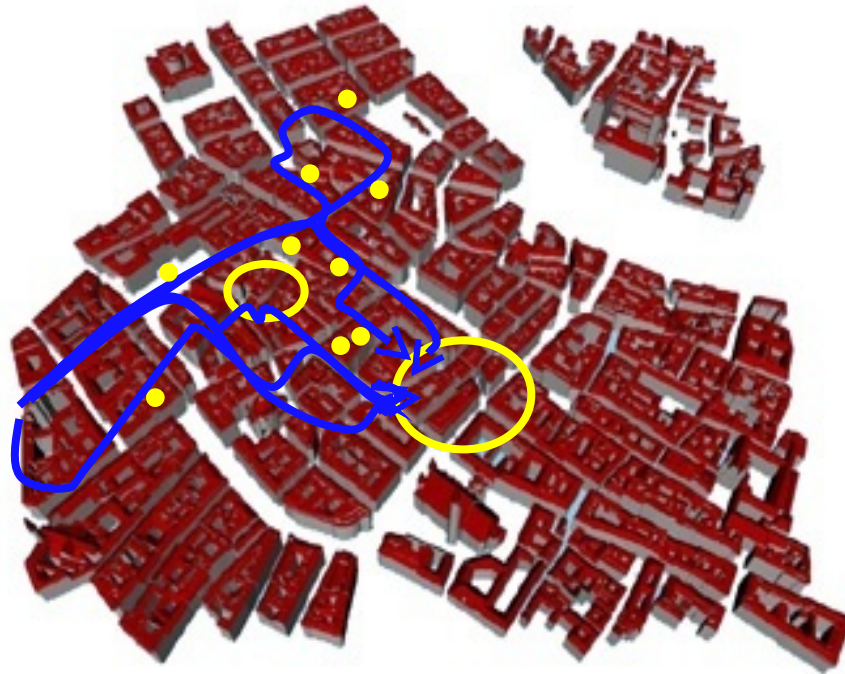
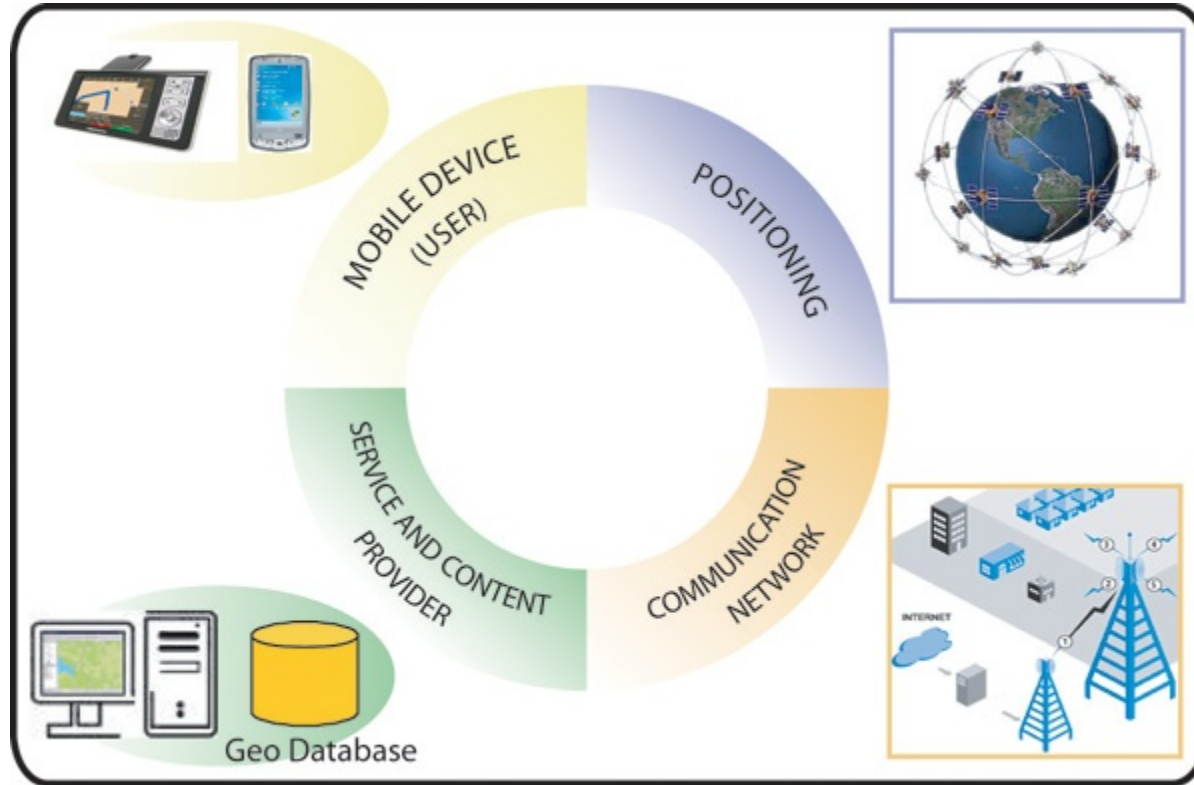


