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**Roger Paez i Blanch**

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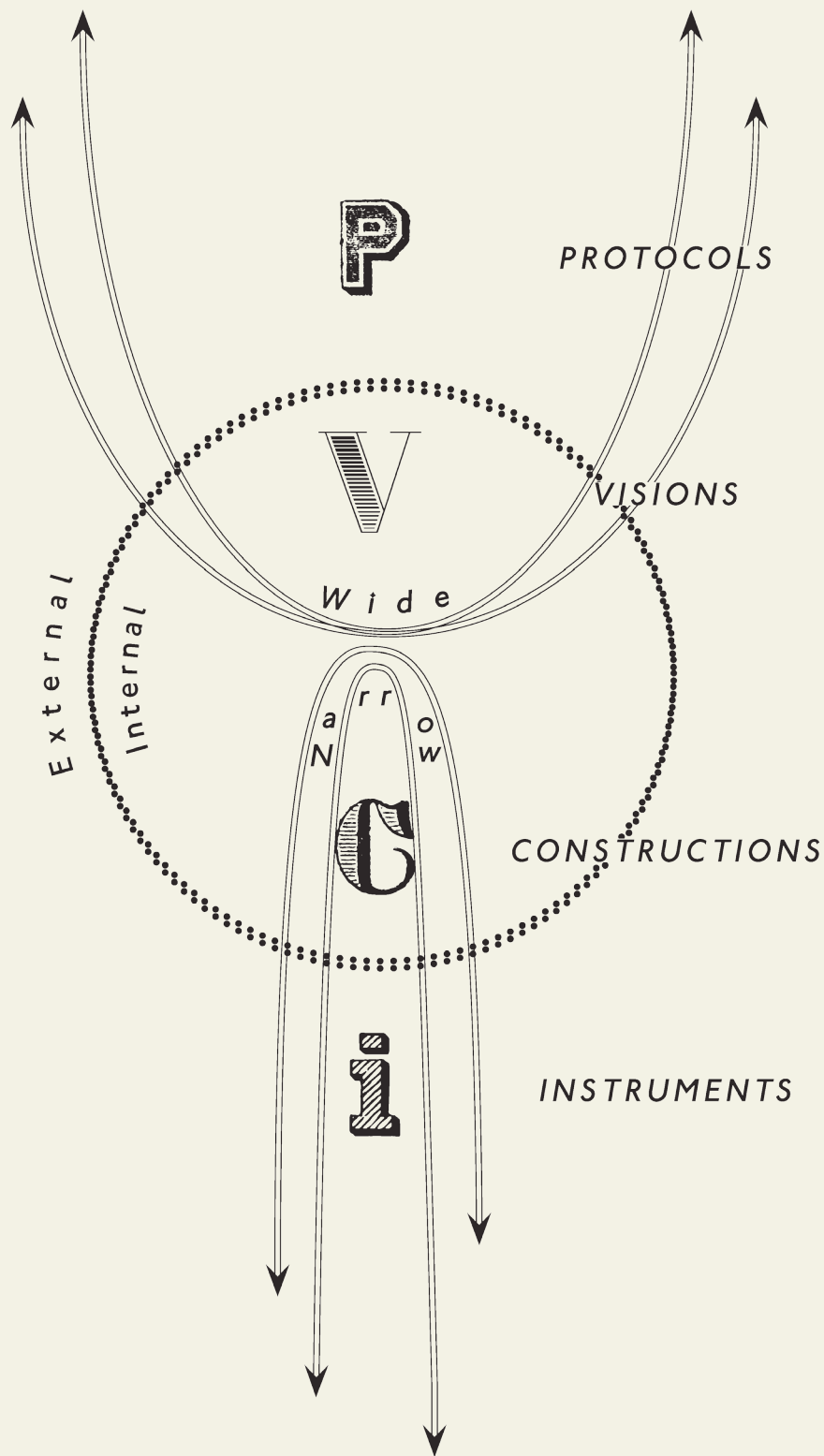
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# CARTOGRAFIA OPERATIVA

Usos del Mapa al Projecte Arquitectònic, 1982-2012

Roger Paez i Blanch

# **CARTOGRAFIA OPERATIVA**

**Usos del Mapa al Projecte Arquitectònic, 1982-2012**

## **TESI DOCTORAL**

Autor: Roger Paez i Blanch

Director: Dr. Iñaki Ábalos (ETSAM-UPM / Harvard GSD)

