

# iPerG Position Paper

For the Second Conference of Pervasive Computing  
Workshop on Gaming Applications in Pervasive Computing Environments  
April 13<sup>th</sup> -21<sup>st</sup> Linz/Vienna Austria  
Date: February 13th 2004

## 1 Introduction

iPerG (Integrated Project of Pervasive Gaming) describes a consortium which applied for the sixth framework program in order to finance pervasive gaming research activities. Participants of the consortium include:

- Swedish Institute of Computer Science / Coordinator (SICS)
- University of Nottingham (UNOTT)
- It's Alive (ITA)
- Interactive Institute (II)
- Nokia
- University of Tampere (Hypermedia Laboratory)
- Fraunhofer Institute (FIT)
- Sony Netservices (SNS)

## 2 Our Vision of Pervasive Gaming

**Pervasive games** are a radically \_digital\_ new game form that extends gaming experiences out into the physical world– be it on city streets or in remote wilderness. Players equipped with handheld and wearable interfaces move through the world. Sensors capture information about their current context, including their location. The sensor info is used to deliver a gaming experience that changes according to where they are, what they are doing and even how they feel.

**Focus** of pervasive games will be only the game play and not the device used as pervasive games will provide focus points where many media experiences can be integrated including TV, film, public events etc.

**The players** are unchained from their console and provided with a gaming experience interwoven with the physical world, offering them gameplay that is potentially available at any place and any time. To achieve a high quality pervasive gameplay experience, new technologies and game design tools to support the creation of new compelling forms of content must be explored.

**Pervasive games** have high educational and cultural potential, being able to reveal aspects of the culture and history of a given environment to visitors and residents alike.

### 3 Our Central Aim

- Accelerate the transition of knowledge and experience crucial for developing pervasive games
- Foster the research and innovation that is crucial for these new forms of leisure and mobile services
- To ensure continuing European leadership in the development of this key form of future mobile media content.

### 4 The Research in IPerG

IPerG investigates pervasive gaming from two perspectives: the research themes, which investigate broadly scoped research issues for pervasive gaming, and the example game genres that explore specific game types through experimental design and development.

**Horizontal research themes.** Each research theme focuses on a set of research issues that concern a generic aspect of pervasive games: the changes in business models and revenue chains that the emergence of pervasive games will trigger, the design and evaluation methodology for games, the technology infrastructure for games, and finally the tools required to develop and deploy games. Each theme is based on different research methods and requires different research competencies.

**Vertical integration through studies of specific game genres.** The main vehicle for investigation in the project are the showcase satellites. These focus on particular subgenre for pervasive gaming (see figure 1). Each showcase explores research issues from all of the four themes, and uses tools and methods developed within the research themes in their work. Furthermore, the software as well as the experiences from the showcases serve as inputs for the research themes, which use them to refine and generalize the scientific results from the projects.

### 5 Our Research Themes

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***Research Theme: Design and Evaluation***

The distributed and collaborative nature of gameplay in pervasive games will produce entirely new game designs in which usability and playability requirements remain largely unexplored to date. To become a popular form of entertainment, pervasive games have to be easy enough to learn and play for mainstream audiences to find them appealing, while providing new and attractive forms of experience.

Pervasive games produce research challenges for game design in several ways. The detailed issues are explored in depth in the showcase satellites, to be incorporated into the overall design framework. Examples of these research issues are:

- How can games be designed to support successful interaction between players and characters that are virtually and/or physically present, including mixed presence for the same player
- How can games be designed to exploit ambiguities and limitations in a real-world environment, rather than suffer from them.
- How can physically and virtually distributed games be designed to allow for spectators
- How can game master roles be supported in pervasive role-play and narrative games
- How can pervasive games be developed that support spectator experiences
- How can games that reside in everyday environments be designed to be interruptable (rather than totally immersive)
- How can games that reside in everyday environments be designed to be socially acceptable
- How can we find ways of matching characters and players in role-playing and narrative games

***Research theme: Infrastructure***

The infrastructure theme is focused on understanding and defining the requirements that pervasive gaming puts on supporting technology like devices, software platforms and networks. A platform will be developed to support pervasive gaming applications by constructing a mapping between the virtual game arena and the physical game setting, accommodating environmental variations in levels of digital support. Game applications that span very different spaces will require support from highly flexible middle-ware that provides a shared model of location and context, realized through a set of common services. A key feature of this middle-ware will be the need to adapt to dynamic changes in both the physical and the virtual context.