# Towards supporting wayfinding



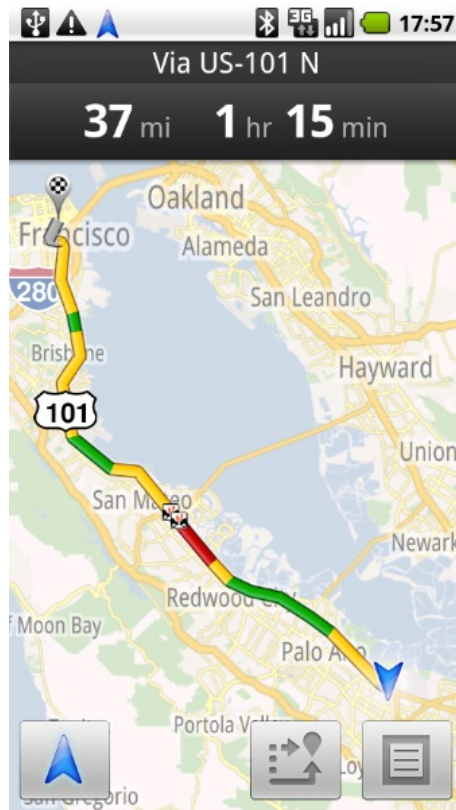
# LBS components



1. Mobile devices
2. Communication Network
3. Positioning Component
4. Service and Application Provider
5. Data and Content Provider

# Navigation

- Car navigation, pedestrian Navigation



Google Map Navigation



Wikitude Drive

# Mobile guides

**Mobile Augmented Reality**

- Combines camera, GPS and orientation sensors
- Enables mass market augmented reality
- 3G phones can embed these components



**Find Friends**  
Highlight friends' locations on screen, link to profiles

**Find Places**  
Search for locations, add weblinks to places: Real World Web!

**Find Your Way**  
See your path right in front of you, or guide others

Markus Kähäri, David Murphy  
(NRC/SWA/DIAS/AIA) <http://research.nokia.com/projects/mara>

**NOKIA**



AR+Wikipedia=Wikitude

Nokia: Mobile Augmented Reality Applications

# Location-based game

Geocaching: a worldwide game of hiding and seeking treasure.

A geocacher can place a geocache in the world, pinpoint its location using GPS technology and then share the geocache's existence and location online. Anyone with a GPS device can then try to locate the geocache.