Co-director: Dr. Jaime Coll (ETSAB-UPC)

DEPARTAMENT DE PROJECTES ARQUITECTÒNICS  
ESCOLA TÈCNICA SUPERIOR D'ARQUITECTURA DE BARCELONA  
UNIVERSITAT POLITÈCNICA DE CATALUNYA

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## Resum

Vivim en un món complex. Ja fa temps que les grans certeses i les narracions que aquestes suporten s'han demostrat inadequades per accedir a la riquesa del món contemporani. No es tracta només de saber entendre el nostre entorn sinó, en igual mesura, de desenvolupar els marcs conceptuals i les eines que ens permetin transformar-lo. Les disciplines del projecte espacial, amb l'arquitectura al capdavant, juguen un paper fonamental en aquesta qüestió, ja que són agents actius tant en la interpretació com en la configuració de la realitat en la qual vivim.

Partint d'aquest interès, la tesi doctoral explora els usos crítics de la cartografia en l'àmbit del projecte arquitectònic, i proposa el concepte de *cartografia operativa* com a espina dorsal per ordenar el treball. En la seva definició més immediata possible, la cartografia operativa és la producció i utilització de mapes per ampliar la nostra concepció de la realitat i promoure'n la transformació. Aquest concepte parteix d'entendre la cartografia com una eina projectiva: els mapes no només informen sinó que sobretot proposen. La cartografia construeix la realitat de manera concreta i és, per tant, una disciplina propositiva i no pas simplement descriptiva.

El caràcter potencialment operatiu de la cartografia en el marc del projecte arquitectònic és clar. A partir de les construccions concretes de la realitat efectuades pel mapa, s'obren no només noves concepcions de la realitat cartografiada sinó també noves possibilitats per a transformar-la. Així doncs, la pràctica cartogràfica i el mapa com a document són eines amb un enorme poder per afectar els processos de projecte a través dels quals es transforma l'entorn dels homes.

La tesi estudia les diferents maneres a través de les quals s'estableixen relacions operatives entre la cartografia i el projecte arquitectònic, i delinea camins per explorar en profunditat aquesta relació. La primera part és la més especulativa: proposa i desenvolupa el concepte de cartografia operativa com un agent amb capacitat d'ampliar els objectius, mètodes i eines del projecte arquitectònic contemporani. La segona part, de caràcter expositiu, mostra que el mapa és un document ric i complex que ha estat incardinat culturalment des de posicions molt diferenciades. La tercera part, de to evocatiu, palesa que els mapes són una font inesgotable de riquesa interpretativa que van molt més enllà del que pretén la visió dominant de la cartografia, d'arrel científica i positivista. La quarta i última part és la més demostrativa. En primer lloc proposa una taxonomia dels modes d'operativitat cartogràfica en el projecte arquitectònic en el període 1982-2012, i després comprova la seva validesa i utilitat a través de l'estudi de vint-i-quatre projectes recents.

Els projectes estudiats parteixen d'un reconeixement projectiu de les condicions de l'entorn on es treballa. Des de sensibilitats arquitectòniques molt diverses, tots ells treballen simultàniament des del pragmatisme i la crítica, assumint la necessitat d'intervenir efectivament en la transformació de l'entorn a partir d'una comprensió d'allò existent, sense per això estar sotmès a la tirania del que (ja) és. A través del concepte i les pràctiques de cartografia operativa es poden construir ponts de diàleg entre allò existent i allò que encara no existeix, és a dir, el projecte. D'aquesta manera es fomenta una arquitectura inquieta i innovadora basada en l'ampliació tan efectiva com simbòlica de l'entorn.

L'objectiu principal d'aquesta tesi és aportar una contribució metodològica, tant conceptual com instrumental, als projectes arquitectònics. La tesi adopta una angulació pragmatista, que busca no només explicar el present sinó sobretot generar una caixa d'eines que permeti ampliar els objectius, les metodologies i els formats del projecte arquitectònic en el futur immediat.