The research issues that will be addressed by this theme include:

- Asymmetric data distribution.
- Network disconnection.
- Device switching.
- Positioning and event recognition.

- Awareness mechanisms
- Monitoring and feedback.
- Game state synchronisation
- Mapping virtual environments to physical environments based on imprecise data.
- Scalability

***Research theme: Tools and Interface Technology***

The main research objective for the Tools and Interfaces research theme is to understand what are the tools needed to easily develop and deploy pervasive games. More specifically, what are the demands on an authoring tool for pervasive games? What content management tools are needed? How does a common interaction model look like for pervasive games? What are the needs for different media tools? How is position and context treated in pervasive games? What information is possible to extract from a game session? What information is needed to analyze a game?

In several of these research issues the Tools and Interface Technology research theme will collaborate with the Design and Evaluation research theme to find commonalities and to guarantee that the design principles developed are supported in the different tools.

## **6 Our Workshop Aim**

Our interest to participate in the workshop can be divided into three topics:

- To discuss and review our own research agenda by presenting it to colleagues in the field of Pervasive Computing
- To better understand others interest in the area in order to adapt our own research agenda to the needs of the public
- To further extend our network of people interested in research on pervasive games.

## 7 Example games

The iPerG project builds upon previous research as well as commercial development by its partners. Relevant partner projects:

**“Can You See Me Now?”/ Nottingham University & Blast Theory.** . This performance took the form of a chase game in which online players logged in over the Internet, were chased through a virtual model of a city by three runners, professional performers, who were running through the actual city streets equipped with handheld computers, wireless network connections and GPS receivers.

**'Uncle Roy All Around You'/ Nottingham University & Blast Theory in collaboration with BT Exact.** In this performance game, street players journeyed through a city in search of the elusive Uncle Roy who communicated with them via their handheld computer. Street players search for *Uncle Roy* through the back streets, the tourist traps and the leafy boulevards with a handheld computer. Online players cruise through a virtual model of the same area, searching for the street players and looking for leads that will help them find *Uncle Roy*. Using web cams, audio and text messages players must work together. They have 60 minutes to find Uncle Roy.

**“Visby Under” (Ericsson 2003)/ Interactive Institute in Sweden** is a location-based game based upon the mythical history of Gotland in Sweden. The game uses local positioning technology to track the player's position in the city of Visby, and triggers events on the player's personal digital assistant (PDA) when one of twelve key locations is found. Then the player, seeing the world through the perspective of her companion Trull, must solve riddles in order to progress the narrative of the game.

**“Pirates!” (Björk et al. 2001) PLAY studio of the Interactive Institute and Nokia Research Center** is an early example of pervasive gaming. It is a multi-player PDA-based game where radio-based proximity sensors are used to detect proximity to other players or 'islands' in the game. By making players move through the physical environment in order to travel within the game, it superimposes the game world on the real world but without disrupting other social activities.

**“ItsPU”/ Swedish Institute of Computer Science.** This trial was based on the eErie platform and concerned a technology-enhanced role-play scenario. In ITsPU (IT support for workforce education) a short-term project performed in collaboration with VINNOVA (Swedish Agency for Innovation Systems) a professional management and team-building course was played out with the aid of pervasive technology. The result shows that even existing and well-used scenarios benefited from a pervasive setting.

**“MHP cross-media advertising”/ Sony NetServices** partnered with Mercedes-Benz to create the interactive advertisement for the new S-class car. The commercial, based on MHP (digital multimedia home platform) technology, offered consumers detailed multimedia information that could be accessed by remote control. Using a back channel set up by Sony NetServices, consumers could take part in a competition, order the current S-class brochure and have a direct dialogue with Mercedes-Benz. The same material was also available via an internet version based on Macromedia Flash technology and via an Sony Ericsson P800 mobile telephone using packet video streaming technology.

**“The Getaway Mission Game” /Sony NetServices** was a mobile mission game to promote role playing games for PlayStation consoles. The mobile game contained characters and parts of the gameplay of “The Getaway” PS2 game and transferred them into an SMS, Web and IVR based role-playing game. In order to increase the target group’s curiosity about the mobile campaign, the SMS game led the user to find out about the prehistory of “The Getaway” PS2 game; this prehistory was developed directly for the promotional mobile game.

## 8 Authors

This document was created by the iPerG Group. Below you find a short biography of the Project leaders and a list of the main iPerG members.

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