

# RESPONSIVE PROTOTYPES: URBAN MACHINES AS A FRAMEWORK FOR THE DIGITAL CITY

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**Abstract.** The aim of this paper is to provide a conceptual understanding of the production of machines/devices in relation to technology and urban environment in order to offer an operative framework to position these types of interventions in our contemporary design practice. These types of systems are inherently spatial. They represent for architects and designers one mode of operating in the urban context as they provide a critical form of inquiry to speculate on the future of cities and urbanism.

## 1. The notion of MACHINE

As a common assumption, Device can be defined as an apparatus, instrument or tool designed for a specific purpose. Devices perform, inform and continually transform the environment and our perception. Devices manipulate data by seeking performative spatial relationships. Spatial conditions are altered by actions and reactions expressed by devices that mediate sensory experiences. With similar assumptions, we can define Machine for its inherent meaning of being a system of devices able to communicate and perform within a certain environment . Machines imply the notion of “something that has been constructed” and “ function with a specific purpose” while being composed by parts that respond to a “ functioning wholesystem”.

### 1.1 WHY THE CITY AS CONTEXT

In architectural discourse, machines became relevant for their transformative nature and their capacity to convert matter into other visible or invisible matter. Why are they also relevant to the urban scale? While during modernism the city was structured based on replication of coherent

forms and divided into functional pockets, contemporary urbanism is more complex. The contemporary city is positioned between complexity and immediacy<sup>1</sup>. Machines for their nature are “sensitive “ to respond to contemporary urban categories and can be instruments of inquiry and production within cities.



Figure 1. CJ Lim, *Devices* (Architectural Press, 2006), p.14.

## 1.2. TECHNOLOGY : INFORMATION + MATTER

Technology is a linkage able to set up new rules for communication between man and matter . Emergent technologies has brought into question the role of the material city in representing the public and collective experience of urban space.<sup>2</sup> Information and matter, code and space collapse into a new system and mediated spaces become an architectural problem.<sup>3</sup> In this new paradigm, the role of machines intended as a set of devices becomes relevant to the experience of urban spaces.

## 2. URBAN MACHINES as SYNTHESIS

From the conceptual context provided above, where machine, city and technology assume their own meaning, how can we define Urban Machines? They could be defined as objects of various scale where the notion of machine (or set of devices) in relation to the city is mediated through technology. They are objects designed to respond to specific urban conditions and are part of the city and perform within the city. In this framework, the role of the architect and designer becomes important in understanding how these machines can be designed to promote and question the relation between city , technology and the human scale. They create and manipulate the environment providing a context to question how space is produced. In *Urban Machines*, matter is associated with information to become a living organism and transgress conventional norms of urban behaviors and patterns. Cj Lim, in his book “*Devices*” argues: “Can a technological or abstract understanding of these devices and their construction influence and redefine the potential for architecture and spatial thinking? ”.

They are deployed as a system that mediate between the human scale and the specific environment where they are located. Urban Machines have the potential to generate a new type of permanent or temporal urban geography as they operate as large scale device/plug-in systems. How those machines could help to intensify the interaction between urban space, people, everyday objects, architecture, media devices and urban networks? How Urban Machines behave?

### 2.1 SCALE: MACHINE / CITY / BODY

Urban Machines are spatial. They are not intended as forms of small scale/portable devices. They perform to exchange information between people, the public realm and city. What type of space do they produce? As the city is more and more produced through entropic processes, urban machine operates as a Synthetic System determined by the recombination of multiple parameters into one performative spatial form. What could be argued, it is their capacity to embed spatial parameters in their mode being situated between the environment and the human scale. Similar considerations regarding the relation between the body, space and machinic devices can be found in the work of Rebecca Horn and Jean Tinguely (fig.2). Both artists explores the notion of incorporations at various scale of the mechanical and technological system as a prototypical form that mediates between body and space.

In a similar way, in *Understanding Media: The Extensions of Man*, McLuhan argues that the capability of the body increases as it is extended through technology. “This is merely to say that the personal and social consequences of any medium –that is of any extension of ourselves – result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology”.

