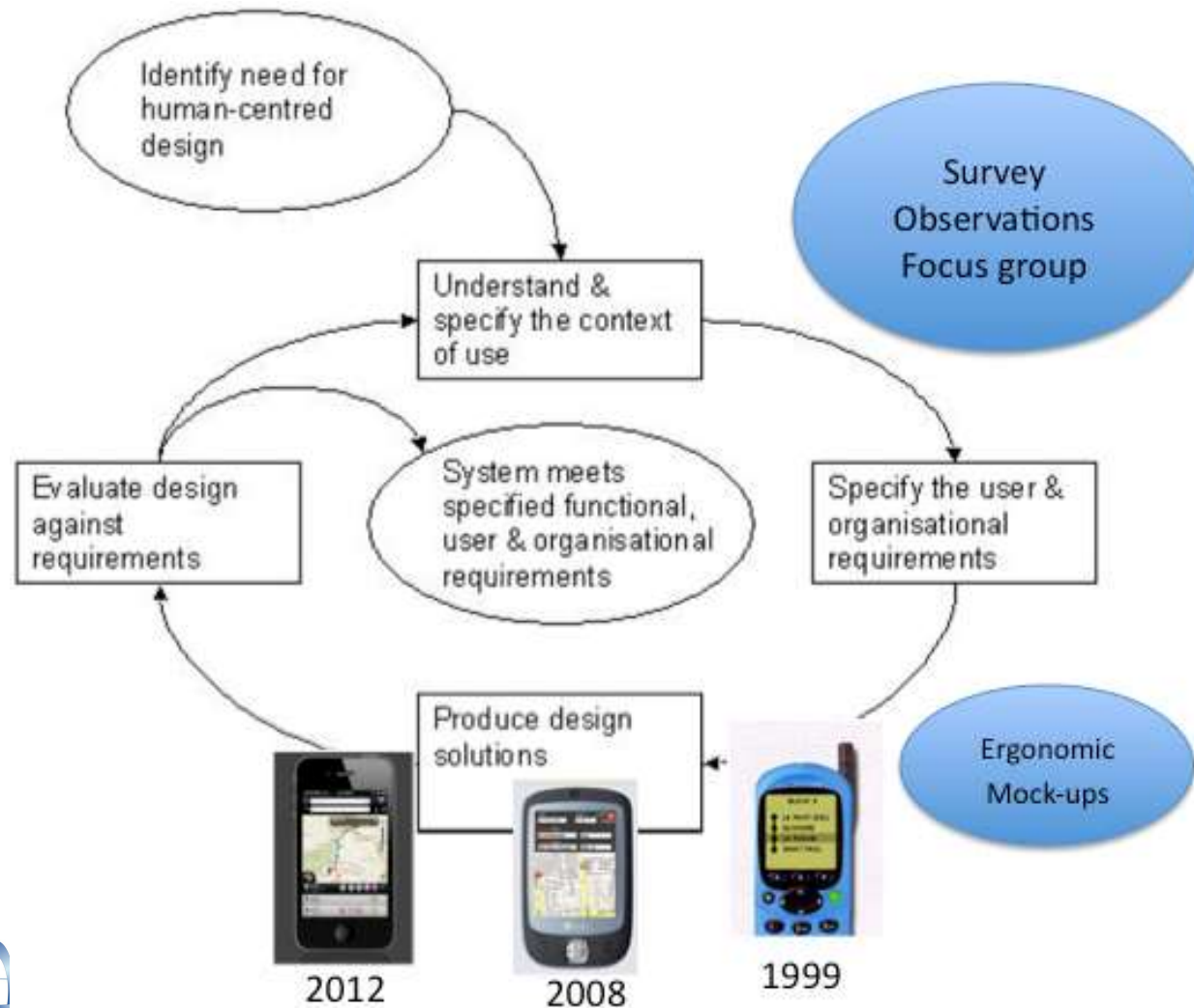# the concept of ergonomic mock-up

Dynamic simulation of the future service using flash development

The ergonomic mock-up is

- An efficient tool for setting up the

design and the modalities of dialogue

of a new service on mobile phone

- A convenient way to communicate with the other partners, and more specifically service developers

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# Method of human centred design processes for interactive system (ISO norm 13407)

