



# Informatik an der Universität Bonn

Überblick

Focus auf Mobile Gaming



Davon gibt es nicht wenige ...







- Algorithmics
- Graphics, Vision, Audio
- Information and Communication Management
- Intelligent Systems



- Algorithmics
- Graphics, Vision, Audio
- Information and Communication Management
- Intelligent Systems
  
- Details dazu gerne als Foliendownload

**Arbeitsgruppen**

-  **Kommunikationssysteme**  
(Prof. Dr. Peter Martini)
-  **Sensornetze und Pervasive Computing**  
(Prof. Dr. Pedro José Marrón)

**Kontakt**

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PGP: 0x5EBB05E3 (nur für Unterschriften)

**Direktor**  
Prof. Dr. Peter Martini


**Professoren**

- Prof. Dr. Peter Martini
- Prof. Dr. Pedro José Marrón
- Prof. Dr. Christoph Stelten (em)

**Öffnungszeiten des Sekretariats**

- Täglich, außer Dienstags: 9 bis 16 Uhr

**Unterwassernetzwerke**



Raphael Ernst (4. von links), Promotionsstudent von Prof. Martini, arbeitet an Unterwassernetzwerken, während eines Seerunsuches der WTD71 (Wehrtechnische Dienststelle für Schiffe und Marinewaffen, Maritime Technologie und...)

[\[mehr\]](#)

**DIMVA 2010 will be held in Bonn at July 8-9, 2010**

The CIP and conference details can soon be found at [dimva2010.fde.fraunhofer.de](http://dimva2010.fde.fraunhofer.de)

[\[mehr\]](#)

**IEEE LCN, 20-23 October 2009**



[\[mehr\]](#)

**IEEE LCN Workshop on Security in Communications Networks**



[\[mehr\]](#)