Urban Machines affect urban patterns and urban life due to their contamination in the City. The city is already a complex interlacement of machines of different forms and digital infrastructure is now ubiquitous. Because of this, a machine performs differently based on how and where it is Situated and its Scale in the environment. Context refers to the enviro-spatial relationship the machine expresses, specifically the manner in which the context directly influences interaction and behaviors. Issues of scale in that contextual relationship are dependent on human interactions and in particular in relations to the body. What type of urban model do they generate? How do they affect the urban patterns? How can we design these types of machines? What is their role in our design culture?



*Figure 2. Rebecca Horn and Jean Tinguely, Body and Spatial Machines*

### 3. URBAN MACHINES: AN OPERATIVE FRAMEWORK

Before defining the operative framework, we can trace back in history few examples of visionaries urban machines that pushed the notion of urban imaginary (fig.3). In 1964 Cedric Price conceived the Fun Palace as a hybrid system that resided somewhere between a participatory space and a unfinished infrastructure. As a provocation, the Fun Palace was envisioned

as a large performative machine where architecture enabled the users to reconfigure modes of occupation.

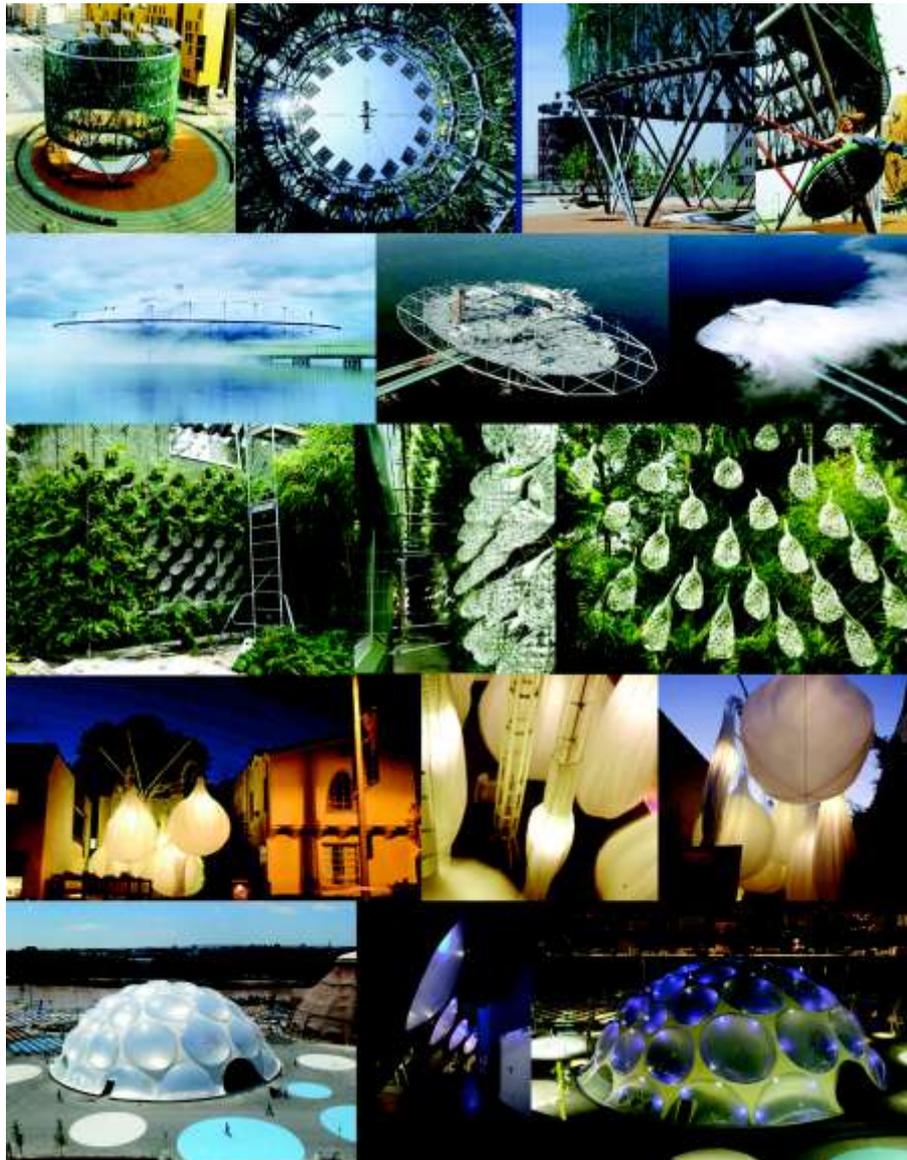


Figure 3. Archigram, Walking City, 1964; Cedric Price, The Fun Palace, 1964; Toyo Ito, Tower of Winds, 1986.

