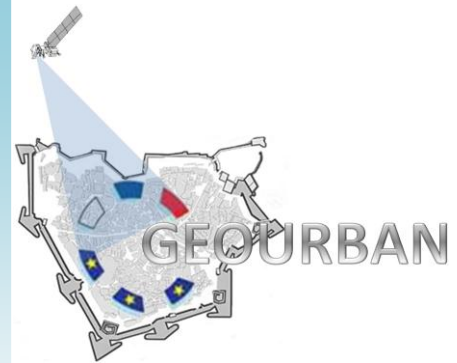


# GEOURBAN Newsletter



## Editorial

**GEOURBAN** is an ERA.Net Project co-founded by the European Commission under INTAS, focusing on "Exploiting Earth Observation in sUustainable uRBan plAnning & maNagement". It is a joint effort of 6 European Organizations from 6 European countries aiming at bridging the gap between Earth Observation (EO) and urban planning by demonstrating the ability of current and future EO systems to provide parameters of urban structure and urban environmental quality over large areas at detailed level. GEOURBAN was launched in December 2011 and will last 2 years.

This newsletter initiates an open dialogue between the partners of the GEOURBAN consortium and all potential end-users and informs about activities, progress and achievements of the GEOURBAN project. The newsletters will be published every 6 months and will be open to articles, news and opinions.

### Geourban partners:

1. **FORTH** Foundation for Research and Technology, Greece
2. **GRADI Ltd.** Specializes in complex method of urban planning, Russia
3. **GARD Ltd.** - Specializes in HW/SW system development - Israel
4. **DLR** - The German Remote Sensing Data Center (DFD) of the German Aerospace Center (DLR), Germany
5. **KUZGUN** Specializes in geospatial solutions for urban planning, Turkey
6. **UNIBAS** - University of Basel, Switzerland

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### The GEOURBAN Indicators

It is expected that in the framework of the GEOURBAN project, key phenomena and challenges will be identified that EO can address. The GEOURBAN indicators are the means to exploit EO potential in addressing the following issues related to urban planning and management. GEOURBAN focuses on:

- Land use/cover change
- Urban structure and dynamics
- Urban sprawl monitoring
- Urban form and periphery
- Open and green space preservation
- Urban microclimate
- Environmental monitoring
- Adaptation to climate change
- Natural hazards
- Urban metabolism

## The GEOURBAN objectives

The innovative potential of GEOURBAN lies in the development of a web-based information system which reflects the multidimensional nature of urban planning and management, as operationalized in intelligible and transferable indicators which are easily understood by non-experts.

The main objectives of the GEOURBAN project are to bridge the gap between EO scientists and urban planners by addressing issues of needs and the potential of EO methods and data for diverse stakeholders dealing with urban and regional planning and management. In addition to that analyzing the urban planning and management requirements relative to EO and review the EO data sources and the respective analysis techniques and implement the most promising ones at selected case studies.

Analysing the potential of future EO missions will enable to support urban planning and management. The development of a set of EO-based indicators supports a sustainable urban planning and management.

GEOURBAN will demonstrate the web-based information system in specific case studies by illustrating the socio-economic advantages of using of EO methods and data on a routine basis in urban planning decisions.

The gain in competitiveness and the added value resulting from the cooperation among the partners of the consortium is mainly because the synthesis of the consortium, as well as the selected case studies will support its dissemination to European, including Russia, as well as to Middle East countries, analyzing the different urban planning and management perspectives;

The synergy between academic and research organizations with industrial partners is expected to lead to a pre-operational product and service which will have the potential to be further exploited after the completion of the project towards their operationalization.

## The Geourban approach

GEOURBAN explores the potential of EO to support urban planning and management by providing guidelines towards sustainability objectives at micro, local and regional scales, as well as towards climate change adaptation. These guidelines are the result of the combination of several EO-based indicators using the web-based information system to be developed. This makes it easily transferable from city to city and the indicators can be evaluated if EO data are available.