## **Abstract:**

We live in a complex world. For some time, the great certainties and the narratives they support have been shown to be inadequate as an entryway into the richness of the contemporary world. It is not just a question of understanding the world around us, but also of developing the conceptual frameworks and the tools to help us transform it. Spatial design practices, with architecture at the head, play a fundamental role in this question, because they are active agents in both interpreting and shaping the reality we live in.

Based on that interest, this dissertation explores the critical uses of maps in architectural design, and it posits the concept of *operative cartography* as the backbone to structure the work. In its most immediate definition, operative cartography is the production and use of maps to broaden our conception of reality and to promote its transformation. The concept is founded on understanding maps as design tools: they don't just inform; they primarily propose. Maps construct reality in a particular way. As such, cartography is a propositional discipline, not a merely descriptive one.

The potentially operative nature of maps in architectural design is clear. The specific constructions of reality inherent in maps not only open up new conceptions of the reality being mapped; they also present new possibilities for a real transformation of the milieu. In this sense, mapping and maps are put forward as tools with an enormous power to affect the design processes that are used to transform our environment.

This dissertation studies the different kinds of operative relationships between maps and architectural design, and it outlines avenues for an in-depth exploration of this relationship. The first part is the most speculative: it introduces and develops the concept of operative cartography as an agent with the ability to expand on the objectives, methods and tools of contemporary architectural design. The second, more expository part shows that the map is a rich and complex document, which has been claimed culturally from contrasting positions. Part three, evocative in tone, makes it clear that maps are an endless source of interpretative richness that reach far beyond the dominant, scientific and positivist, vision of cartography. Finally, part four is the most demonstrative. First, it proposes a taxonomy of the areas and modes of cartographic operativity in architectural design during the period 1982-2012; then the validity and utility of that taxonomy is tested through the study of 24 recent designs.

The case studies begin with a projective survey of the conditions of the milieu subject to intervention. From different architectural sensitivities, they all work pragmatically and critically, acknowledging the need for an effective transformation of the milieu based on an understanding of pre-existing conditions, without being subject, however, to the tyranny of what already is. Based on the concept and practices of operative cartography, we can build bridges to create a dialog between what exists and what doesn't exist yet: in other words, design. This encourages an active and innovative architecture based on the effective and symbolic expansion of the milieu.

The main aim of this dissertation is to offer a methodological contribution to architectural design, both in conceptual and instrumental terms. The dissertation takes a pragmatist angle, which aims not only to discuss the present but, above all, to generate a toolbox to help expand on the objectives, methodologies and formats of architectural design in the immediate future.

## Resumen

Vivimos en un mundo complejo. Hace ya tiempo que las grandes certezas y las narraciones que estas soportan se han demostrado inadecuadas para acceder a la riqueza del mundo contemporáneo. No se trata sólo de saber entender nuestro entorno sino, en igual medida, de desarrollar los marcos conceptuales y las herramientas que nos permitan transformarlo. Las disciplinas del proyecto espacial, con la arquitectura a la cabeza, juegan un papel fundamental en esta cuestión, puesto que son agentes activos tanto en la interpretación como en la configuración de la realidad en la que vivimos.

Partiendo de este interés, la tesis doctoral explora los usos críticos de la cartografía en el ámbito del proyecto arquitectónico, y propone el concepto de cartografía operativa como espina dorsal para ordenar el trabajo. En su definición más inmediata posible, la cartografía operativa es la producción y utilización de mapas para ampliar nuestra concepción de la realidad y promover su transformación. Este concepto parte de entender la cartografía como una herramienta proyectiva: los mapas no sólo informan sino que sobre todo proponen. La cartografía construye la realidad de manera concreta y es, por lo tanto, una disciplina propositiva y no simplemente descriptiva.

El carácter potencialmente operativo de la cartografía en el marco del proyecto arquitectónico está claro: a partir de las construcciones concretas de la realidad efectuadas por el mapa, se abren no sólo nuevas concepciones de la realidad cartografiada sino también nuevas posibilidades para transformarla. Así pues, la práctica cartográfica y el mapa como documento son herramientas con un enorme poder para afectar a los procesos de proyecto a través de los cuales se transforma el entorno de los hombres.