# Social networking



Foursquare: check-in



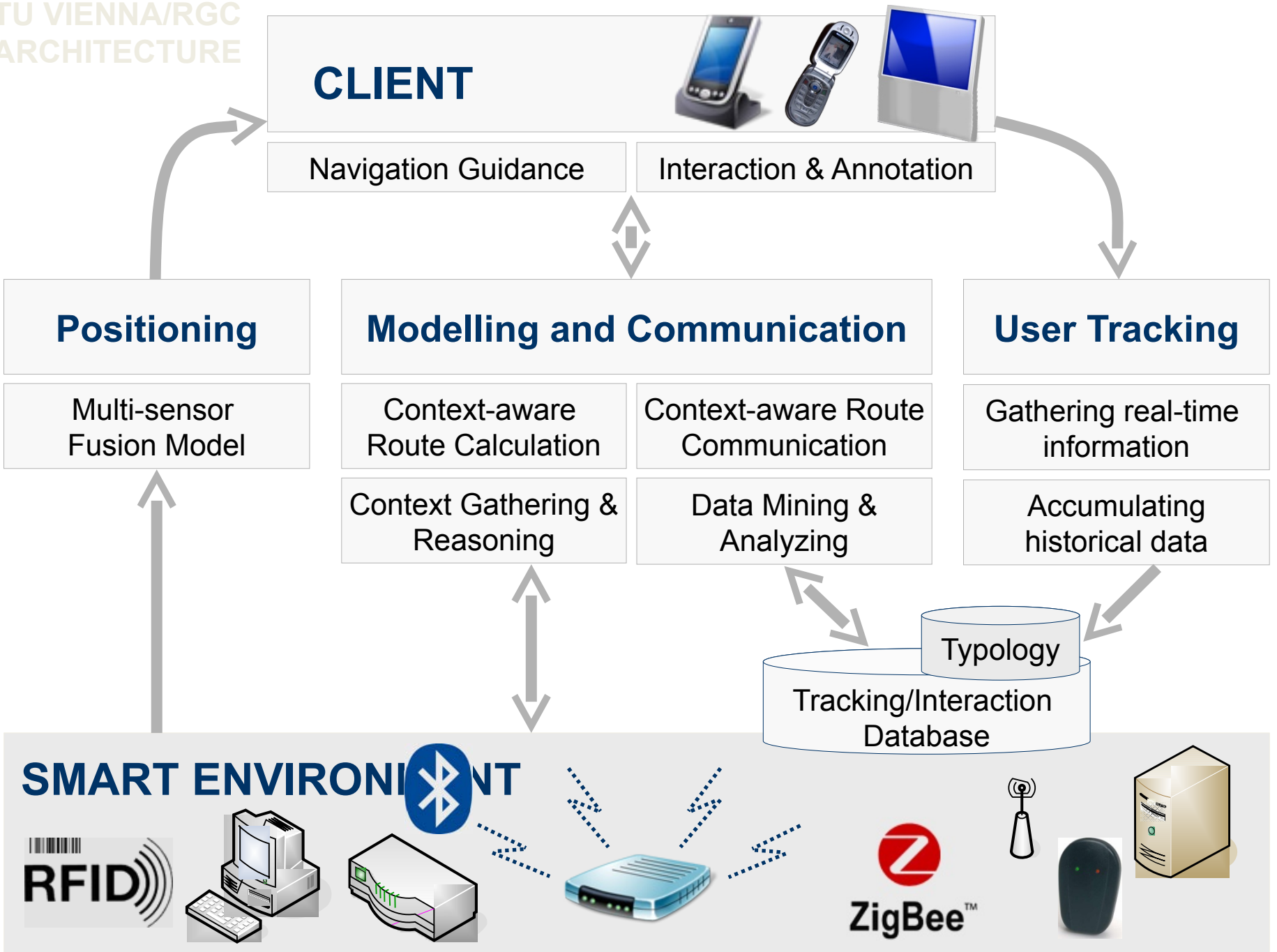
# Pedestrian Navigation





# Master Plan

- 1 Sensor Fusion
- 2 Ubiquitous Infrastructure
- 3 Behaviour Modelling
- 4 Semantic Wayfinding
- 5 Landmark Taxonomies
- 6 Context-Awareness
- 7 Keyhole Effects
- 8 Communication and Interfaces
- 9 Pragmatic Wayfinding