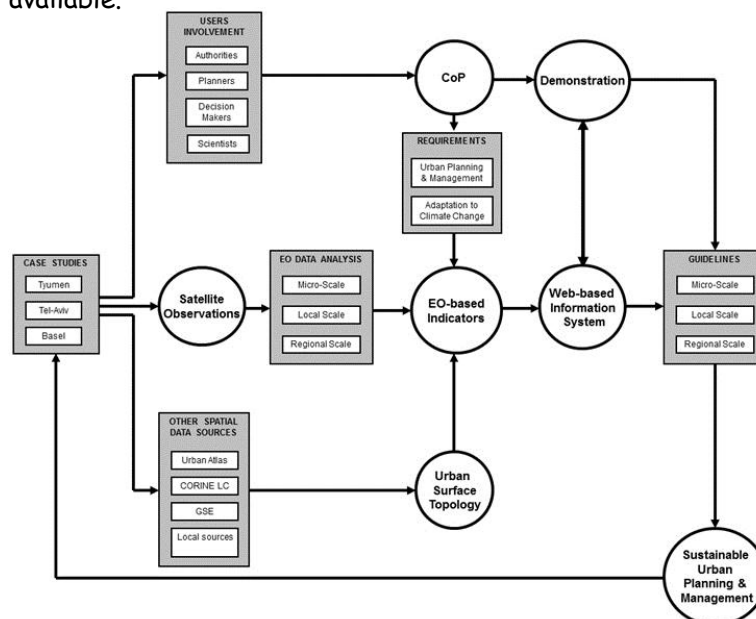
The EO data is the main input for GEOURBAN indicators. Well-known EO analysis methods are used to calculate products from raw data. The end-user will be provided with guidelines on the implementation of a minimum set of these methods, capable of extracting the products that are needed in indicator estimation. Most of these methods will be implemented off-line. However, some indicators, especially in regional scale, can be evaluated by EO higher level products available on-line, such as MODIS Level-2 products. In this case, the indicator evaluation will be fully automatic. The GEOURBAN approach is shown in the following figure:

A new service can be developed after the completion of the GEOURBAN information system. The indicators can be easily evaluated for any city if the required EO data are available. Thus, the inputs needed in their estimation need to be produced off-line. It is therefore obvious that the private companies involved in GEOURBAN consortium can develop a new service for the urban planning community by supporting the information system implementation.

Three cities with different typologies and planning perspectives are included as case studies: Tyumen (Russia), Tel-Aviv (Israel) and Basel (Switzerland). The end-users at GEOURBAN case studies (local authorities, urban planners and decision makers) will be involved in the project from the beginning via a Community of Practice (CoP) approach. They will provide the consortium with requirements related to urban planning and management, as well as to adaptation to climate change. A sub-set of these requirements that can be supported by EO methods and data will be extracted after a round of CoP meetings in all case studies. A second round of CoP meetings, or an umbrella CoP, will be organized during the demonstration of the GEOURBAN information system.

In the framework of the demonstration procedure, hands-on applications will be organized to give the end-users the opportunity to be familiarized with the final version of the information system.

Since the adaptation of the system to future missions will be addressed, it is expected that a fully operational tool can be developed in the future. However, new services based on the GEOURBAN pre-operational information system can be developed for the urban planning and management community, as soon as this system is available.



## Urban planning and management requirements in the three cities of GEOURBAN case studies

The organization, structure and management of urban planning authorities in the cities of the three GEOURBAN case studies are described. The main objectives of urban planning authorities and territory development management goals with respect to:

- social, economic and space planning;
- transport infrastructure planning;
- engineering infrastructure planning;
- evaluation of environmental restrictions in the course of urban planning.

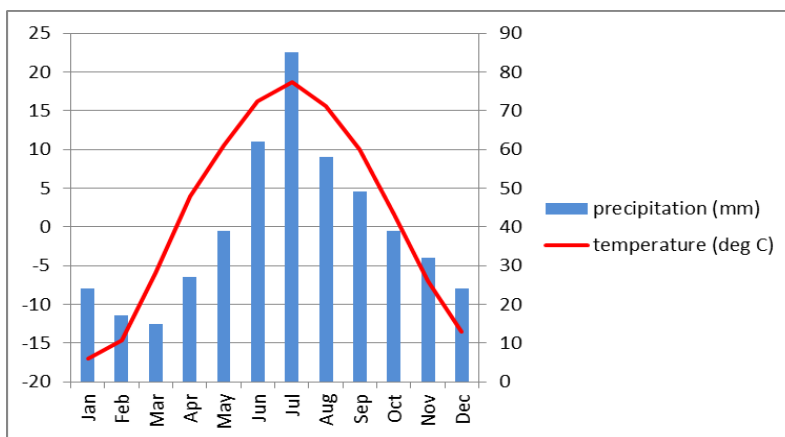
### TYUMEN Case Study

A city as a residential area is always included into municipal entity, thus it is necessary to follow the list of issues of local value in the course of determining a regulatory benchmark. This list is set in the Federal Law No 131-FZ dated October 6, 2003 "About the general principles of the organisation of local government in the Russian Federation". Town planning documentation and town planning regulation documents make a normative basis for urban planning activities.



