Antonella Contin
Paolo Paolini
Rossella Salerno *Editors*

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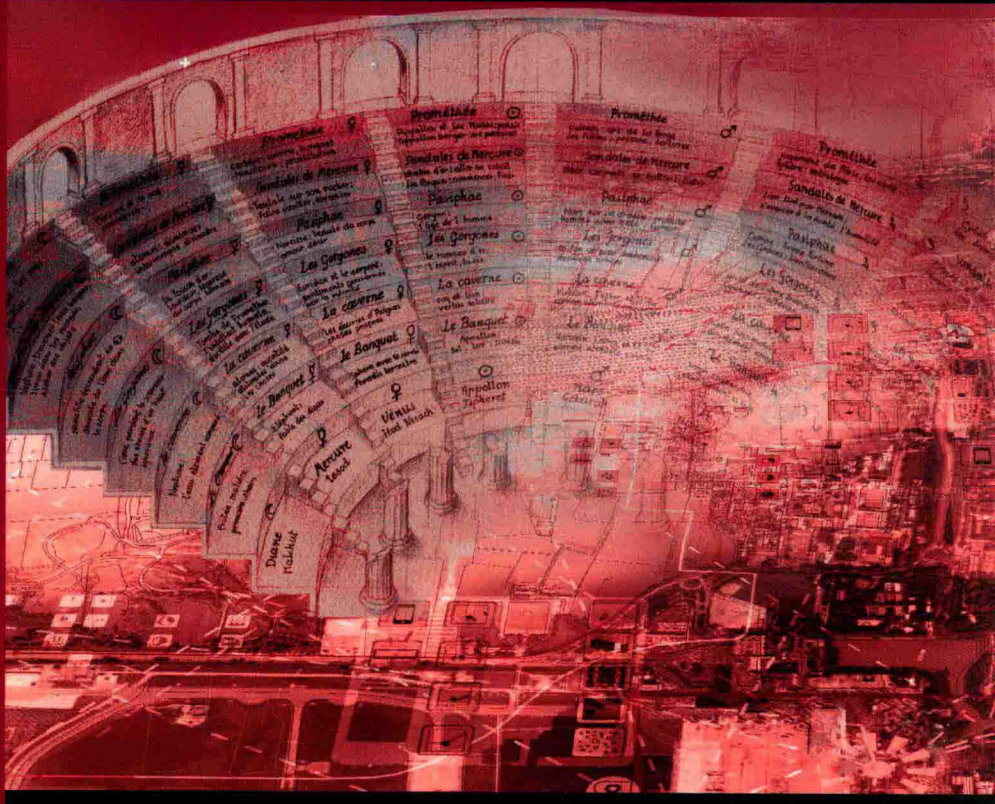
Innovative Technologies in Urban Mapping

Built Space and Mental Space



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Introduction

Antonella Contin, Paolo Paolini and Rossella Salerno

1 Introduction

Imagine a pebble: a rough, rugged pebble, some three inches of diameter. Do you think it is interesting? Would you stop by were you to stumble upon it? Would you take a picture of it? Would you put it in a museum? Of course not. Unless, you were to know, by any means, that this little insignificant stone is the stone used by the later-to-become king David to kill Goliath. This piece of news would change everything and any good-sensed museum in the world would no doubt be more than happy to host the little insignificant pebble in a specially-dedicated room.

Most cultural heritage 'objects' do not talk by themselves except maybe, in cases where beauty prevails. Most cultural heritage objects are, in fact, in desperate need of 'stories' about them since their value is not self-evident. Therefore, communicating their value is 'the' – not just one – role of cultural heritage institutions; their 'raison d'être'.

Imagine a large metropolis: a Metropolitan Net City, several kilometres wide. Do you think it is easy to live there or to discover its hidden values? To detect, learn and show the importance of informality as a source of resilience and adaptability? New information technologies are changing the planning and design activities on both the architectural and urban scale by giving access to information through interactive digital environments.

The whole new media environment creates a communication mood through different display codes: new virtual design tools and new meaning derived from figures/images integration and narrative texts.