La tesis estudia las diferentes maneras a través de las cuales se establecen relaciones operativas entre la cartografía y el proyecto arquitectónico, y delinea caminos para explorar en profundidad esta relación. La primera parte es la más especulativa: propone y desarrolla el concepto de cartografía operativa como un agente con capacidad de ampliar los objetivos, métodos y herramientas del proyecto arquitectónico contemporáneo. La segunda parte, de carácter expositivo, muestra que el mapa es un documento rico y complejo que ha sido incardinado culturalmente desde posiciones muy diferenciadas. La tercera parte, de tono evocativo, hace patente que los mapas son una fuente inagotable de riqueza interpretativa que van mucho más allá de lo que pretende la visión dominante de la cartografía, de raíz científica y positivista. La cuarta y última parte es la más demostrativa. En primer lugar propone una taxonomía de los modos de operatividad cartográfica en el proyecto arquitectónico en el periodo 1982-2012, y luego comprueba su validez y utilidad a través del estudio de veinticuatro proyectos recientes.

Los proyectos estudiados parten de un reconocimiento proyectivo de las condiciones del entorno donde se trabaja. Desde sensibilidades arquitectónicas muy diversas, todos ellos trabajan simultáneamente desde el pragmatismo y la crítica, asumiendo la necesidad de intervenir efectivamente en la transformación del entorno a partir de una comprensión de lo existente, sin por ello estar sometido a la tiranía de lo que (ya) es. A través del concepto y las prácticas de cartografía operativa se pueden construir puentes de diálogo entre lo existente y lo que aún no existe, es decir, el proyecto. De esta manera se fomenta una arquitectura inquieta e innovadora basada en la ampliación tanto efectiva como simbólica del entorno.

El objetivo principal de esta tesis es aportar una contribución metodológica, tanto conceptual como instrumental, a los proyectos arquitectónicos. La tesis adopta una angulación pragmatista, que busca no sólo explicar el presente sino sobre todo generar una caja de herramientas que permita ampliar los objetivos, las metodologías y los formatos del proyecto arquitectónico en el futuro inmediato.

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Els nivells de l'índex són referits al llarg de la tesi segons la nomenclatura d'importància decreixent següent:  
PART, CAPÍTOL, SECCIÓ, SUBSECCIÓ

## **CONCLUSIONS**

Throughout this dissertation, we have explored the relationship between maps and design from different angles and a variety of methodologies. The first part is the most speculative: it introduces and develops the concept of operative cartography as an agent with the ability to broaden the objectives, methods and tools of contemporary architectural design. The second, more expository, part shows that the map is a rich and complex document, which has been claimed culturally from contrasting positions. Part three, with a more evocative tone, makes it clear that maps are an endless source of interpretative richness. Finally, part four is the most demonstrative, and it formulates the different avenues of cartographic operativity in recent architectural design.

These conclusions will focus on part four, since that is where most of this dissertation's key premises are concentrated: first, it proposes a taxonomy of the areas and modes of cartographic operativity in architectural design during the period 1982-2012; then the validity and utility of this taxonomy is tested through the study of 24 recent designs.

The 24 case studies laid out in the preceding chapter are intended, first, to demonstrate the relevance of the taxonomy we have proposed. It follows that they should clearly present the differences between *vision-maps*, *construction-maps*, *protocol-maps* and *instrument-maps*. Second, the case studies are also meant to convey the wide variety of designs that each mode of operativity admits. Third, they are posited to raise a critical perspective on the taxonomy itself, which like any classificatory structure needs to be 'useful' rather than 'true'. The taxonomy we have proposed is not meant to generate essentialist classifications, but rather purely *operative* ones, and as such its value should not be judged in terms of truth, but in terms of agency. Our intention is not to define absolute and hermetic compartments, but rather to identify, with a certain degree of precision, poles and tendencies in the operativity of maps that contribute to expanding the scope of design. Finally, the modes of vision, construction, protocol, and instrument that we propose should help us interpret the past 30 years of architectural design culture from a new perspective while, above all, advancing new avenues for research in the immediate future.

The case studies were chosen following the criterion of clearly illustrating the *different types of operative relationships between map and design*. In this sense, we have tended to present cases that exemplify these logics in the clearest possible way. Most of the 500 plus projects in the initial research phase, among which these 24 were selected, are not as clear-cut; though that does not make them any less interesting. In addition to different operative *modes* (vision, construction, protocol and instrument) and the design *areas* where they are applied (conceptualization, resolution, communication), the different designs also exhibit varying *degrees of implication* with operative cartography. While in some cases the importance of

cartographic operations is fundamental, in other cases cartographic operativity is just *one* of the many horizons that serve to inform contemporary architectural design.