### Tyumen

Urban Planning in Tyumen is regulated by the Town Planning Code of the Russian Federation (RF TP Code) - being the basic legal rule in the field of town planning regulation. It describes the criteria providing safety and favorable living conditions, environmental protection, protection of cultural heritage facilities and specially protected national territories. Further on, decrees enacted by the Tyumen State Duma and the Administration of the Tyumen city provide the guidelines for city specific planning.



Climate data for Tyumen (source worldweather.org).

### Tel-Aviv Case Study

The Strategic Plan for Tel-Aviv Yafo is multi-disciplinary. It is concerned with all the city's facets - the social fabric, the economy, culture, leisure, land-use, the urban fabric, transport and the environment. The planning process involved is participatory. Residents and other stakeholders are invited to express their views regarding the city's current situation, identify problems and opportunities and prioritize possible remedial courses of action. Later on, they are called upon to formulate their 'vision' for the city's future. The dialogue instigated by this process, helps to promote understanding among different interest groups, thus paving the way for consensus-building around specific issues.

Strategic Planning allows short-term and long-term 'Action Plans' to be brought forward, while the Strategic Plan is still in preparation.



## Tel-Aviv

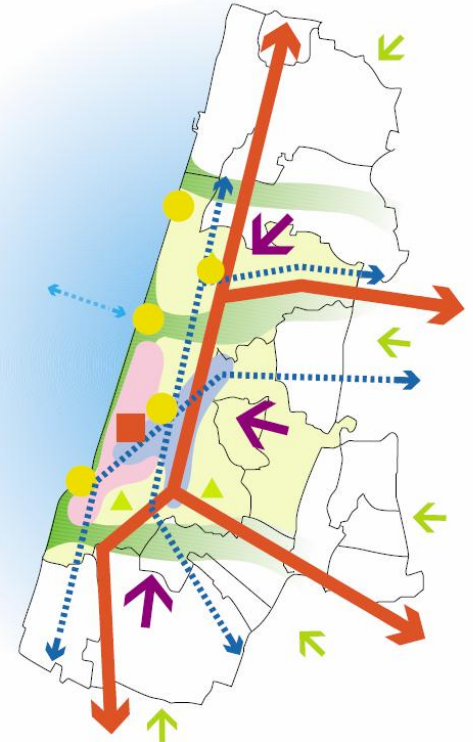
The Master Plan of Tel-Aviv Yafo is based on the Strategic Planning approach. Strategic Urban Planning combines modern planning concepts with strategic management procedures, normally applied nowadays in the business world. It consists of a continuous cyclical process, involving: planning, implementation, monitoring and evaluation of programs, actions and urban projects, then going back full circle, when modifications are called for, in response to changing circumstances.

Early implementation of projects and programs arising for the Plan helps to build public confidence in its merits, whilst at the same time, strengthening the Municipality's problem-solving capacity. A built-in control and follow-up mechanism helps to assess the Plan's measure of success and ability to meet its pre-set objectives. The Strategic Planning process is open and transparent. The public can follow progress on the Municipal Website and through other media.

