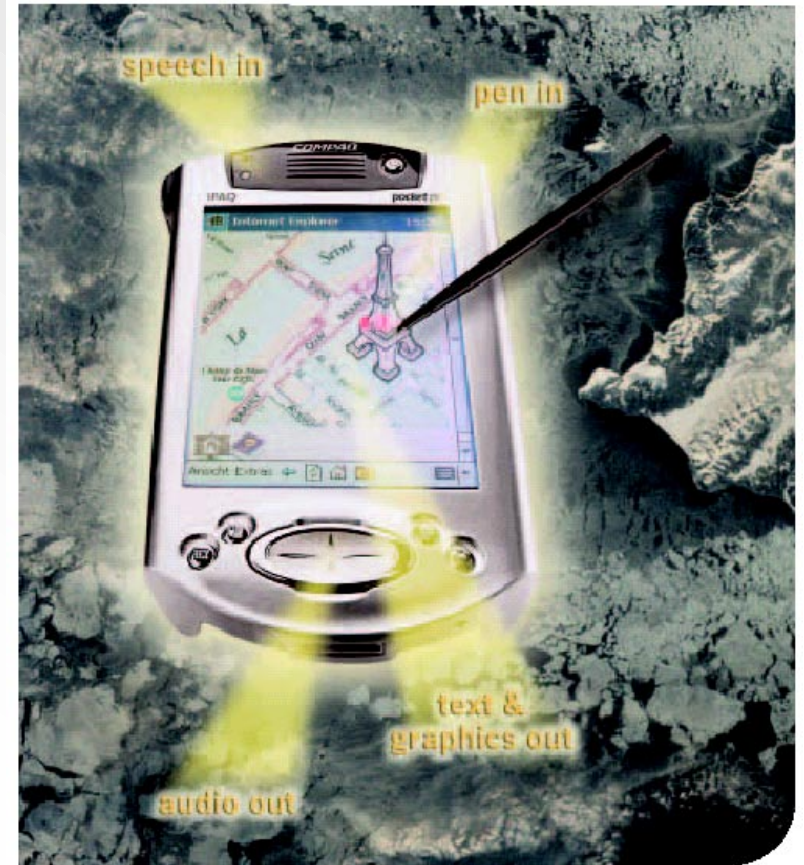


EURESCOM

# The Multimodal and Multilingual Tourist Guide for Paris



**Lou Boves**

University of Nijmegen

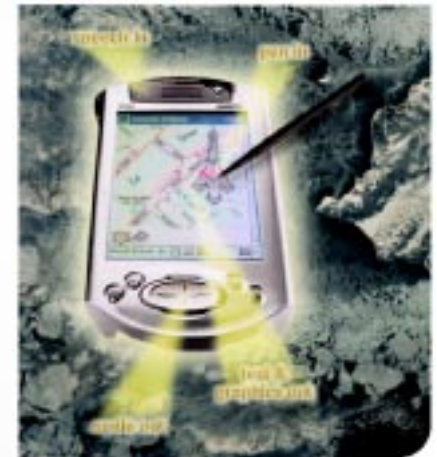
**John Rugelbak**

Telenor R&D

**And the MUST Team**

## Overview

- ▶ The EURESCOM MUST project
  - ➔ What is EURESCOM
- ▶ Objectives of the project
- ▶ The demonstrator
  - ➔ Functional specifications
- ▶ Implementation issues
- ▶ Expert evaluation



## **EURESCOM**

- ▶ The European Institute for Research and Strategic Studies in Telecommunications
- ▶ Company for collaborative R&D in telecommunications in Europe
- ▶ Provides comprehensive collaborative research management services
- ▶ Conducts studies

# The MUST Project

## ▶ Partners

- ▶ Telenor R&D
- ▶ Portugal Telecom Inovação
- ▶ France Télécom R&D
- ▶ Max Planck Institute for Psycholinguistics
- ▶ University of Nijmegen

## ▶ February 2001 – December 2002

# Objectives of the MUST Project

- ▶ Help telcos to understand issues related to multimodal multilingual services on small mobile terminals
- ▶ Is it possible to build services with
  - State-of-the-art platforms
  - Off-the-shelf technology
  - Real-time responsiveness
- ▶ Demonstrator as vehicle for usability studies and in-company promotion