Finally, we should make it clear that the case studies were chosen with the aim of offering the fullest and most balanced vision possible of the many different architectural sensitivities—in building design as well as urban planning and landscape design—which make an operative use of maps as design tools. However, because the scope of our research had to be limited, it is worth pointing out that the final selection did leave out a large number of excellent designs. Many designers whose work is relevant in the field of operative cartography are not included in the final list.<sup>1</sup> Likewise, many interesting designs by architects whose other work does appear among the case studies could not be included.<sup>2</sup> This reflection is relevant before we move on to the conclusions, since we must also avoid confusing this series of case studies with the entire landscape of cartographic operativity in architectural design; nor should we make the mistake of extrapolating the characteristics of operative cartography in recent architectural practice as a whole based only on the observation of this one series of case studies.<sup>3</sup>

Despite this disclaimer, it is clear that, based on this dissertation—and especially the designs studied in part four—we can identify a series of recurrences, which we will present here as initial conclusions regarding cartographic operativity in architectural design from 1982 to 2012:

### **THE RELATIONSHIP BETWEEN OPERATIVE CARTOGRAPHY AND DIAGRAMMATIC PRACTICES**

The operative uses of maps in architectural design can be read in direct relationship to the increase in the use of diagrams, likely the most salient characteristic of academic architectural research over the past 15 years. Operative cartography as we have conceptualized it in this dissertation can be connected directly to the diagrammatic trend in architectural design.

The most characteristic aspects of diagrammatic practices can be summarized in three points:

- » Understanding and modeling reality diagrammatically; i.e., paying attention to relationships rather than formalizations; focusing on dynamics rather than on structures.
- » Using the generative capacity of the diagram, i.e., its double role as simultaneously descriptive (describing a behavior or a relationship) and projective (proposing a behavior or a relationship).

- » Understanding the diagram as a way of multiplying thought and action, giving rise to new types of architectural authorship where subjectivity is mediated by the diagram.

Operative cartography shares all of these characteristics, in addition to providing friction with the outside—an entirely necessary exteriority that counteracts the tendency toward introversion in architecture, reconnecting it with contemporaneity.

### **DISCIPLINARY INTEGRATION, BUILDING DESIGN/URBAN PLANNING/ LANDSCAPE DESIGN**

In recent years, research and practice focused on what we call operative cartography has been concentrated in the disciplinary areas of landscape architecture and planning, at the cost of architecture in the more traditional sense of building design.

This does not imply, however, that the use of operative cartography as a methodological approach is unsuited to building design. On the contrary, it simply means that because of the characteristics and, especially, the history of maps, they have been more immediately relatable to a territorial scale than an objectual scale. That being said, it is worth reflecting on the reasons for this tendency. In our opinion it responds, to characteristics inherent in the map and the nature of mapping:

- » Maps have historically favored the large territorial scale; as such, cartography already belonged to the methodological toolkits for working on a large scale—even if, until recently, it would have been limited to an analytical use based on a technical-positivist conception of cartography.
- » Maps offer a specific understanding of the reality subject to intervention; as such, maps are the preferred format for disciplines that don't take a blank drawing board as their starting point. The logic of building design—often excessively autonomous—has sometimes hindered the operative use of maps.
- » From another point of view, the prioritization of the critical use of maps in landscape architecture and urban planning also responds to conditions in the evolution of architecture understood in the broadest sense, which has tended toward an integration of the three disciplinary spheres. Relevant aspects of that evolution include:
  - » The crisis of conventional architecture as a discipline with real agency over contemporary reality. Specifically, the objectual quality of architecture and its insistence on strictly morphological questions entered into a state of crisis in relation to the late-capitalist narrative and reality of economic globalization, with its prioritization of flows. A number of architectural movements in the late-1970s and mid-1980s made

an enormous effort to locate the validity of architecture in the problem of meaning—what Rem Koolhaas very eloquently characterized as the “semantic nightmare”. After a series of ‘-isms’, the avant-garde positions shifted their focus toward procedural, programmatic, strategic and tactical logics, which obstruct the pre-eminence of objectuality from the outset, in favor of performativity.