Fig 00  
Spatial-Functional  
Structure



- The Metropolitan Centre
- Textures for Conservation
- The Core of the Metropolitan Area
- Metropolitan co-operation space
- Metropolitan Parks
- Cultural Quarters
- ▲ Higher Education Centres
- The Central Cultural Quarter
- ↔ Metropolitan Transport Corridors
- ↔ Mass Rapid Transit
- ↔ International sea-link
- ↔ Functional interactive links



*Synthesis map for the Tel Aviv case study with the main features of spatial-functional structures.*

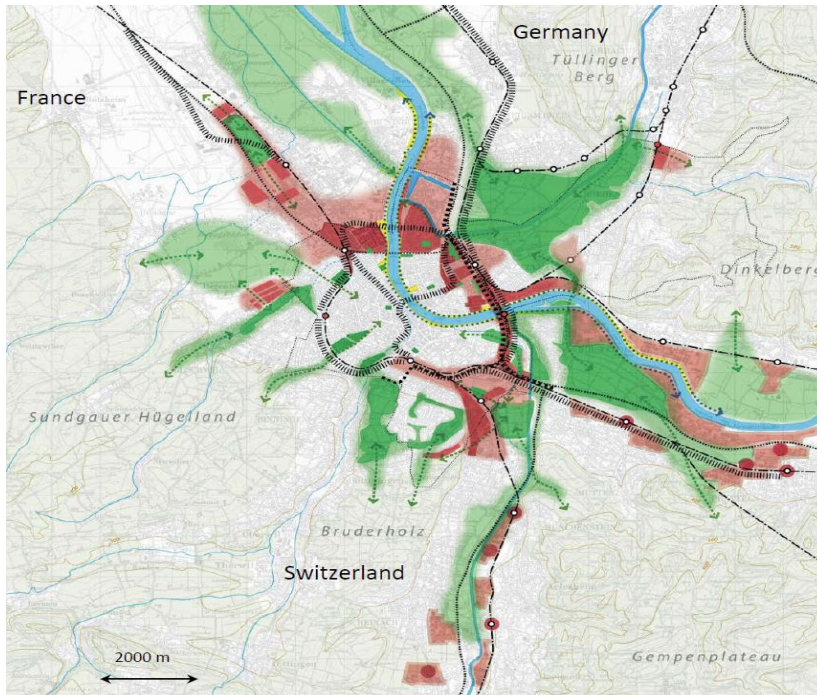
## Basel Case Study

Urban planning in BASEL is mainly performed by three city agencies in three different departments. Each agency has its own specific field, but interactions, cooperation and communication are well developed.

The Agency of Cantonal and Urban Development in the presidential department counsels and supports the government council in its task to observe and evaluate all significant developments in the city and the agglomeration and to coordinate and arrange the appropriate dispositions.

The Planning Office in the department of construction and traffic is responsible for urban and regional planning, for town construction and the projection in the public space and sphere. It manages the regional development plan and the zoning plan for the city of Basel, the future use of upcoming free areas and works out proposals for use and design of public plazas. In order to guarantee a future-oriented and sustainable urban development, the Planning Office is in close cooperation with the Trinational Eurodistrict Basel as the representative of the surrounding towns in Switzerland, Germany and France.

The Agency for Environment and Energy in the department of economic, social and environmental affairs is responsible for the protection of the population and the environment from harmful or disagreeable influences. It ensures that the existing resources are conserved, that water is used in moderation and propagates the avoidance of unnecessary waste and the use of renewable energies.



- areas with development potential
- focal points of urban development
- riverside, partly with development potential
- urban and peri-urban open and green spaces
- open space to the surrounding landscape
- outer landscape
- corridor for cross-linking of open spaces
- cross-linking corridor along the river Rhine
- railroads with stations and stopovers (red point: planned stops)
- public transport: capacity increase
- highways
- highways: rectification of bottlenecks
- city border
- waterbodies

**Synthesis map for the Basel case study with the main features main features of the spatial development (extracted from structure plan)**

Due to the special location of Basel right at the border to Germany and France, several international institutions were established with to aim to enhance communication and coordination of the local planning authorities. The municipal bodies of the trinational urban region of Basel realized, that a durable attractiveness of the economic and living environment and an appropriate infrastructure require a close cross-border cooperation. The Trinational Eurodistrict Basel (TEB) was thus founded in 2007 in order to coordinate regional planning activities efficiently across national borders. Meanwhile, TEB emerged as the forum, where important transnational questions are discussed and problems are solved by specific projects. The common objectives of regional planning for the agglomeration of Basel are defined in a paper on the development strategy 2020.

## Basel

Basel's basic requirements for general urban development and planning are defined in the guidelines for the legislation period 2009-2013.

With the Legislation plan 2009-2013 the government council defines the mid-term and long-term key aspects according to the constitutional mandate, where a sustainable development and planning is explicitly regulated by law. The combination of quantitative observation and qualitative evaluation, as defined in the legislation plan, is the base for planning and coordination of the government council's actions.