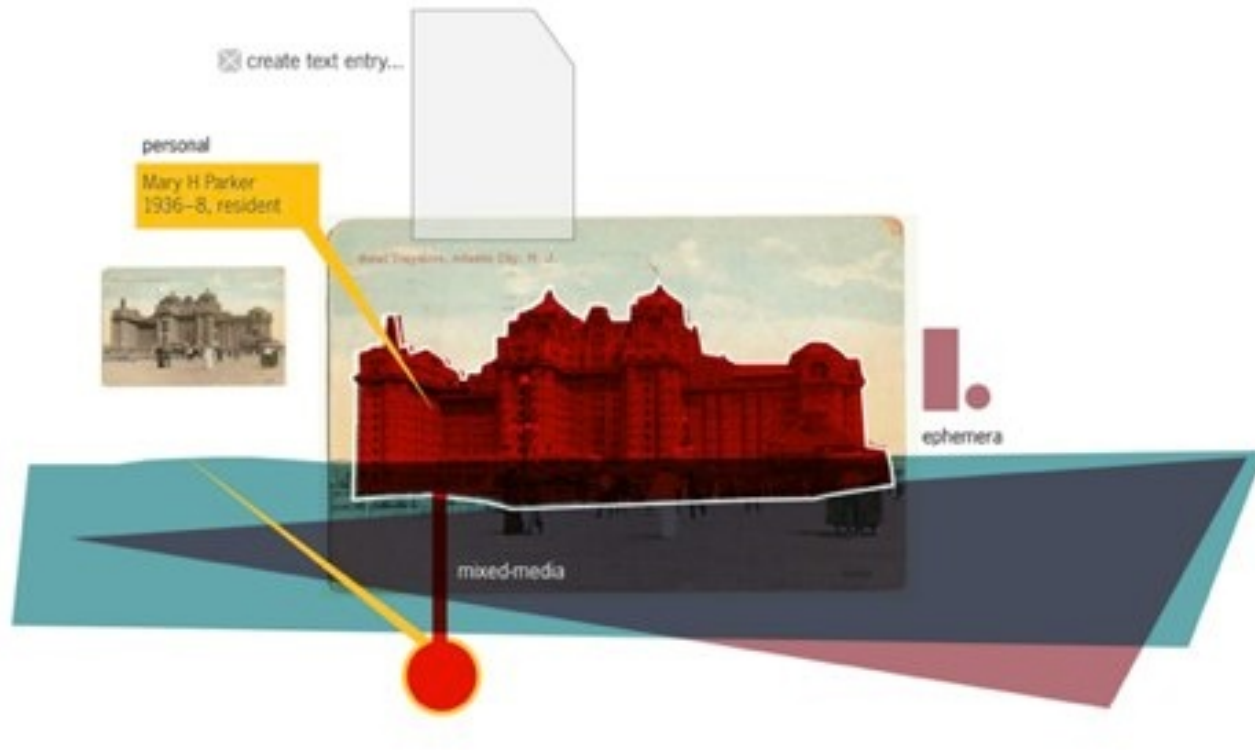


# Data acquisition and Modeling

## Collaborative Filtering



## Augmented Reality and Social Media



# Behaviour modelling

	Cluster 1	Cluster 2	Cluster 3
Gender	f: 40% m: 60%	f: 36% m: 64%	f: 67% m: 33%
Age	~ 30	~ 35-40	~ 30-35
Duration of observation	~ 5 min	~ 10 min	~ 23 min
Speed	~ 1.2 m/s	~ 0.6 m/s	~ 0.2 m/s
Number of stops	almost none	1.4	3.6
Duration of stops	7 sec (max. 1 min)	2.5 min (max. 8 min)	4.7 min (max. 17 min)

# Semantic Wayfinding

**Urban area** in situ experiments in Vienna and Salzburg, oral descriptions of environment and possible actions

## Ski touring

additional experiments for comparison



© aboutpixel.de – Rainer Sturm



© photocase.de – olivermick



- SemWay
  - "Gehen Sie an der Felsformation links vorbei im Tal hinauf."