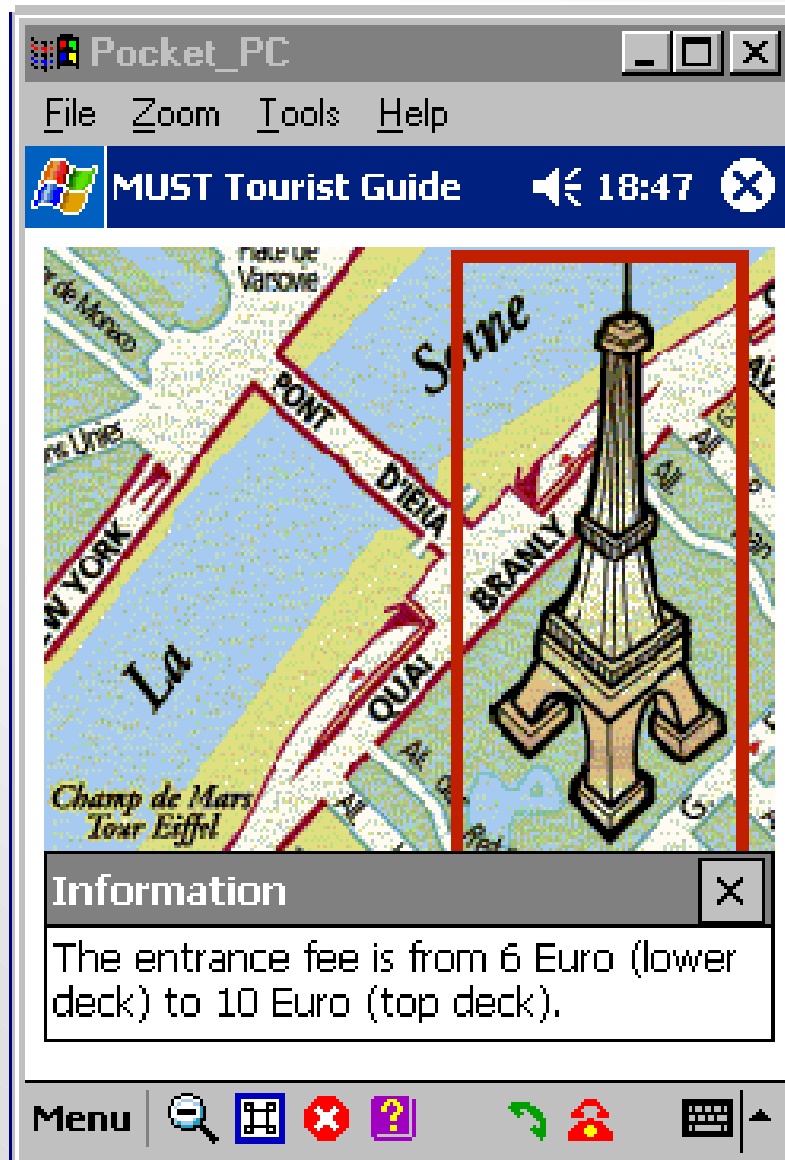


# The MUST Demonstrator

- ▶ Coordinated multimodal interaction
  - Map application -- Tourist guide
- ▶ Speech and pen for input
  - Interface designed to elicit combined pen/speech input
- ▶ Graphics, text and speech for output
- ▶ User-initiated dialogue