## Deliverables

- Project Management Plan
- Semesterly Progress Reports
- Urban Planning Requirements relative to EO
- EO Products Database (VHR)
- EO Data Analysis Protocol (VHR)
- Dissemination and Use Plan
- GEOURBAN Web Site
- EO Products Database
- Mid-term Report
- GEOURBAN Published Material
- Guidelines for Future Missions Data Analysis
- EO-based Indicators Development
- GEOURBAN Information System
- Demonstration Proceedings
- Final Report

## CoP meetings in GEOURBAN case studies

CoP meetings were organized by the local institutions of the respective case studies with the support of FORTH. The outputs of the CoP meetings are of highest importance for the definition of indicators because they really reflect the current needs of practitioners in the near future but also in their everyday work. Following Table presents an overview on the CoP meetings of the three case studies.

Case study	Date
BASEL	1 <sup>st</sup> CoP meeting 25 April 2012 presentations available on <a href="http://www.mcr.unibas.ch/typo3/index.php?id=209">http://www.mcr.unibas.ch/typo3/index.php?id=209</a> 2 <sup>nd</sup> CoP meeting 7 June 2012
TEL AVIV	1 <sup>st</sup> CoP meeting 16 May 2012
TYUMEN	1 <sup>st</sup> CoP meeting 23 July 2012

The main outcomes of these meetings are following summarized:

**Basel:** The planner's presentations revealed that the city authorities of Basel already have access to an excellent high resolution data base for a huge amount of parameters and indicators relevant for sustainable urban planning, management and development. The potential for additional input by the GEOURBAN project may therefore be modest and will be concentrated on VHR data. However, due to the specific location of the city of Basel at the trinational border of Switzerland, Germany and France and the joined efforts of the respective national planning authorities for a closer cooperation in the context of a sustainable development of the trinational metropolitan region, several issues concerning the acquisition of cross-border data were highlighted. Here, the activities of GEOURBAN are very welcome and a close cooperation for the future was substantiated at the end of the meeting. In the second CoP meeting this cooperation was further deepened with the result of a common practical course for advanced students to be established in the upcoming winter semester 2012/13 with the aim of analyzing the spatial and settlement development in the greater Basel area.

The discussion showed that indicators related to the EO-derived parameter "land cover" and all its derivatives (e.g. land cover change, fractional land cover, imperviousness, vegetation fraction, surface materials, etc.) are highly welcome as possible parameters for further development in the frame of the GEOURBAN information system. Other favorite indicators were related to building characteristics (building density/volume).

**Tel Aviv:** The participants represented the three sectors involved in urban planning in Israel - government, local authority and private sector. During the presentations, many questions were asked and discussed and the participants showed great interest in the potential contributions of EO and of GEOURBAN to their work. The users presented their organizations and the aspects of their work which are relevant to GEOURBAN. One important issue that rose during the meeting is the need for simulation software which would enable to evaluate the effects of changes in the urban environment during the planning stages. This is especially relevant for Tel-Aviv at this time since a new Master Plan is now in the process of being approved by the relevant committees and authorities.

**Tyumen:** Representatives of regional and municipal authorities, representatives of the largest universities of the region and representatives of business took part in this CoP meeting. Reports and presentations of the participants were devoted to a sustainable development of the city of Tyumen, a role of spatial/ environmental dimension in current urban planning practices in Tyumen, to potential of use of Earth Observation data for town-planning design goals, and also to support of city planning in the city of Tyumen. One of the main topics discussed at this meeting was the list of indicators of GEOURBAN as a required input to WP3. The first version of this list was established at the CoP meeting in Basel, updated at the CoP meeting in Tel Aviv and finally discussed in Tyumen. Participants also argued about a better exploitation of EO in urban planning and made the preliminary list of indicators of GEOURBAN for Tyumen. For the Tyumen case study indicators with a high potential are: water surface temperatures and temperature change, land cover and land cover change, urban surface materials, surface albedo, surface emissivity, built-up density, fractional land cover, imperviousness/surface sealing, traffic (street and railway) networks and lines of communication. Of particular interest was also a group of ecological indicators, e.g. the availability of ground water and flood prevention.