**Arbeitsgruppe  
Kommunikationssysteme:**

**Leiter: Prof. Martini**

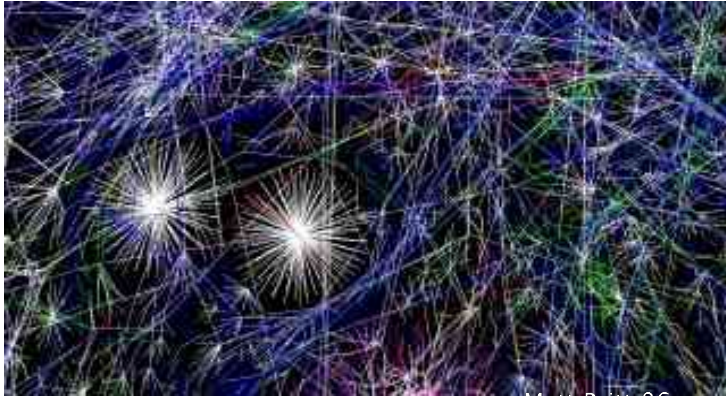
**Wiss. Mitarbeiter: 17**

**Techniker: 3**

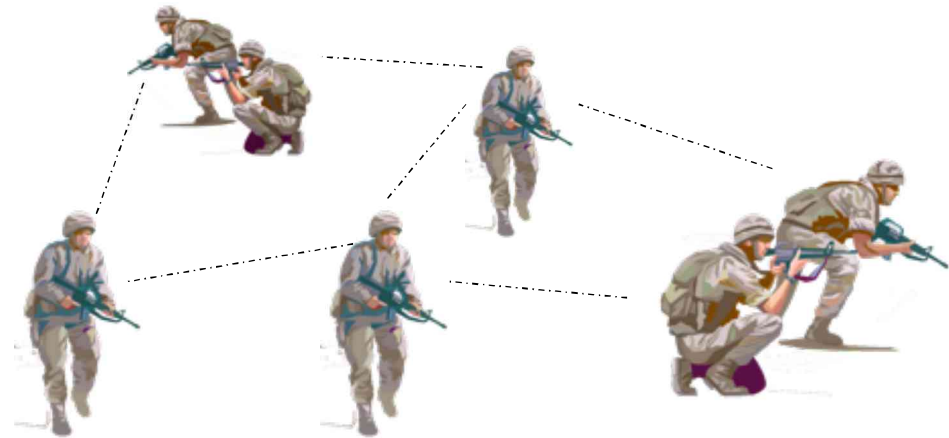
**Studenten: viele**

**URL: [iv.cs.uni-bonn.de](http://iv.cs.uni-bonn.de)**

## I. Sicherheit & Effizienz im Internet



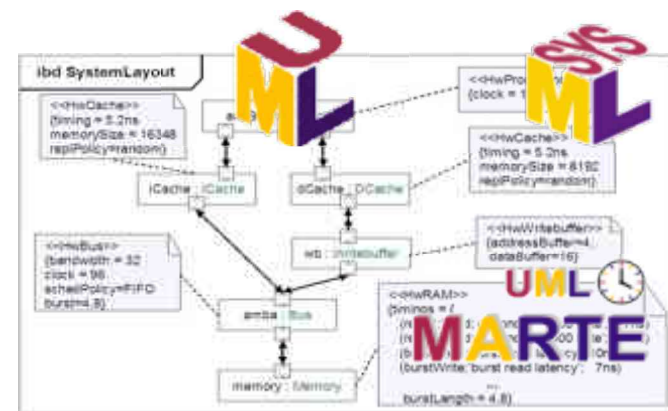
## II. Taktische Multi-hop Netze



## III. Dynamische Ende-zu-Ende-Netzdienste



## IV. Performance Engineering

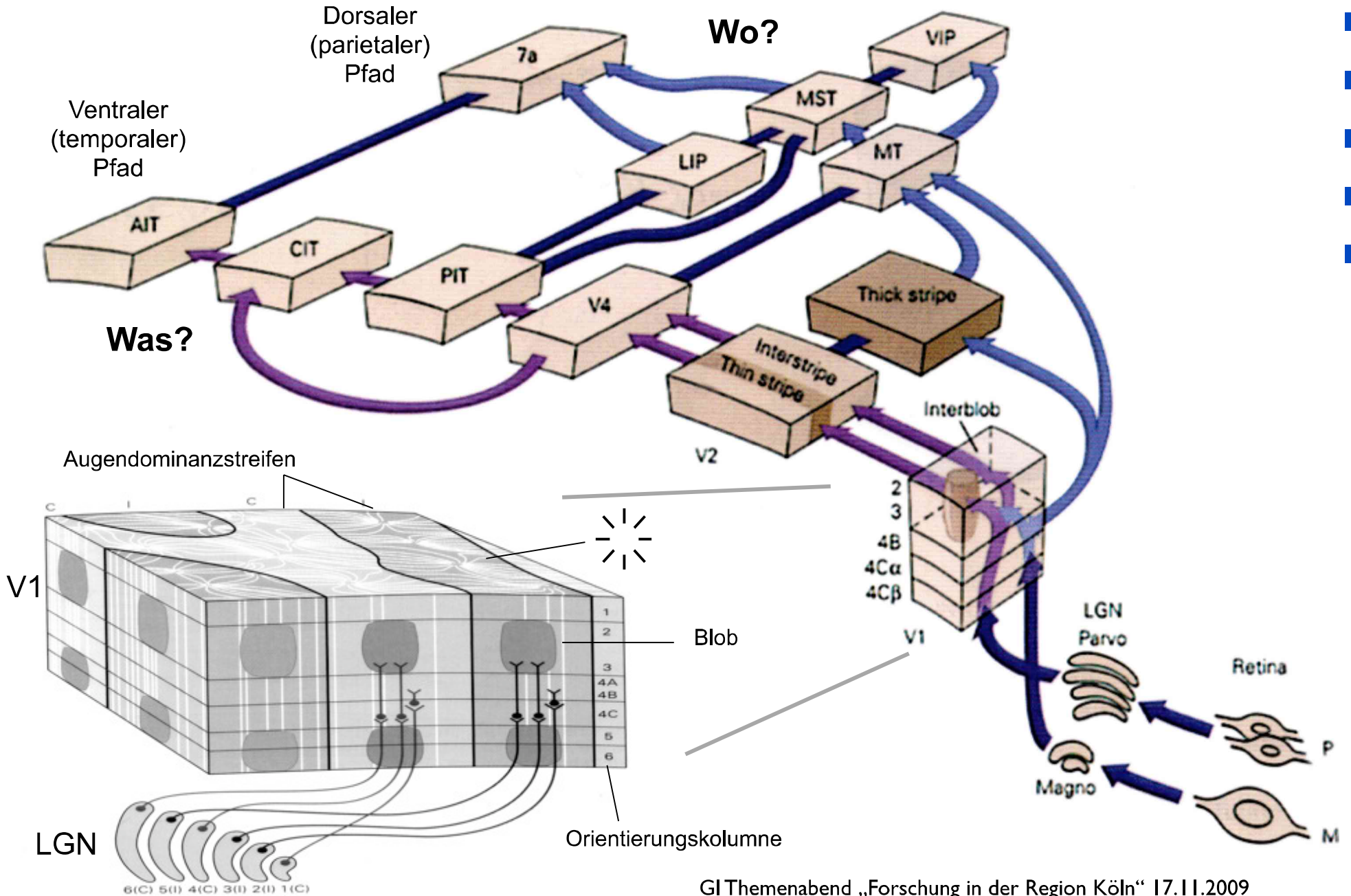


# Abteilung VI

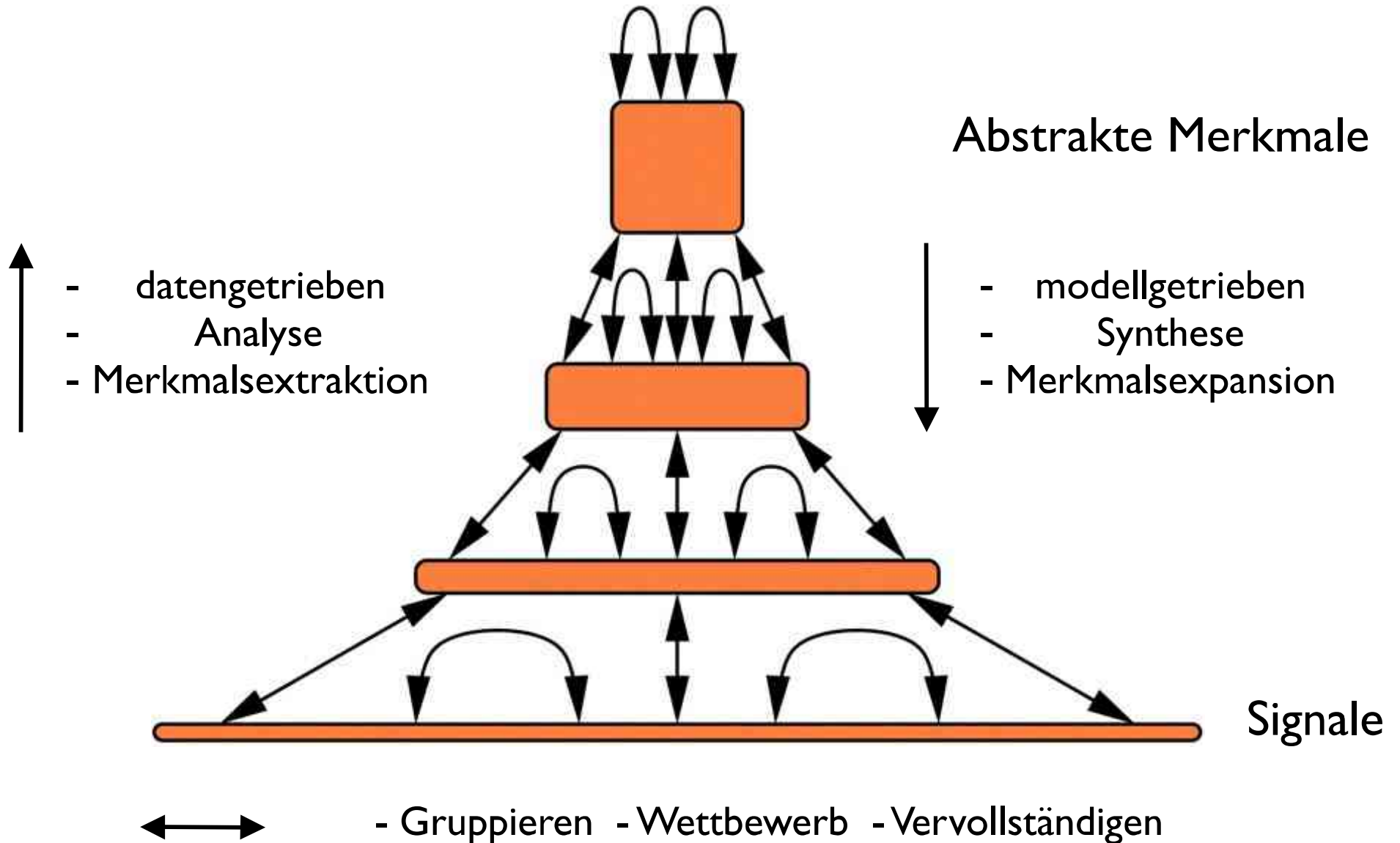
AG Autonome Intelligente Systeme  
Prof. Sven Behnke



# Vorbild: Menschliches Sehsystem



# Neuronale Abstraktionspyramiden





## Humanoide Roboter





# Context-Sensitivity and Location-Based Services

Prof. Dr. Armin B. Cremers,  
Holger Mügge, Pascal Bihler,  
Mark Schmatz, Tobias Rho



- University of Bonn
- Institute of Computer Science III
- Software Architecture and Middleware
  
- Prof. Dr. Armin B. Cremers
- Holger Mügge, Pascal Bihler, Mark Schmatz, Tobias Rho
- An increasing number of students ...
  