Identify need for human-centred design

Understand & specify the context of use

Survey
Observations
Focus group

Evaluate design against requirements

System meets specified functional, user & organisational requirements

Specify the user & organisational requirements

Produce design solutions

Ergonomic Mock-ups

2012   2008   1999

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CD Rom ergonomic Mock-up
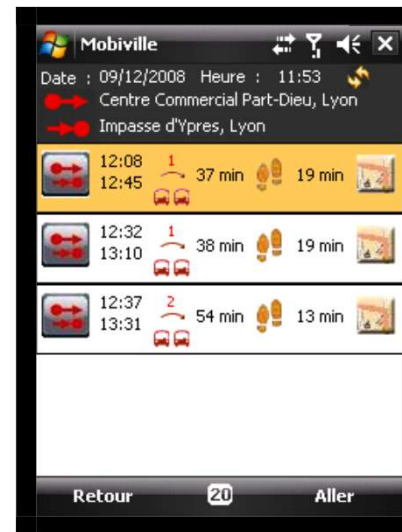## set up for software developers

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Some examples of Mobiville service displays

Choice of the trip
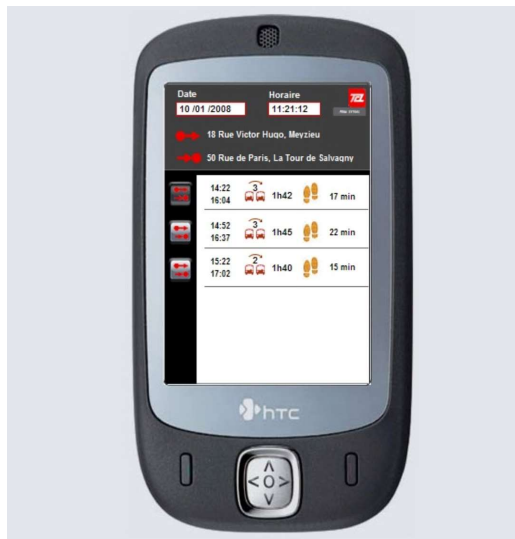
Ergonomic Mock-up
February 2007

Developped service
November 2007

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Some examples of Mobiville service Displays

Time schedule

Ergonomic Mock-up
February 2007

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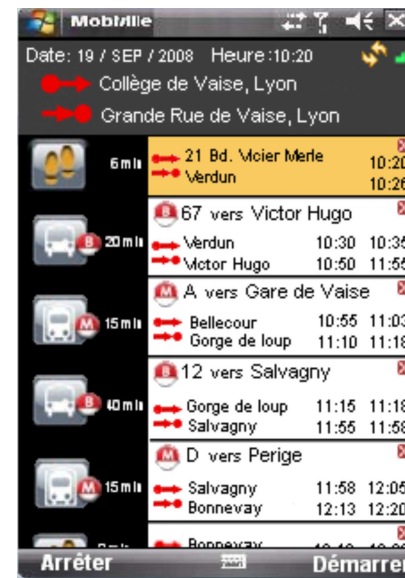
Some examples of Mobiville service displays

Detailed description of the trip
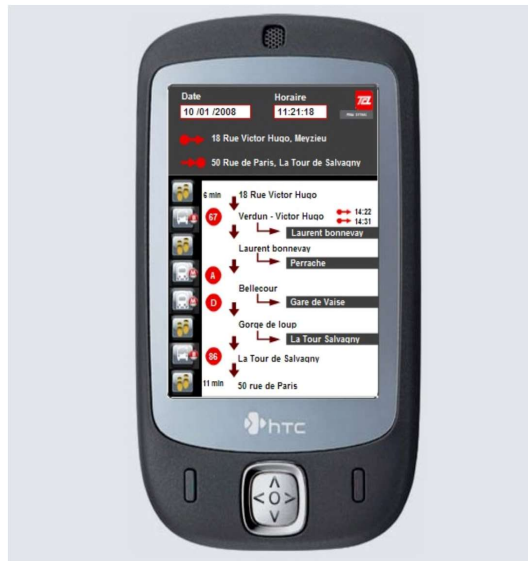
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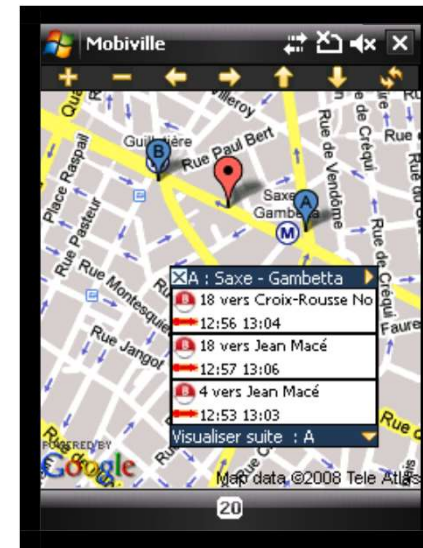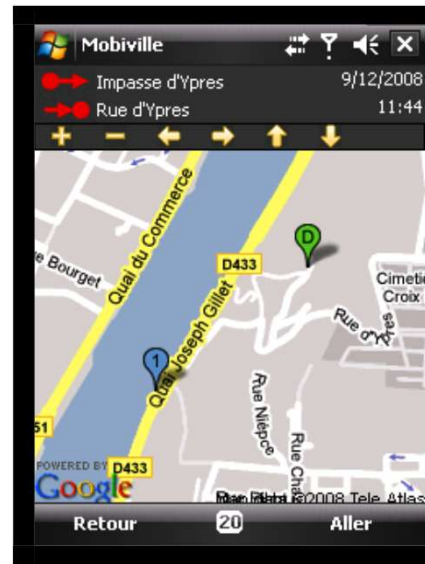
Some examples of Mobiville service displays