# ..engineering the semantic dimension





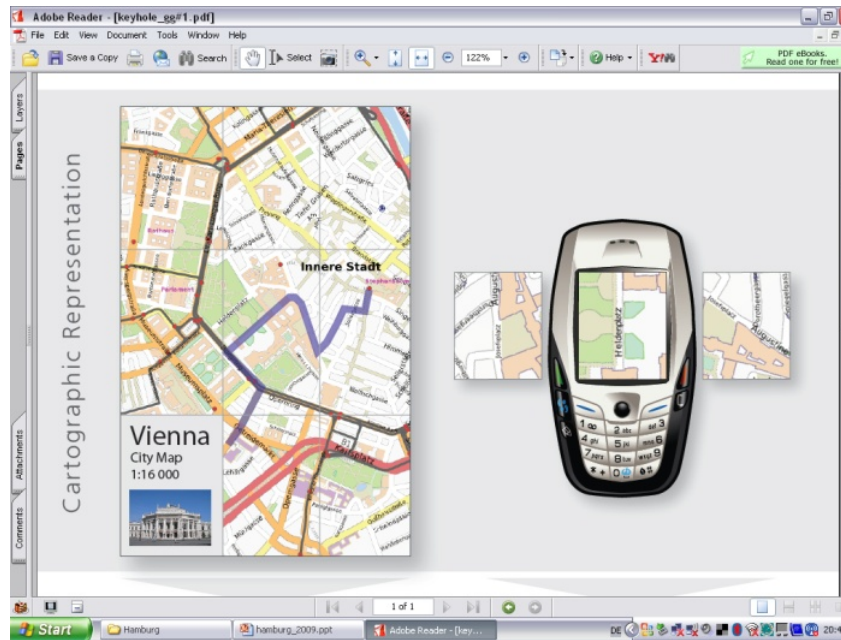


Research Group Cartography

# Ways2navigate



# Keyhole Problem



# FemRoute, Fem2Map

How do the psychological route qualities attractiveness, convenience and safety depend on the context of use?

# EmoMap

Considering the emotional perception of space in navigation systems for pedestrians

## Project goals

1. Gathering relevant parameters from pedestrians for creating an *emotional layer* of Vienna
2. Contributions via VGI to an open online database - **OpenEmotionMap.org**
3. Using collected data for improving/personalizing pedestrian navigation

## Hypothesis

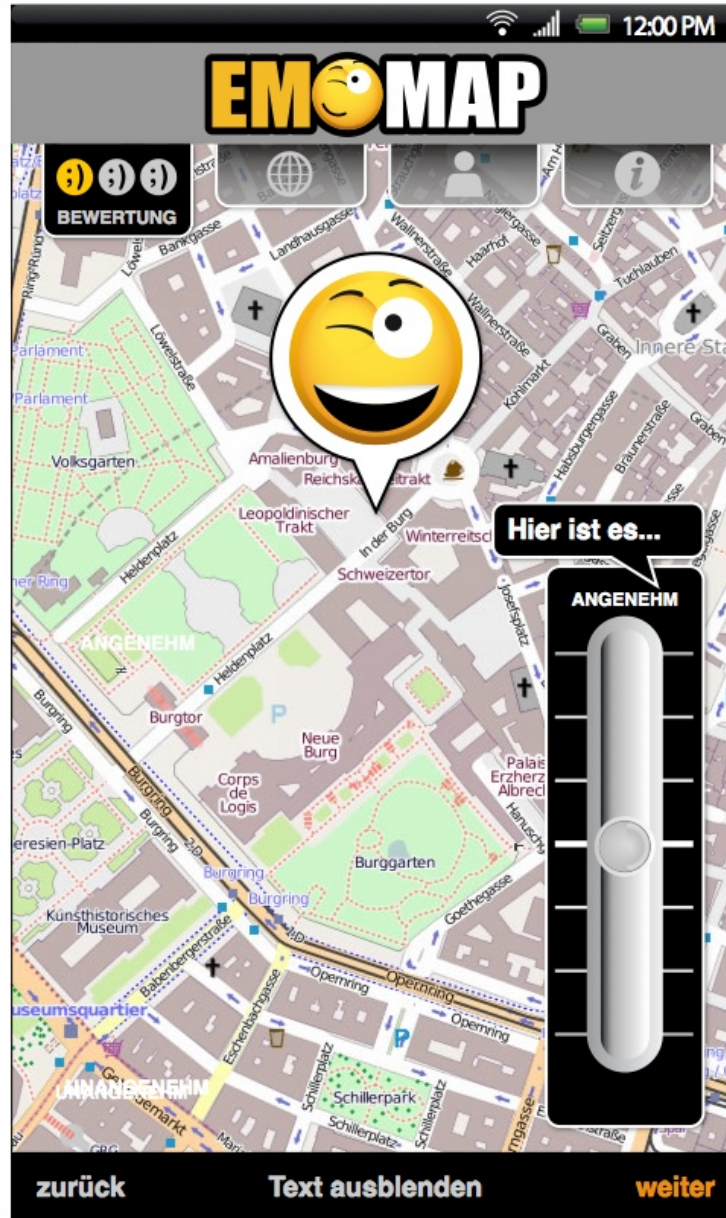
- The strength of emotional attachment for a particular landmark, place or space embedded in memory, by an individual, influences our structuring of space, thus our “identity building” and “well being”