- Recently founded a spin-off for commercial aspects

# Our Recent Projects



- Context-Sensitive Intelligence (CSI)  
(2004-2007)
  - Runtime Adaptation Techniques for Mobile Software
- CASOU (2008)
  - Applying Context-Sensitivity to Flight Scenario
- Amoga (since 2008)
  - Construction Kit for Location-Based Games

# Example From CSI Project

## Making a Tourist Guide Location Aware



Just like a Polyglott book on my PDA.  
Nice to have but not really useful.

We adapt it while it runs.  
The software stays the same,  
no code is altered.

After CSI-Adaptation:  
a location-aware guide, that can be  
used to navigate from sight to sight.



# From CASOU Project: Modeling a Flight Scenario

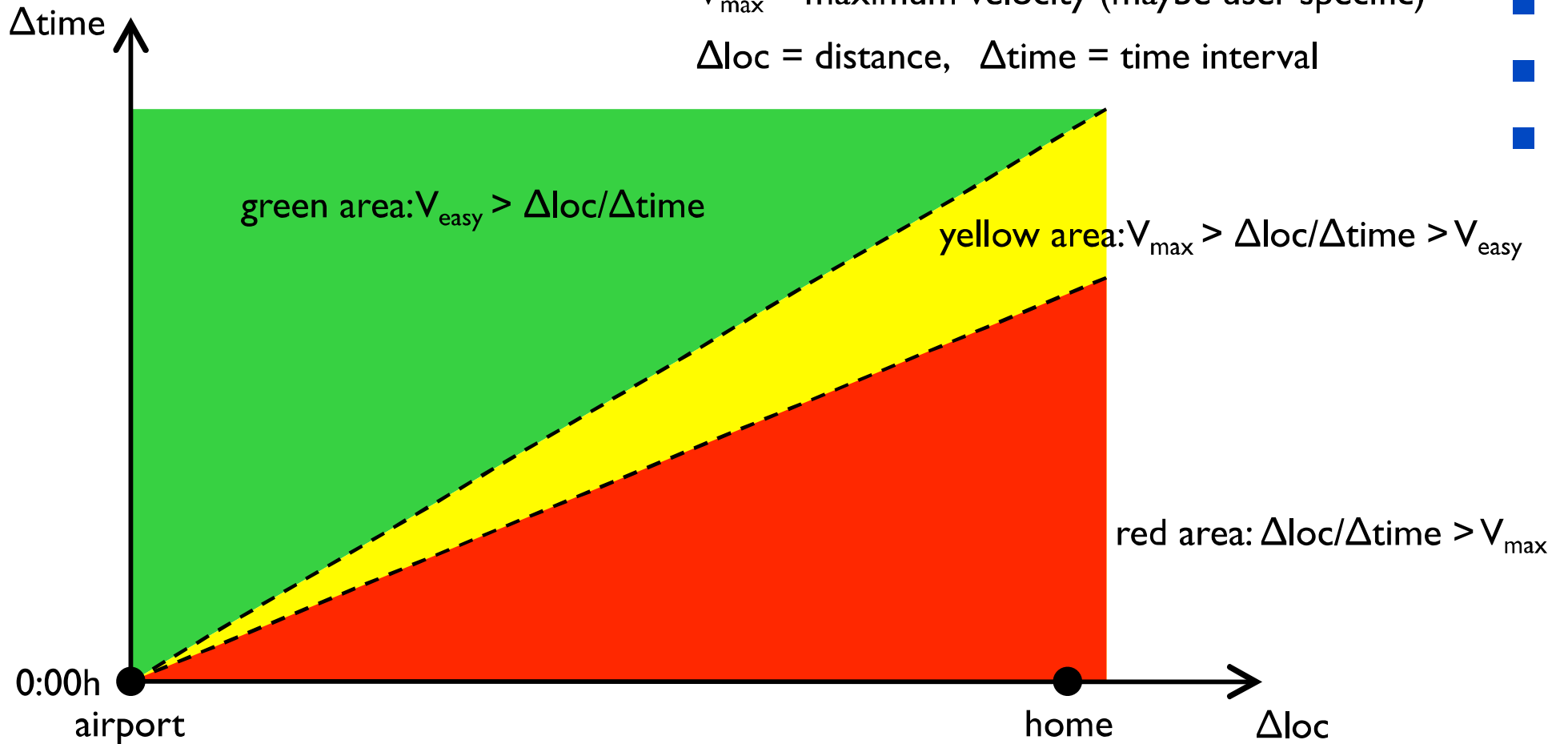
## Context Modeling – Time, Space, Velocity