Pedestrian location

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Understanding users to design and to evaluate system

Functional abilities, needs and requirements of Drivers/Riders/Travelers

Iterative process

Design

Functional specifications Ergonomic criteria

EVALUATION

Evaluation process Indicators

Concept, Mock-up, Prototype

Acceptability, Usability, Appropriation, Safety

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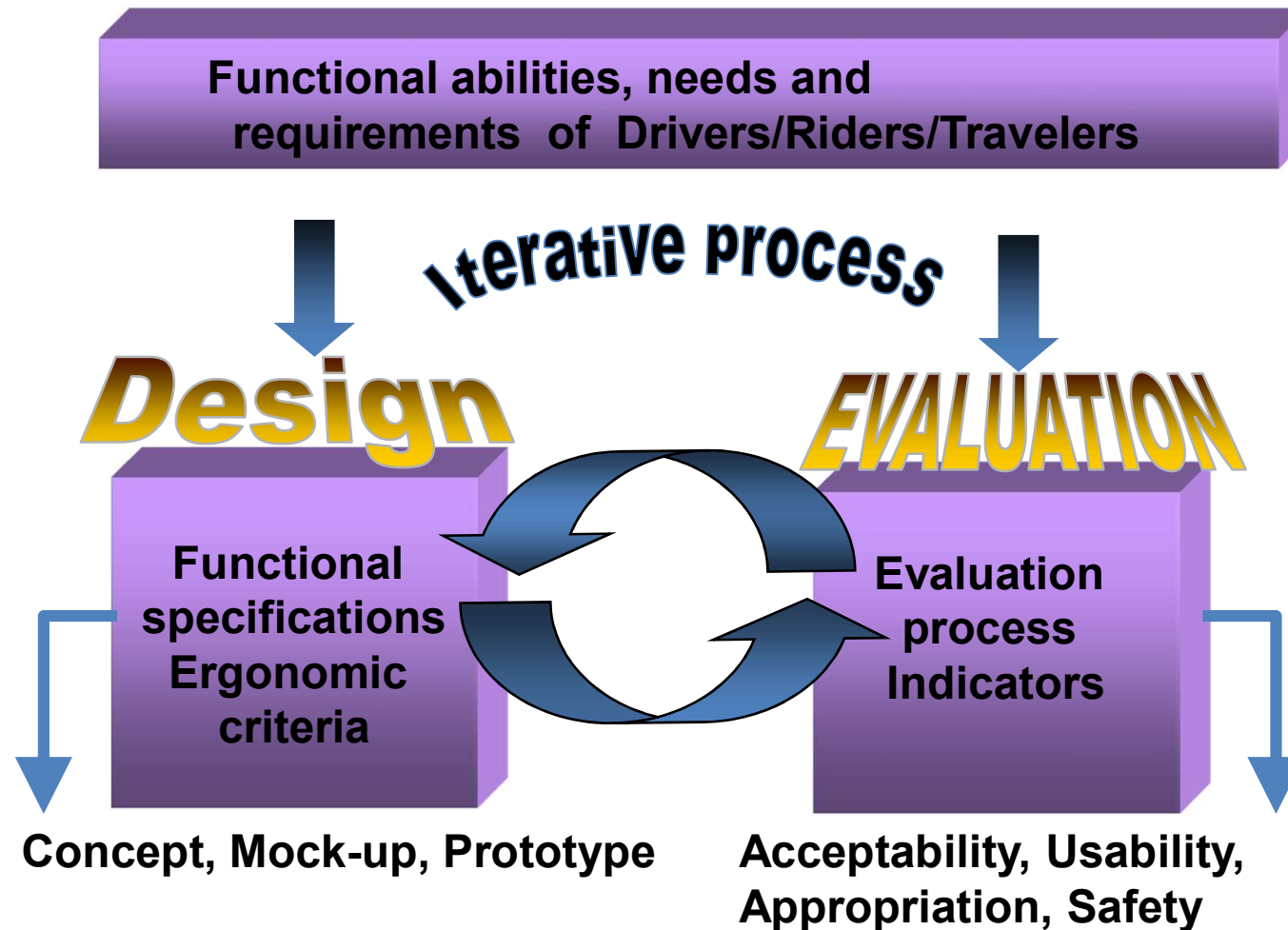
# Evaluation of usability and acceptability of system