- » The development of landscape architecture as a discipline in its own right. This implied a redefinition of the disciplinary limits of architecture on both an academic and a professional level. Landscape architecture departments, freed from most of the cultural and procedural baggage that weighed down conventional architecture, emerged as active research centers with a growing relevance in the classical discipline of architecture (building-oriented and objectual). This led to positing landscape as the new front line for renewing the conceptual and operative tools of architecture and urban planning. The competition for the Parc de la Villette, which we pinpoint as the beginning of an era, is the visible trigger for the emergence of this underlying tendency. This renewed interest in landscape among architects was the starting point for the coalescence of a real disciplinary integration of architecture as a whole: building, planning and landscape.

### **MULTISCALARITY, RELATIONALITY AND TEMPORALITY**

Properly used, maps become a compelling format for dealing with aspects of reality that are difficult to approach using the classical tools of architectural design. Maps let us approach design in procedural and performative terms, which opens it up in a more immediate way to a contemporary reality that is ‘in flux’. We would underscore three especially significant areas of contemporary architectural design that are *derived* from the exploration of the operative qualities of maps:

- » Multi-scalarity: the map’s plane of consistency allows for incorporating—both conceptually and instrumentally—the intrinsic multi-scalarity of any design, which the division of spatial design practices into different sub-disciplines undermines (§ Allen-Hacker, Busquets, Miralles, Easterling, Holl).
- » Relationality: the indexality of maps lets us understand architectural design in terms of establishing relationships between different elements, conditions or agents; those relationships are as meaningful, or more so, than the intrinsic qualities of the elements involved (§ Tschumi, Ito, Libeskind, FOA, OMA).
- » Temporality: the performative quality of maps, derived from their nature as an open format with multiple entryways, which can be continually updated, reread and reused,



encourages the inclusion of a time-based vector in design, and allows for exploring a reality that is in a constant state of change (§ Allen, Eisenman, Chora, Mosbach-Rahm, Corner).

The incorporation of the temporal vector, along with multi-scalarity and the relational logic, have a profound impact on architectural design's *objectives*, as well as its *methodologies* and its *formats*.

## **NEW DESIGN OBJECTIVES**

Architectural design's objectives have undergone a significant expansion as a result of the incorporation of operative cartography into design processes. The issues architectural design can approach and the questions it aims to answer have been progressively broadened in scope drawing from the map's inherent capacities—such as generating a consistent environment where everything enters into relation with everything else, or the oriented recording of certain aspects of the reality that is subject to intervention. New design objectives that have been explored, even if only incipiently, over the past 30 years include:

- » Enabling design, which focuses on promoting, encouraging or enabling rather than resolving—logistic landscapes, infrastructural urbanism, appropriable spaces, structures activated through use, etc. The space of organization, a performative space for activity that takes place over time, is added to the architect's arsenal, which is no longer limited to the space of a static and representative object (§ Ito, Allen, Mansilla-Viu, OMA, Corner).
- » Strategic design, where architectural design decisions are not based on specific determinations, but rather on lines of action that are directed and focused yet remain open. Given certain levels of complexity, the objective of the design can no longer be limited to the specific and closed-off definition of a structure. Strategic design allows for maintaining the relevance and transformative capacity of architecture, by redefining its objectives and adapting its decision-making systems (§ Branzi, Tschumi, Murado-Elvira, Chora, Busquets).
- » Tactical design is based on a survey of conditions, a development of various solutions—catalogs of solutions, prototypologies, catalysts, etc.—and a tactical implementation of these solutions in a field that has been surveyed beforehand. The conventional objectives of architectural design are adapted through a flexible and nimble perspective on the reality subject to intervention, and the results are maximized based on the use of a relatively limited palette of specific options in a very precise and directed way (§ FOA, Ahylo, Herzog & de Meuron, Sanaa, Miralles).
- » Activist design transforms activist criticism into architectural design, overcoming the negativity of conventional criticism and endowing it with a positive and anticipatory

character. These designs often involve indirect proposals, based on denouncing certain undesirable conditions or revealing certain possibilities for reshaping the architectural terrain. If there is a specific solution offered, it is usually understood in terms of the exemplification of new possibilities; promoting those possibilities is the design's real aim (§ Hacker-Allen, Easterling, OPSYS, Desvigne, Ábalos-Sentkiewicz).