- 
- 
- 
- 
- 
- 

$V_{\text{easy}}$  = comfortable velocity (maybe user-specific)

$V_{\text{max}}$  = maximum velocity (maybe user-specific)

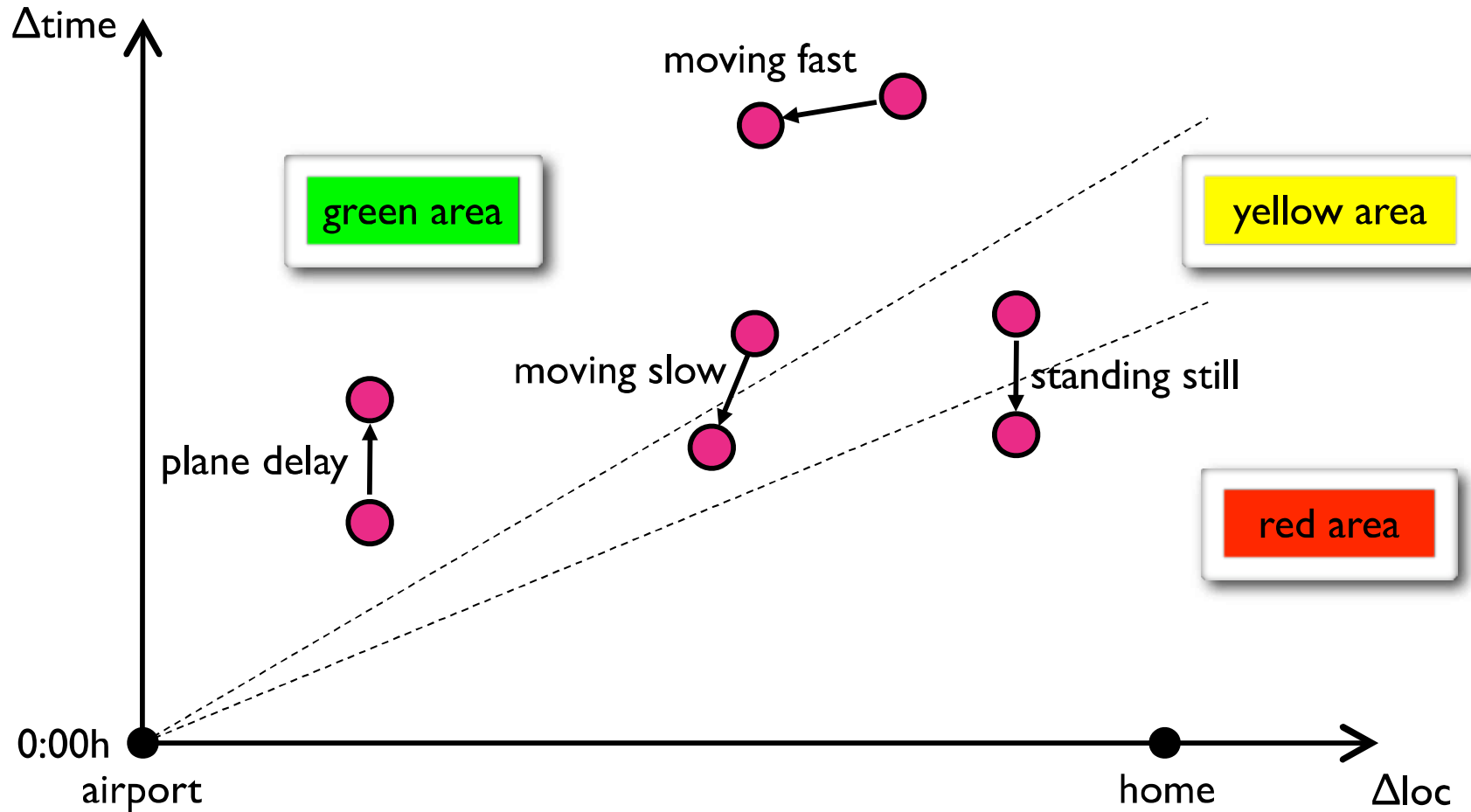
$\Delta\text{loc}$  = distance,  $\Delta\text{time}$  = time interval