## Concept

applying crowdsourcing methods  
using state-of-the-art tools/social media

correlate with psychological findings

Evaluate (focus groups, CF)





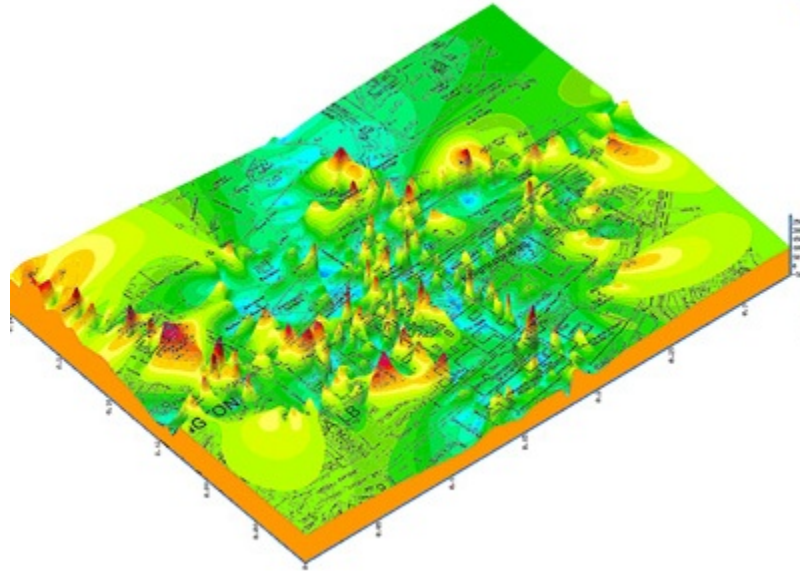




## App

- Android Platforms
- OSM
- GPS location
- downloadable from [cartography.tuwien.ac.at](http://cartography.tuwien.ac.at)





[Openemotionmap.org](http://Openemotionmap.org)

**International Cartographic Association**  
Association Cartographique Internationale



# **International Cartographic Association**

International Cartographic Association  
Association Cartographique Internationale



# International Cartographic Association

mission

the **world authoritative body** for cartography  
and geoinformation science

International Cartographic Association  
Association Cartographique Internationale



# International Cartographic Association

mission

world authority means

national and affiliate members

**represented at UN bodies** and other  
international organisations



# International Cartographic Association

## Aims

- Understanding and solve world-wide problems using cartography
- Informing about environmental, economical, social and spatial information through mapping
- Promote professional methods, techniques and solutions
- Global forum on cartography

**International Cartographic Association**  
Association Cartographique Internationale



# **International Cartographic Association**

## **Commissions**

Commission on **Art and Cartography** Commission on **Atlases** Commission on **Cartography and Children** Commission on **Cartography in Early Warning and Crisis Management** Commission on **Cognitive Visualization** Commission on **Data Quality** Commission on **Digital Technologies in Cartographic Heritage** Commission on **Education and Training** Commission on **Generalisation and Multiple Representation** Commission on **Geoinformation Infrastructures and Standards** Commission on **Geospatial Analysis and Modeling** Commission on **Geovisualization** Commission on **GI for Sustainability** Commission on the **History of Cartography** Commission on **Map Design** Commission on **Map Production and Geo-Business** Commission on **Map Projections** Commission on **Mapping from Remote Sensor Imagery** Commission on **Maps and Graphics for Blind and Partially Sighted People** Commission on **Maps and Society** Commission on **Maps and the Internet** Commission on **Mountain Cartography** Commission on **Neocartography** Commission on **Open Source Geospatial Technologies** Commission on **Planetary Cartography** Commission on **Theoretical Cartography** Commission on **Ubiquitous**



International Cartographic Association  
Association Cartographique Internationale