## **NEW DESIGN METHODOLOGIES**

The progressive inclusion of operative cartography in the toolbox of contemporary design has led to new processes and new working methodologies, including the following:

- » The incorporation of heteronomic narratives into architectural design, which allow for connecting design with logics that are external to conventional architectural discipline—such as, for example, globalization, energy, history, or the text (§ Allen-Hacker, OPSYS, Eisenman, Libeskind).
- » The protocolization of a specific aspect of reality that is transformed through design, such as, for example, thermodynamic somatisms which allow for informing a design morphologically based on energetic-climatic parameters (§ Mosbach-Rahm, Ábalos-Sentkiewicz) or relational topography that connects the surface configuration with the organization of the flows of water, circulations or program (§ Desvigne, Corner).
- » The application of advanced computer technologies to simulate behaviors in a given (existing or designed) environment, providing for the emergence of self-organizing patterns, exploring form-finding logics, or establishing feedback loops between proposal and a register of its effects, which allow for working dynamically as opposed to taking a finalistic approach (§ FOA, Ábalos-Sentkiewicz, Ahylo).
- » The exploration of methodologies derived from game theory in architectural design—which promote an active and performative understanding of the existing dynamics in a specific place—encourages negotiation as a way of approaching solutions and, above all, allows for incorporating chance—thus avoiding the over-determination that often plagues both conventional and experimental design processes (§ Allen, Murado-Elvira, Chora, Corner).

## **NEW DESIGN FORMATS**

Operative cartography allows for proposing new criteria of rigor and exploring new working formats in architectural design. Rigor is an index of the degree of correspondence, coincidence or conformity between a result and its objective, and in contemporary archi-

ecture it can no longer be strictly associated with the metric and positive precision of classical mathematical tradition. Maps, when used critically, open up new ranges of measurable qualities. In addition, they also bring out qualities that cannot be measured, but which can be qualified and are thus conceivable, relatable, comparable and operable. These new criteria of rigor provide access to new working formats and design formats. Some new working formats in architectural design include the following:

- » Imagery: design formats based on generating an imagery that transforms the perception of a particular issue in architecture. The value of the image in this case is not mimetic-representative, but rather symbolic-foundational, since it is meant to unlock new design territories.
- » Remote control: design formats that embrace the impossibility of total control and which propose systems for management or 'soft' control, as opposed to the strict control of decisions, processes and results in architectural design.
- » Open solutions: formats that acknowledge the validity of architectural solutions that are not determined in a clear-cut and closed-off way. This format can range from the case of multiple architectural solutions responding to the same design brief, to solutions that vary in keeping with the specific actualization of a design understood as an open protocol.
- » Emergence: working formats based on activating self-organization in the design process and exploring emerging solutions. Emergence refers to processes by virtue of which interactions between simple entities generate larger entities, patterns and regularities that are not present in the former. From this point of view, a design solution is not imposed from the top down; rather, multiple possible solutions appear as the result of a process of interaction.
- » Form-finding: working formats that are based on the precise definition of a morphology so that it responds to certain pre-defined conditions, often associated with a desired behavior. This approach allows for thinking about form as the result of an iterative process aimed at reaching a specific performativity, as opposed to understanding it as a mere morphological a priori.
- » Mediation: working formats based on mediation systems between designer and design—maps, diagrams, scores, scripts, scenarios, spatial formats, protocols—abstract intermediaries that operatively inform the designers' decision-making process by mediating between reality and the intent to transform it through architecture.

- » Negotiation: dialogic and choral working formats, which involve multiple agents in a consistent format that helps bring them into an operative relationship. Negotiation formats extend far beyond the search for consensus or the politically correct myth of participation, and they open up a new decision-making front rooted in a plural subjectivity.

## **NEW AUTHORSHIPS**

The association of new objectives, new methods and new working formats generates new decision-making systems in architectural design and, therefore, new authorships. Cartographic operativity, among many other elements, encourages the emergence of these new forms of authorship: collaborative frameworks involving multiple agents; fuzzy authorship; the architect-mediator; or the master of ceremonies—a conductor of irreducible processes. These new ways of becoming an author progressively generate what we might call the *augmented architect*, i.e., a figure that expands on the architect's conventional authorship through an enhancement of his or her performative capacities based on the incorporation of new conceptual, methodological and technological devices, including operative cartography.