# Modeling a Flight Scenario

## Context Modeling – Time, Space, Velocity





- Funded by Deutsche Telekom Laboratories
- Realized by University of Bonn, Institute of Computer Science III
- Use adaptivity to enable next generation mobile games
- 2 years, divided into two phases:
  - Research, Analysis, and Prototype Development
  - Development of Adaptive Gaming SDK and Evaluation



- Cross-Platform
- Multi-Player
- Location-Based
- Context-Sensitive
- Enhanced by the user
- User Generated



- Players
  - are different



# Reasons for Adaptivity



- Players
- In-game context
  - game situations are different



# Reasons for Adaptivity



- Players
- In-game context
- **Out-of-game context**
  - Game action is interwoven with real life



# Reasons for Adaptivity



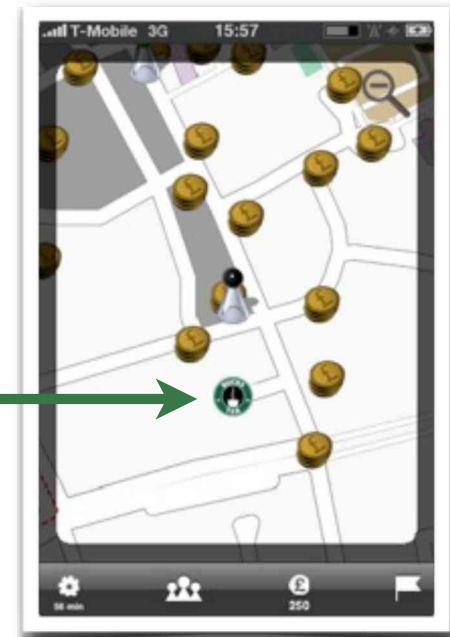
- Players
- In-game context
- Out-of-game context
- **Client device capabilities**
  - screen size
  - keyboard
  - video
  - ...



# Reasons for Adaptivity



- Players
- In-game context
- Out-of-game context
- Client device capabilities
- **Integration of partners**







- Game tailoring
- Context-sensitivity
- Evolving long term games
- User-generated content
- End-user game development



- Adaptive User-Interfaces
  - Device capabilities (screen, keyboard, video, ...)
  - Game situation-specific UIs
  
- Adaptation to diverse platforms
  - iPhone server support (e.g. Push-Notification)
  - Browser-based clients
  - Webservice meshups



From classic table game to a modern mobile game:



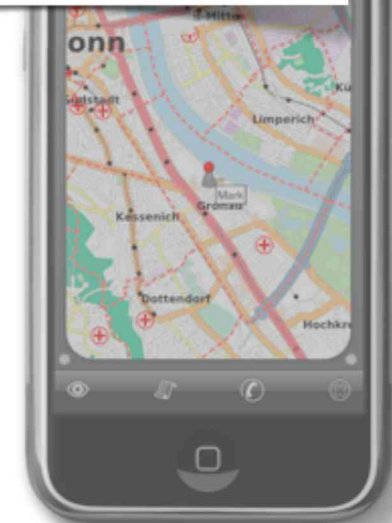
# From a classic table game ...

- The original Scotland Yard by Ravensburger
- Two Roles: 1 Mr. X and up to 5 Detectives
- One Goal: Catch Mr. X !