We begin with the idea that to valorise cultural heritage means to generate values for the addressee when the contemporary urban space – using new technologies –

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could gain a fundamental role in the information and teaching field. This occurs in many senses:

- understanding: the addressee better understands the meaning of the 'object';
- appreciation: through understanding, the addressee feels the importance of the object;
- knowledge: the addressee gets more information about the object and related issues (e.g. history, sociology, art, movements, etc.);
- curiosity: the addressee now 'wants to know more';
- care: the addressee feels as if s/he owned the object;
- contact: the addressee wishes to get in contact with the object – through a visit to the institution.

In this way, contemporary urban spaces, consisting of heritage values, 'prophecy places' and using new technologies can be integrated with the information and teaching field. This happens in two ways: directly and indirectly. The first way relates to the daily fruition of urban space giving information about society and ensuring integration. In the indirect way the urban space, through its self-preview – provided by new media – becomes the very first tool of 'distant' information.

Our aim is to investigate these modalities, in order to make the urban space – especially its hidden heritage values become understandable not only visually but also to all of the senses and mostly when moving inside the city.

2
Heritage Valorisation and a Concept of Information Ecology

This book aims at suggesting the theory that valorisation of cultural institutions is the highest kind of communication. In other words, today technologies can greatly help to tell wonderful, enticing stories about cultures as they can potentially reach a vast range of audiences which was hardly possible before. On the other hand, this books intends to study mapping projects closely, not only as design operations but also as analysis, knowledge providers and expressive tools able to extract those hidden ensigns beyond the ecology of cities. Such knowledge needs to be disclosed and brought to the user's attention, in order to get a feedback and a deeper understanding of these places.

The book also proposes a definition of 'Information Ecology', where the contemporary digital technology system must be integrated into a larger topic of housing as 'participatory and sustainable management' of the 'own place' through an integrated systemic prospective. The virtual and sensitive result of information, the process and the modalities of translation/filtration of abstract data into fascinating images, require a limited use of resources and a soft physical impact towards an economic and spatial sustainability, maximizing the interactive nets that are able to promote simulations and immersive experiences in valuable contexts – both well-known and

not so common, both close and distant. Considering these media as extension of our body through time and space, we can reduce distances and synchronise all the elements of a whole complex and enlarged informative deployment. This book investigates the construction of a 'sensitive reactive network of proactive nodes', following alternative mapping instruments, such as augmented reality, GPS, Embedded Technologies, Fast Tracking Systems, etc. in order to define the reading layers of the city through: Preview Maps, Field Maps, Immersive and Sensitive Maps.

The goal of our research is an effective image to understand, conceive, design and project the physical city, in order to define the traits of one 'structuring image' of the contemporary city through the use of digital interactive technologies.

This book is also about 'mental spaces and heritage': let's hope that digital stories can create in people's minds mental spaces which make them feel closer to their cultural heritage and cultural roots.

3
Translation, Internationalization, New Technologies

3.1
Translation

We intend to propose, with this book, a translation work. We know that in every discipline relations are always mixed and urged by a whole set of operations: these include synthesis, comprehension and mediation which we must do in-between our horizon and that of others. Nowadays a researcher is more than a mediator but an academic figure who must connect his world and that of others in a hermeneutical way. Of course, there is still a problem of untranslatability among disciplines, which actually shows the borders within which we are used to moving because of our belonging to such hermetic disciplines. Discourse tends to meet and translate the experience of different disciplines, which, integrating with urban design can concur towards a vision, and realization of methods and tools for *a building art of the Metropolis.*

We are especially interested in the setting of those operations which let us define the '*public realm*' as a more porous space, through the construction of a layer, which we are used to calling meta-city (Shane 2011), and which once was called meta-space: "When a part of a city is designated a meta space, it becomes an Urban Gallery a fluid form of public space that evolves in time, generating different definitions of public space and different ways of participating in it. These definitions yield 'floors' in the spatial structure of the urban gallery. Meta-spaces make it possible to bring the dynamic structure of scenarios into the flows of the second skin. A meta-space in the second skin is a public space, a public matrix" (Bunschoten 1998).

3.2
Internationalization

The book we propose is an international book. We refer to the international scene because it allows us to compare and focus on our identity, in a contemporary way, when international professors' points of view – as international good practices, cases and new disciplinary openness – will meet the Italian professors' classes.