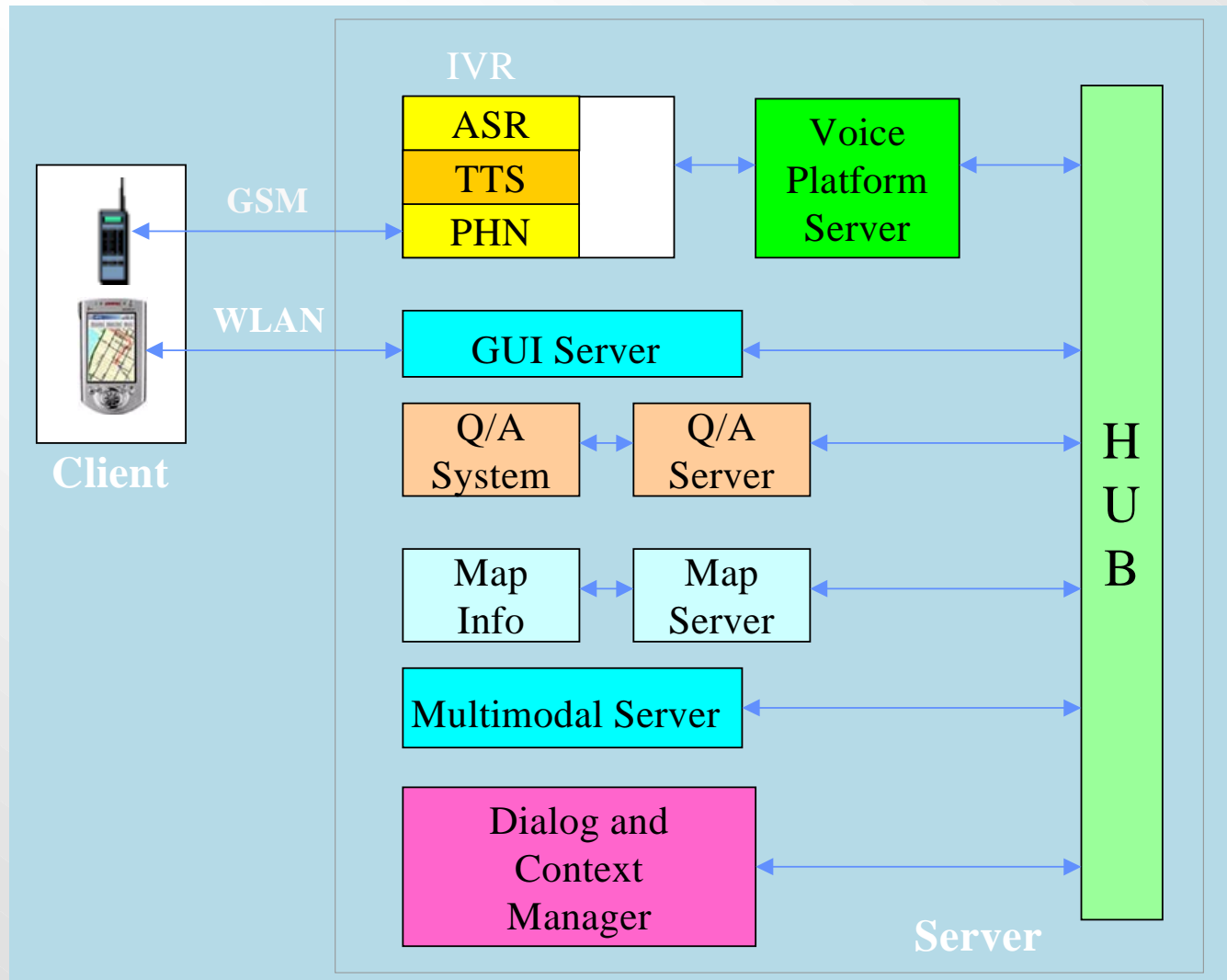
# Special Functionality

- ▶ Multilinguality
  - ➔ Norwegian, French, Portuguese, English
  - ➔ Important for Telcos, because of customer roaming
- ▶ Multilingual Question-Answering system
  - ➔ Handles out-of-database requests
  - ➔ Graceful degradation in case of out-of-database requests



# Graphical User Interface Design

# Overall System Architecture



# Implementation Issues

- ▶ Compaq iPAQ as terminal
- ▶ Galaxy as platform
  - ↳ Preferred over OAA and SmartKom
- ▶ Plug-and-play for speech server
  - ↳ SpeechPearl2000 for ASR
  - ↳ Several TTS systems
- ▶ Q/A system is asynchronous
  - ↳ Accessed via Internet

## Results

- ▶ Stable system built in short time
- ▶ Software development and implementation as distributed effort
  - Telenor
  - Portugal Telecom
  - France Télécom
- ▶ Tolerable response latencies

# Expert Review

- ▶ 12 experts
  - ➔ 7 at Telenor
  - ➔ 5 at Portugal Telecom
- ▶ Cognitive Walkthrough
- ▶ Two types of comments
  - ▶ On general interaction style
  - ▶ Specific to the MUST Tourist Guide

# Comments on Interaction Style

- ▶ Experts are used to pen-only interaction
- ▶ Simultaneous multimodal interaction is not self-evident
  - ➔ Introduction/explanation is essential
  - ➔ But users will learn very quickly
- ▶ Need for standardization?

# Comments on MUST Interface

- ▶ Graphics design needs improvement
  - Function of the buttons was not clear
- ▶ Context-dependent help is needed
  - Also to explain interaction style and overall functionality

# Conclusions

- ▶ Real-time multimodal demonstrator can be built using existing building blocks
- ▶ Simultaneous coordinated input requires instruction and habituation
- ▶ Experts suggested substantial improvements to first interface design

## Future Work

- ▶ Implement improvements in the graphical interface
- ▶ Design scenario-based user evaluation
- ▶ Conduct evaluations with users in Norway, Portugal and France