This is, in our opinion, a question of fundamental importance, since the augmented architect lets us imagine overcoming conventional architectural authorship (limited by the abilities of an autocratic subject), through a new form of *augmented subjectivity*, which does not curtail decision-making ability, but rather maintains and even expands on it—i.e., an author who can *take a stance* and make the leap that redirects reality through the exquisite *violence* of “subjectivity”, without which, at least up to now, any truly creative project cannot be possible.

## **PROJECTIVE SURVEY**

Finally, operative cartography has implied a giant leap forward for contemporary architectural design, by incorporating a projective survey of the surrounding conditions of the milieu subject to intervention. As we pointed out in the Introduction, operative cartography overcomes the analytical and strictly instrumental approaches of maps from the past, opening up the possibility of working both pragmatically and critically, acknowledging the need for an effective transformation of the milieu based on an understanding of pre-existing conditions, without being subject, however, to the tyranny of what already is.

The case studies in this dissertation reveal multiple manners of activating this projective survey through operative cartography: Hacker-Allen explore conditions of globality, Her-

zog & de Meuron obsolescence, Branzi extension, Easterling legality, Busquets continuity, OPSYS infrastructure, Tschumi sequence, Eisenman history, Libeskind memory, Holl regulations, Miralles orogenesis, Desvigne orography, Ito simultaneity, Allen logistics, Murado-Elvira opportunity, Mansilla-Viu connectivity, Chora negotiation, Mosbach-Rahm metabolism, OMA complexity, FOA propensity, Corner temporality, Sanaa topography, Ábalos-Sentkiewicz thermodynamics and Ahylo self-organization.

We believe that the attitude of exploration combined with the refusal to submit to reality—the reality constructed specifically through the map—demonstrated by all of the case studies, is a hugely relevant design avenue, since it encourages an active and innovative architecture based on the effective and symbolic expansion of the milieu.

The conclusions summarized in these eight points not only demonstrate the richness of the relationship between map and design as it has been put into practice over the past 30 years; in addition—and more importantly, in our view—they open up *new paths* for a continuing exploration of cartographic operativity in architectural design in the immediate future. Beyond the professional practice that is the focus of the last part of this dissertation, exemplified in the 24 case studies, we should not forget that the academic world has been, still is, and certainly will continue to be an especially rich domain for the exploration of cartographic operativity. Moreover, it is often the case that minor, incipient practices, which have yet to be consolidated, end up taking on fundamental importance as research laboratories—in that sense, we should keep a watchful eye on forums that sit on the outskirts of the established professional circuit and prestigious academic circles. In any case, be it in a professional, academic, activist, artistic, or any other context, it is through research and experimentation that new paths for operative cartography in the architectural design of tomorrow will be tested out and defined. We hope that the work included in these pages will be of use as we all travel down that fascinating path.

## Notes

- 1 For example, to name only a few: Ishigami, Solà-Morales, Mathur-da Cunha, Vignanò-Secchi, ARO, Stoss, Smets, NoMAD, R&Sie(n), a/Um studio, Fujimoto or Lacaton-Vassal.
- 2 For example, to name only a few: Chartres, Downsvew Park, Le Fresnoy (Tschumi), Seattle, Downsvew Park (Corner); La Gavia, Parc dels Auditoris (FOA); Tours, Derendorf, Banyoles (Eisenman); Arnhem, Templehof (Chora); Borghetto Flaminio, Dresden, Bremenhaven (Miralles).
- 3 For instance, looking only at the 24 case studies most of the ‘constructions’ are from the 1980s, whereas most of the ‘instruments’ date from the 2000s; most of the ‘protocols’ are large-scale designs; and most of the ‘visions’ are European projects. Obviously, that is not necessarily the case in the panorama as a whole.

**TESI DOCTORAL**

Autor: Roger Paez i Blanch

Director: Dr. Iñaki Ábalos (ETSAM-UPM / Harvard GSD)

Co-director: Dr. Jaime Coll (ETSAB-UPC)

DEPARTAMENT DE PROJECTES ARQUITECTÒNICS  
ESCOLA TÈCNICA SUPERIOR D'ARQUITECTURA DE BARCELONA  
UNIVERSITAT POLITÈCNICA DE CATALUNYA

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