

MICRO-GEOGRAPHY-A NEW FRONTIER

ANTONIO S. CAMARA
New University of Lisbon and YDreams, S.A.
Monte de Caparica, Portugal
asc@mail.fct.unl.pt
<http://gasa.dcea.fct.unl.pt>
<http://www.ydreams.com>

During the last twenty years, cities have been busy replicating their physical infrastructure into digital geographical information systems (GIS). In the last decade, with the phenomenal expansion of the Internet, availability of digital video and sound, and ever growing processing power, traditional GIS have turned into networked multimedia spatial information systems.

In the beginning of the twenty first century, cities are witnessing yet another technological breakthrough: the mobile data revolution. Traditional geographical information systems are not detailed enough to satisfy the information needs of mobile phone or personal digital assistant users. Their immediate proximity to real spaces requires detailed geo-referencing of city buildings and elements of those buildings.

We are reaching a stage where a parking place in a shopping center, a shelf in a library, a painting in a museum, a room in a hospital, and a booth in an exposition should be geo-referenced. With mobile geographical information systems, detailed geo-referencing of such items will aid solving traditional geography problems in non-traditional spaces.

Mobile geographical information systems will integrate also multimedia information with the emergence of Multimedia Messaging Services (MMS) and the third generation mobile phones. They will incorporate, for instance, images from the ubiquitous cameras now available in the city environment. Those cameras include traffic, ATM and other event or security related cameras.

The challenges for researchers in geographical information are highly attractive:

- First of all, traditional mapping has to be adjusted to small screens. How to minimize display clutter and text input, and maximize spatial context are problems that have not been properly solved in the current commercial software versions.

- With a focus on mostly indoor spaces, layered diagrammatic mapping will be a relevant research topic.
- Alternative proposals for indoor positioning abound but there are options that still need research: the use of Bluetooth chips emitting position codes; and the use of RadioTags (see www.autoid.org). A new concept that may be called "spatial bar codes" may emerge from this line of research.
- Although video cameras are ubiquitous, appropriate image processing and broadcast for multiple platforms, namely mobile phones, has been limited. Intelligent processing of such information may be used in mobile GIS to re-route drivers during traffic jams, detect emergency situations or simply provide indications on the usage levels of public facilities.
- Micro-geography opens new opportunities in the area of location-based games, such as those based on the treasure-hunting model. These are expected to be one of the fastest growing segments in the new services offered by third generation mobile phones.
- The diversity of mobile devices that are expected to co-exist in the next ten years, ranging from second generation phones to PDA's based third generation phones, will imply the development of portrayal engines. These engines will automatically adjust the presentation of information to different types of screens.
- The expected widespread use of mobile devices for specific professional or mass oriented applications will also lead to changes in the architecture of mobile geographical information systems. These changes are already shaping up with the new .NET and J2EE platforms and the recommendations of the OpenGIS Consortium: interoperability and modularity are becoming common.

These topics are illustrative of a wider body of knowledge that has to be created to handle what may be called Micro-Geography. That body of knowledge will have components associated to content, interface design and technological support development. Such components will combine traditional expertise in geographical information with new concepts associated to mobile computing.

I would like to stimulate the publishing of such novel contributions in GeoFocus. After all, the members of its Editorial Board reflect a centuries old tradition in geography but also some of highest penetration rates of mobile services in the world.