- To identify positive and negative points in terms of concept, available functions, interface and dialogue in order to improve the design
- To identify advantages and limits of the service
- To identify software dysfunctionnings to be transmitted to the software developers

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Conclusion
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- Drastic increase of smartphone number in the overall population

Total Navigation Systems Sales

In thousand units
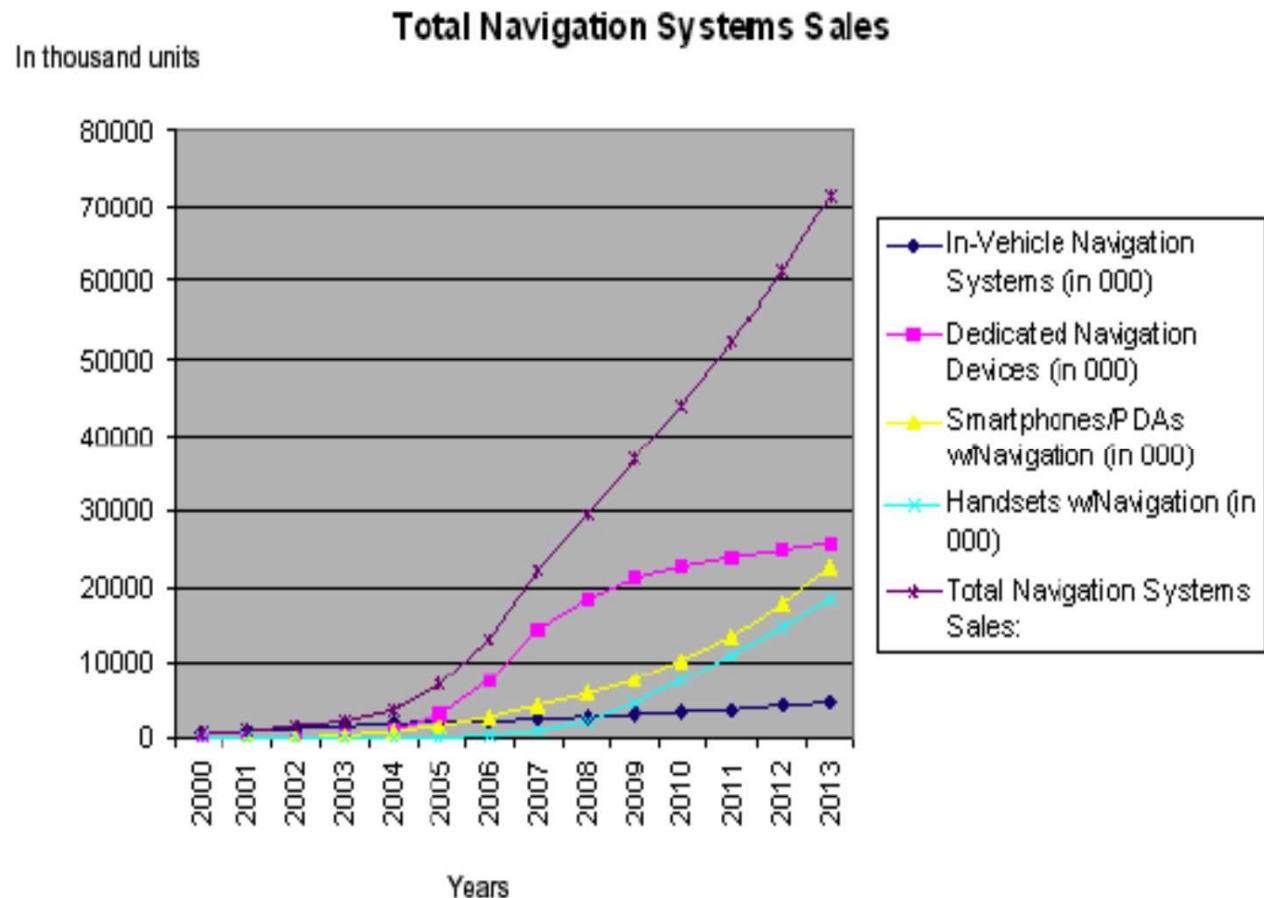
Conclusion
Nomadic systems and ecomobility

- Great improvement of technology and design for mobile phone

**Evolution of the screen size through
the successive generations of mobile phones.**

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Conclusion
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- Efficiency of the dynamic ergonomic mock up to support design of the dialogue and interface on mobile phone and to communicate with system developers to illustrate the principle and the content of the service

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