# International Cartographic Association Commissions

Commission on **Art and Cartography** Commission on **Atlases** Commission on **Cartography and Children** Commission on **Cartography in Early Warning and Crisis Management** Commission on **Cognitive Visualization** Commission on **Data Quality** Commission on **Digital Technologies in Cartographic Heritage** Commission on **Education and Training** Commission on **Generalisation and Multiple Representation** Commission on **Geoinformation Infrastructures and Standards** Commission on **Geospatial Analysis and Modeling** Commission on **Geovisualization** Commission on **GI for Sustainability** Commission on the **History of Cartography** Commission on **Map Design** Commission on **Map Production and Geo-Business** Commission on **Map Projections** Commission on **Mapping from Remote Sensor Imagery** Commission on **Maps and Graphics for Blind and Partially Sighted People** Commission on **Maps and Society** Commission on **Maps and the Internet** Commission on **Mountain Cartography** Commission on **Neocartography** Commission on **Open Source Geospatial Technologies** Commission on **Planetary Cartography** Commission on **Theoretical Cartography** Commission on **Ubiquitous**



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# International Cartographic Association

Instruments: Maps (Exhibitions, Awards)



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# International Cartographic Association

## Instruments: Research Agenda

Geographic Information  
Metadata and SDI  
Geospatial Analysis and Modelling  
Usability  
Geovisualisation  
Map Production  
Cartographic Theory  
History of Cartography and GI Science  
Education  
Society

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# International Cartographic Association

Instruments: Conferences

**International Cartographic Conference**

August 2013, Dresden, Germany

**[www.icc2013.org](http://www.icc2013.org)**



International Cartographic Association  
Association Cartographique Internationale



# **International Cartographic Association**

Instruments: Conferences

**International Cartographic Conference**

August 2015 Rio de Janeiro, Brasil

International Cartographic Association  
Association Cartographique Internationale



# International Cartographic Association

www.icaci.org

The screenshot shows the ICA website homepage. At the top, there is a navigation bar with links for News, Calendar, Publications, The Association, Members, Commissions, Research Agenda, ICC Conferences, and a question mark. Below the navigation bar is a large banner image of a panoramic tourist map of resort Sunny Beach, Bulgaria, with a callout for 'ICA Map of the Month 03/2012'. The main content area features two news articles. The first article is titled 'CfP: LBS 2012 in Munich' and discusses the 9th International Symposium on Location-Based Services in Munich, Germany, from October 16 to 18, 2012. The second article is titled 'CET Workshop Opportunities' and mentions successful workshops in Iran, Indonesia, and Viet Nam. On the right side, there are sections for 'Recent Posts' and 'Upcoming Events', listing various conferences and workshops.

**ICA**  
International Cartographic Association  
Association Cartographique Internationale

News Calendar Publications The Association Members Commissions Research Agenda ICC Conferences ?

**ICA Map of the Month**  
03/2012

Map of the Month 3/2012: Panoramic tourist map of resort Sunny Beach, Bulgaria

**CfP: LBS 2012 in Munich**

We would like to inform you about the 9th International Symposium on Location-Based Services, which will take place in Munich, Germany, from October 16 to 18, 2012.

Given the fact, that a number of activities and industries in the domain of GNSS, LBS and geoinformation management are situated in and around Munich, this promises to be an excellent venue.

The call for paper is currently open, please consider the deadline of April 15, 2012.

Publication in either the *Journal on LBS* and/or a book within the series *Lecture Notes on Geoinformation and Cartography* is anticipated.

Detailed information can be found at <http://www.lbs2012.tum.de>.

**Category:** Commission News, Maps and the Internet, Open Source Geospatial Technologies  
**Tag:** cfp, Germany, LBS, symposium

5 March 2012 Guest No comments

**CET Workshop Opportunities**

GIS/Cartography workshops have been successfully organised and conducted in Iran (2009), Indonesia (2010) and Viet Nam (2010), by the *CET*, on behalf of the International Cartographic Association. An outline of the workshop conditions and format can be found at <http://azarus.elte.hu/cet/workshop/overview.pdf>

**Recent Posts**

- CfP: LBS 2012 in Munich
- CET Workshop Opportunities
- Education and Training Modules
- March's Map of the Month is a panoramic tourist map of Sunny Beach, Bulgaria
- Mountain Cartography Workshop in New Zealand in September

**Upcoming Events**

- Mar 26–Mar 30 **GeoTunis 2012**
- Apr 17–Apr 19 **Geo Siberia 2012**
- Apr 19–Apr 20 **7th ICA Workshop on Digital Approaches to Cartographic Heritage**
- Apr 23–Apr 27 **Geospatial World Forum**
- Apr 24 **Open Source GIS & WebMapping**

2013