3.3
The Role of New Technologies

The book we propose is a work which attempts to integrate new technologies into the urban design discipline. These materials have valuable effects on daily urban life since it is considered as a construction offered to individual and social activities of the citizen-actor inside the city, representing in a common view an exclusive place where mediations of urban forms play a basic role. In other words, the dimension of the meta-city is necessary to recognize urban space as a desirable object from faraway, and as appropriation field from close-up. Then the urban space will no longer be used with regard to the housing/factory, as a radical theme of the city, but as the substitution of that relationship with the public/communication space theme in real time. This will have an impact on:

- economic and social aspects;
- institutional aspects;
- search for approval;
- local and global values and their influence on the citizenship concept itself.

Part I
The Academic Question of Research

The Project of a New Cartography: Patterns of Use, Spatial Experiences and Perceptions of the Urban Environment

Antonella Contin

The objective of our research is to pursue the development of students' design skills, the construction of a design and development platform. Innovation is a result of a plural, and ethical process, not sequential. First we must decide if the innovative solution – achieved through interdisciplinary expertise – is inserted: (a) in a defined technological environment, for which there is an 'already tested' application of a technology, so we can produce feasibility studies and prototypes; or (b) in a known context from which we extract a problematic issue and choose what kind of technological world can support it. In this case we will produce feasibility studies.

Our field of action is the new metropolitan scale of the city. Large metropolises are growing. Sometimes the old heart of the city is dismissed and transformed into a symbolical mediator. The new settlements have become huge and full of neglected spaces where the informal sector is increasing. The mapping of dynamic urban processes through digital open interactive platforms has become very important to facilitate self-management dynamics for the lack of services.

When dealing with new technologies it is necessary to point out: (a) mapping and displays (available or generated by citizens) which give new ideas about infrastructure and space-use, making sure that information is available and that structures are adaptable and understandable; (b) interaction tools among people-matters-spaces, in order to create situations and processes (from the widespread museum to social art and participatory design); (c) mobile and fixed technologies which modify the inhabitants' spatial experience of public space, based on their needs and desires (for example mobile device applications which collect, offer and trade information between context and inhabitant, or among users); (d) augmented reality and similar new technologies as identity-image intensifier of built and natural heritage; (e) people's virtual navigation and the dissemination of information as a connection moment between unit and function, not only on the urban scale, but also at territorial and global level.

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If we are blind in our capacity of imagining, the technological equipments are mute; which means that their appearance does not reveal anymore their real potentialities
(Anders, 1980)

1
The New Information Technologies and the Concept of the Reality

In order to produce a new mapping project, the first question we ask ourselves is: how does it change the concept of reality through new information technologies?

Today, in fact, culture is objectified in the technical tools rather than in individuals, so technology seems to be the new subject of History (Anders 2011). Our question then becomes: what can we do with technology (Galimberti 1999)? We might answer that humans are the protagonists of the processes of self-management (Ferraris 2009) only through new trends in collaborative technologies, sharing information, which form the basis of an adequate level of description of a complex reality. So, in addition they can promote chances of cooperation between different disciplines.

The first value which we grant to technology is a documentary value, related to the power of maps – starting from the historical Atlas – which lets us conceive images. Maps then enable us, today more than ever, to see quantitative data, such as a sensible form of a concept or an idea. But, we are most interested in the fact that, with new technologies, we can produce maps consisting of new signs – irrespective of the language and conventions of the picturesque characteristic of landscape – which are a huge resource in multi-language and multi-cultural contemporary societies (Ferraris, 2009). New technologies then – especially in the so-called developing countries – can facilitate the dynamics of self-management to overcome the lack of services and to stimulate society through 'informal' dynamics, which can improve new functions in the territory. Accordingly, technology allows us to get closer to urban themes by allowing for a proactive approach, based on the analysis extracted from data mining. These make it possible for us to adapt to the environment – through a series of feedback analyses – according to a reactive approach.

2
An Information Role for Contemporary Urban Space

Therefore we have started from the idea that even the contemporary urban space – using new technologies – could gain a fundamental role in the information and teaching field; directly and indirectly. In the direct way, the daily practice of this space shapes society, ensures social integration, when the economic, social and epistemological structures are inscribed in this new space. We argue, however, that it is crucial to find a new way to inlay the level of the *meta-city* (Shane, 2011) within the urban

ground, so that the information, which it hides, can be decipherable not only by the eye but also through all our senses, and particularly through movement inside the city.

The indirect way occurs due to the fact that the urban space still functions as information provider, lending itself to human contact, interacting with it and becoming media *par excellence* of the near and distant accessible information. In short, the contemporary city offers a space of contact, which simultaneously and 'im-mediately' informs and forms citizens and 'media-tely' – as a tool – links the streets of circulation and of information together.