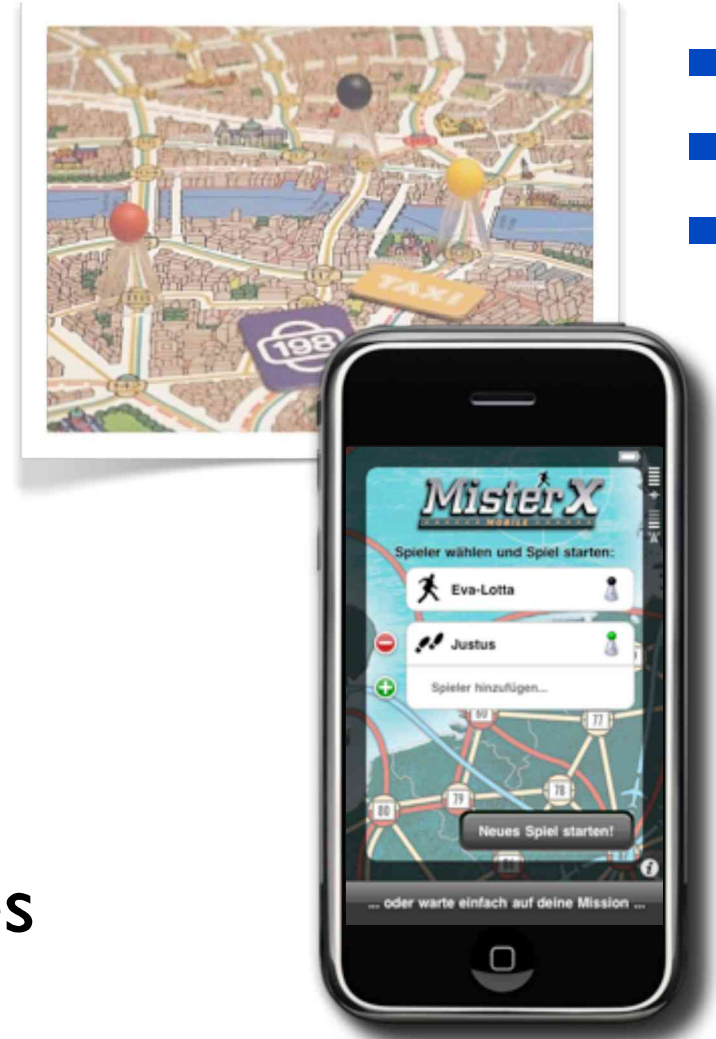
Some features remain:

- Goal of the game
- Roles (Mr. X and Detectives)
- Map
- Mr. X shows up only sometimes
- Cooperative game



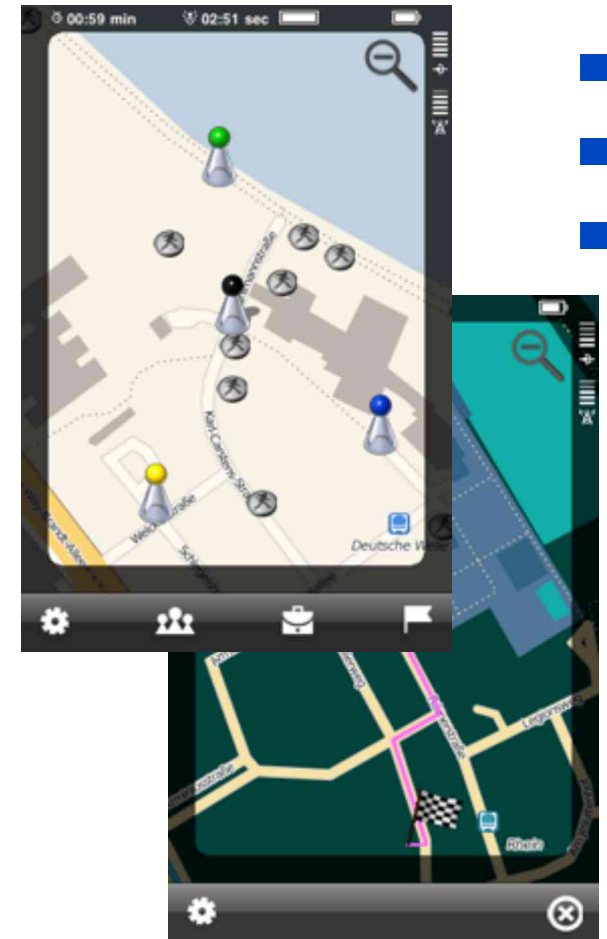
A lot is new and different:

- GPS localization instead of a discrete graph
- Can be played anywhere not just in London
- Distributed players: Communication difficult
- Arbitrary movement instead of fixed set of transportation modes



## Map & Location-Awareness:

- Live tracking of all teammates
- Show-Up of Mr. X. and history of old positions
- Two zooming levels.
- Map follows player and keeps him centered.
- Map rendering adapted to Scotland Yard.





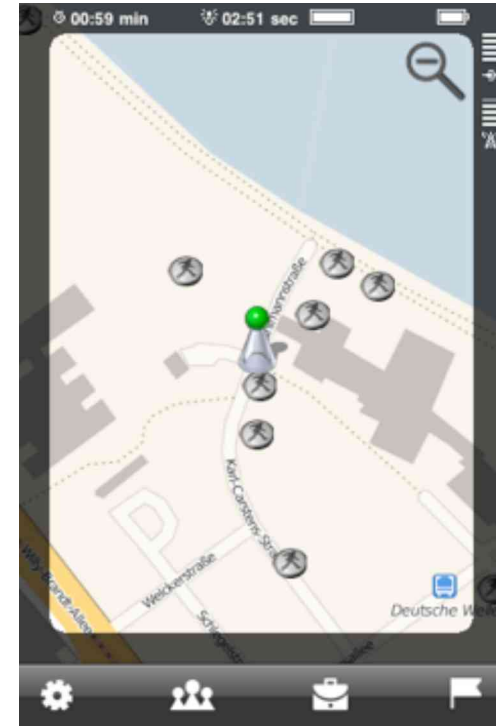
## Gadgets:

- Valuable gadgets are spread around the game location.
- Each player can gather gadgets and apply them strategically later on.