### Adaptation to climate change

Cities are extremely vulnerable to extreme weather events which are expected to become more frequent and intense with the present climate change. Planning authorities at all political levels need to consider adaption and mitigation measures in order to make their city resilient against these impacts.

Several topics referring to the future adaption of urban planning with respect to climate change are closely related to routine requirements, but will attract increased interest and significance with the ongoing climate change with its main expected impacts like the increased number of flooding/drought events, heat waves and water scarcity as the consequence of rising temperatures, changing precipitation pattern and sea level rising. The following lists the most significant sectors:

- Marine and inland water ecosystems
- Ground water
- Drinking water
- Buildings and infrastructure
- Urban climate
- Air quality
- Health

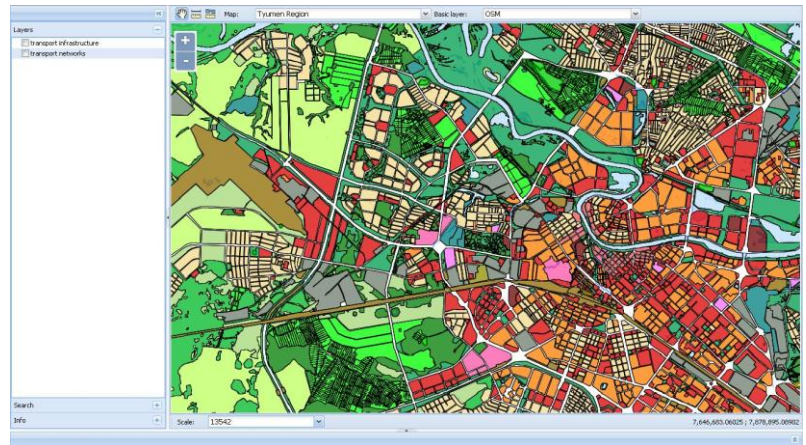


## About GRADI

GRADI has a wide experience of development of town-planning documentation and rendering consulting services in the sphere of planning of development of the territory. Thanks to it within participation in the project GEOURBAN in work process were involved outstanding experts in this field. It allowed creating the developed requirements to results of the project as a whole and to EO indicators in particular. The performed analytical work provides a high demand of results from bodies of regional and municipal authority, investors and urban planners. The first report on results of carrying out such research was delivered before the Russian professional community (urban planners and GIS developers) at

## WIS development

The 1st English version of the mockup was presented at the meeting that was held in Ankara on December 13-14, 2012. The mockup of the Web-based information system (WIS) with standard set of tools for mapping and monitoring of the urban environment as object searching, measuring the distance and evaluating the square uses Basel and Tyumen datasets.



The main goal for the next six months is define what technology will be used and what design of the WIS's architecture will be chosen in order to implement several WIS's prototypes and submit them to the CoP for consideration and determining the best one. This version should integrate a minimum set of indicators and supposes to be realized on the next Progress Meeting that will be held in Tal-Aviv at the end of the June, 2013. Using our experience and the method that already welcomed by local governments in the research and development we should create the public web-site that helps end-users as urban planners and decision makers to use EO based Indicators in planning the future urban environment.

The final version of the WIS for three case studies as Tel-Aviv (Israel), Tyumen (Russia) and Basel (Switzerland) with all defined Indicators included will be released in October 2013. The user will be able to evaluate it online how to use its individual Earth Observation derived products and to extract and save the produced maps in several standard vector formats.

## Contact info

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## Current Status and Upcoming events

The 1<sup>st</sup> GEOURBAN Progress Meeting was held in Tyumen on July 23-24, 2012.

The 2<sup>nd</sup> GEOURBAN Progress Meeting will be held in Ankara on December 13-14, 2012.

## Publications

Penyevskiy I., 2012. The international project GEOURBAN. Russian Urban Planning Conference to be held in Vyborg, Russia, 24-31 July 2012.

Esch, T., Taubenböck, H., Chrysoulakis, N., Düzgün, H. S., Tal, A., Feigenwinter, C. and Parlow, E., 2013. Exploiting Earth Observation in Sustainable Urban Planning and Management - the GEOURBAN Project. Joint Urban Remote Sensing Event JURSE 2013, to be held in Sao Paulo, Brazil, 21-23 April.

<http://geourban-fp7-eranet.com/>