According to the mapping project we want to pursue, we have to produce very powerful evocative images. Then – through the use of new technologies – we determine some sensory inputs in the context area, which can cause specific memories of a particular situation. The observer's senses are transformed into a conscious perception and knowledge, which means that the feeling must be conceptualized. The observer then, doing so, develops the 'scene' with the variation of his body, enriching a project that, on the contrary, is based on the permanence and durability of physical contexts.

What we propose, then, is a project for sensitive maps of the cities: a new generation of maps that can record, critically analyze and represent, in a dynamic and renovated way, the complexity and heterogeneity of new territories in order to produce 'sensitive' images. The aim is, therefore, to disclose ways of territorial accessibility and to predict and calibrate 'pro-active feedbacks' of the various urban events, on a territorial scale. The concept of time, for instance, may be different from the 'just in time' mood, able to turn the city events into a durable process that significantly transforms the city structure. This means stimulating through new technologies and strategic design a value of *long duration* for the entire metropolitan area. This fact establishes a strong perceptual and programmatic link between specific sites, the entire city, and the extended territory of the urban region in its various connotations: identity – social, productive – economic, recreational – tourist, connective – infrastructure, regenerating and strengthening the entire network of actors involved, from public to private, from local to global. In this case, we attribute to technology a proactive value, which stimulates the active involvement of citizens.

3
The Project of a Sensitive Mapping

Therefore, our project is a Sensitive Mapping project, which is not only a representational operation but also the analysis, the awareness and the translation of the knowledge layered over time within a territory and often implicit in the ecologies of the city. The shape of the territory is thus considered as an intermediate state, an emergent, ecological and in-progress asset. How can we represent, therefore, this instable territory?

Rethinking a mental and technical operation to map the space of the ecologies through a series of maps coinciding with the complexity of the metropolitan context is fundamental. The new map is a process. It is a morphogenetic process. So, detecting the elements of the complex context is the first act of mapping. Its aim is to determine the relations between the existing matter and the generative process; this is a cultural and not a material device. It is the meaning of the research answer that determines the final result of a map. This issue has to be revealed and brought to the user's attention leading to a greater appreciation and a deeper understanding of places through deep involvement on the part of citizens.

We, thus, presuppose the concept of 'information ecology' with which we will recover the deep meaning of two following words: o¿=ikoc, 'house' and -log'ia, 'study on'. In this way, also the information system conveyed by the new current digital technologies must be reduced to the broader issue of living, such as 'participatory and sustainable management' of places in which it was rooted, according to an integrated system perspective. Moreover, we present the concept of eco-pastoral landscape (Contin 2012) defined as the use of technology that allows us to return to ecological nature. In other words, it allows us to be shepherds again, but through a personal choice. In particular, technology is needed to live in balance with nature, so that we can become 'natural' again, using the necessary resources, through technological advances with all the limits and thresholds of a possible coexistence with nature.

We then need to build and represent an eco-pastoral landscape as a new kind of nature. We need to ally ourselves with the natural landscape, adjusting also our aesthetic tradition to our renewed environmental knowledge. All that is possible through new technologies.

The virtual and sensory information, the mapping process and the ways of translation and filtering of abstract data into images with a high value of involvement, require a limited use of resources and a low physical impact towards a spatial and economic sustainability. Instead we try to maximize interactive networks capable of promoting simulations and immersive experiences in relevant contexts – known and unknown, near and distant. Conceiving of these media, and of the mapping that their permit, as an extension to our body in time and space, we can reduce distances and effectively synchronize all the elements of a complex and dilated information apparatus. So we are able to represent through a synchronic map a diachronic reality – which was also the aim of ancient maps.

We intend to interpret, then, the entropy of all the territorial exchanges – such as a light infrastructure for the meta-city or as a tool for the upgrading and the transformation for the entire city – through a process related to the rediscovery of the deep memory of places and characters involved: a cognitive process related to the present condition, and a mapping in progress project as a projection of the implementation of its potential. We are thinking of a territory as a field of pressures and of a map like a weather report map.

Thus, we propose the construction of a 'sensitive reactive network of proactive nodes' into the metropolitan city, through the use of alternative mapping tools such

as augmented reality, GPS, embedded technologies, fast tracking systems. The reading levels of the city will be defined as follows:

- maps of forecasting;
- maps of field;
- immersive map / plural-sensorial map.