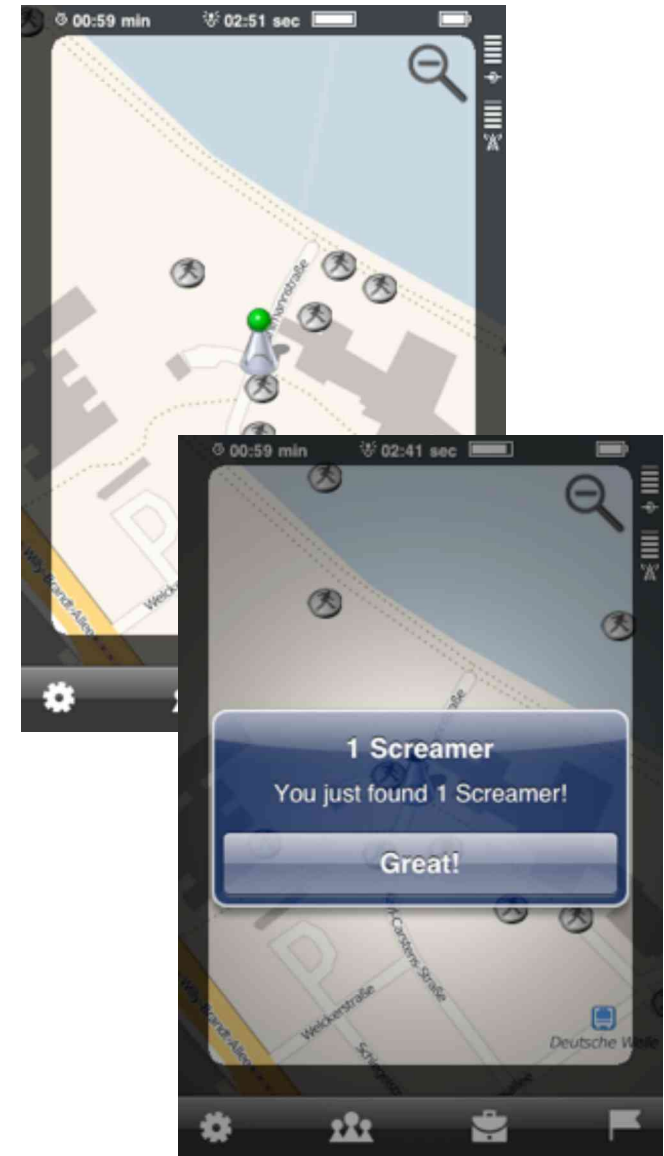
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- Valuable gadgets are spread around the game location.
- Each player can gather gadgets and apply them strategically later on.



## Inventory:

- Each player has an inventory
- Functional gadgets can be found and collected
- Some gadgets only for certain player role available



- For all players:
  - Screamer => All iPhones scream loudly
  - Magic Hood => You will be invisible on all maps for 30 seconds
  
- For detectives only:
  - Magnet => Turn the map of Mr. X upside down





- For Mr. X only:

- Delay => Doubles the time until you show up again on the detectives' maps.
- Wire Tap => Lets you listen to the next telephone conference of the detectives.
- Smoke Bomb => Makes the maps of the detectives in your surrounding useless





- ein Film sagt mehr ...

## Towards a Game Construction Set:



What else can be achieved by the game's modules?

- Multimedia Geocaching
- Scavenger Hunt
- Puzzles and Educational Games
- Sport & Fitness Games
- Outdoor Adaptations of Table Games



## Abstraction from the prototype:

- Reuse of game modules for other games
- Extension to other platforms (Android, Web-Browser)
- Development of adaptive SDK

## Evaluation and Use of SDK

- Development of further building blocks
- Experiments towards end-user generated content and game-logic



# Thank you for your Attention



- Any Questions?
- Contact: [muegge@cs.uni-bonn.de](mailto:muegge@cs.uni-bonn.de)