The goal is to find a suitable pattern to understand, conceptualize, design and represent the physical city, in other words, to define the characteristics of a 'structuring figure' of the city – the informal or neglected side of the metropolis mostly – through the use of interactive digital technologies.

Forecast Maps (scale 1:50000) Maps dedicated to the visitor interested in knowing a remote site and the catalysing presence of various natures surrounding it, via the Internet and from a laptop. These representations are intended to stimulate the interest and imagination of the user, without having seen the places (Atlas). These maps build a mental map of the spatial structure, assuming and sharing areas of interest and specific expectations, which the designer can incorporate into the programmatic systemic configuration of an event or a place. The activity environment is the user's own room and the device is a PC.

Field Maps (scale 1:5000) They are graphic diagrams showing the actual structure of urban spaces. The main value of this work will be identified in the translation of possible scenarios and the relationship between the urban biography, calendar of events of the city and visitor's interests, including places dedicated to characters/tonalities of the city representation or its potential future development: in this way, the event or the place builds the 'reverberating actions'. They are maps that will be used by those coming into the town in order to access places through a map that is clear in terms of connections and interesting nodes. The activity environment in this case will be a sustainable moving vehicle – such as train, bike, public sharing car, electric bus, metro –, the device is a smart-phone, an ePad, a tablet, etc.

Immersive Maps / Sensorial Maps (1:500) These maps are for those who will be physically in the place and will want to learn more about them by following physical paths designed according to the principles of accumulation and sensory integration. Through these maps it is possible to have an overview of the previous conditions of the project framework and its projections on the future city's life cycle. These maps represent the level where the city and city users relate with information flow, producing micro-urban prototypes – patterns – of transformation and regeneration, conceived as tactile and sensitive effect of these media on the body. Not only will one particular site will be closely involved with the project, but also a number of available unconscious spaces of the city – perhaps peripheral or peri-urban – will be affected by a renewal participative action with a performative and shared value, including also the use of organized and social networks.

4
New Maps: An Ontological Reversal

The opaque and untranslatable track of the singularity of each territory mapped and the *philìa* that it produces, face the *mathematization* of the *Euclidean* space: there is, then, related to the real places, something intangible that cannot be considered only as 'it is', but also as 'it would be' otherwise. The new maps are born from this inversion, this sudden ontological reversal. The fact is that the world can be seen and interpreted through new and different forms of hermeneutics, and, therefore, through configurations of elliptical meaning, inevitably. Ultimately, what emerges is not so much the security – and, in fact, the illusion – of a stable and accomplished foundation of the territory map, but the certainty of a 'having-to-understand' a metropolitan territory always open and renovated. It is a matter of fact that, beyond any 'subjective' and 'relativistic' perspective, the *dynamis* (Aristotle) is the original and further foundation that is before and beyond the *energheia* (Aristotle). Today, in fact, we are much more interested in the extreme possibility of thought – the more cruel and radical chance, the chance that exposes thought to the risk of a complete reversal of meaning and, therefore, displays in the same categories of thought, the insuperable limit which thought breaks again and again.

This 'intrinsic possibility' of reality shows the failure of an only objective thought; then, nobody can conceive the "truth" understood as a correspondence, as the '*adaequatio*' of reality to its representation. Therefore, the failure of a possible total representation of thought, its deconstruction and dismantling of its globalizing claims appear. The new map, then, is the symbol and the icon of an 'un-representable' matter that every representation guards inside. This is the meaning of our choice. A choice that requires the ability to feel both the appeal of 'nature', but being, however, in a space that has been defined and circumscribed by the objectifying and categorizing action of 'culture'. We deal, therefore, with orientation maps much more than with traditional topographical or itinerary maps. So we want to interpret and represent the development of the territory starting from initial data much more than the final result, the fixed portrait of it. Therefore, the structure of the map shape allows to answer to the variation of parameters in the territory, regardless of whether the reasons which determined them were unpredictable or pre-determined (Figs. 1 and 2).

5
The Projects of the Measure and Scale Laboratory of the Contemporary City

5.1
Smart Map: New Mapping for XXI Century Citizens

This is an applicative project done inside the High School of the Politecnico di Milano (ASP). After quite a long time spent in defining an original interpretation of