Provisional space, the endless process of construction, the dismantling and reassembly was the machine-like system. The inhabitants had to adapt and change because of its incompleteness. The Fun Palace was conceived more as an instrument rather than a building.

At the same time, Archigram's Walking City was designed as complex macro-system, macro-machine that had the vision to absorb the city and transform it into an adaptive and dynamic living being. Devices with a specific purpose were synthesized into a "walking animal" to provide an alternative model of living. With similar parameters, Toyo Ito's Tower of Winds is a machinic urban icon that behaves as public symbol to respond to the changing condition of the nearby underground train station.

Following similar narratives, there are many other more recent projects that could be described as prototypical example to expand on the argument but this is not the point of this section. The aim is to describe overarching principles to address a conceptual and operative framework to situate those types of machines (fig.4). Because of their nature of being mix-hybrid spatial functioning systems operating in the city and public realm, they cannot be categorized with one single definition. They exist right at the intersection of what could be considered architecture, urban design, art, product design and interaction design. They are a direct byproduct of the entropic condition of contemporary cities.



*Figure 4.* Ecosistema Urbano, Air Tree; Diller Scofidio + Renfro, Blur; R&Sei(n), Hydroponic System; FoxLin, Bubbles; Eric Ruiz-Geli, Expo Zaragoza.

In a recent interview on the Melbourne radio show “The Architects”, Bernard Tschumi argues: “Architecture is a form of communication.... of knowledge. Architecture is a way to understand our world , and also possibly to have some effect on it. It doesn’t have to necessarily be through building – It has to do with the idea that involve our immediate environment, our physical space. Any way to use that physical environment, that architecture context, as a means of discuss issues I think is very appropriate“.

My intention is to conclude providing an operative framework that aims to speculate on common categories shared by contemporary forms of Urban Machines. Thus the following conceptual context represents possible overarching principles to position these types of interventions. This is not a conclusive statement nor a final thesis but an open matrix of operative categories to foster further inquiries and investigations.

1. **AFFIRMATION and APPROPRIATION OF THE CITY:** These types of interventions, either permanent or temporary, are symptoms of an alternative understanding of urban planning. The development of urban forms is not only developed by the government or economy but urban machines appropriate the city by subverting the traditional order of urban processes and questioning the culture of planning by giving an alternative form of urban occupation.

2. **PROTOTYPICAL.** Urban Machines could be considered “intrusions” mostly deployed in public space that seek to make alternatives evident. As a prototype, they are able to demonstrate a system of relationships. Because of their prototypical nature, they are relevant to the urban space as modes of re-thinking the specific urban conditions and the public response.

3. **HYBRID SYSTEMS.** They emphasize hybridity over mono-functionality. Environment, space, technology and forms of use are intertwined to produce an object that encourages new modes of urbanity. It is a space environment where multiple conditions exist simultaneously. Urban Machines promotes mix and continuous hybridization and exchange between the city, the space where they are situated, technology and the human being.

4. **SPACES FOR ACTION.** Urban Machines are systems able to extend material space into spaces for action. Action is a generating mechanism to express form and space. We could argue that an inherent characteristic of urban machine is their relational nature and the ability to set up a public system for inter-actions and events to occur.

5. **GENERATIVE and CATALYTIC:** Urban Machines can be the accelerator of other and multiple urban operations. They are dynamic agents able to influence urban configurations and narratives yet to come. The above operative framework attempts to provide shared conditions for the deployment of urban machines in contemporary cities with the aim of setting up parameters for our design practice. This is not an attempt to state a manifesto but, on the contrary, it is a mode to provide critical categories of inquiry. The debate and discussion is open and this paper is a base for further and future research.

## ENDNOTES

1. MARIA LUISA PALUMBO, *Electronic Bodies and Architectural Disorders*, p.31 (Birkhauser, 2000).
2. CHRISTINE BOYER, *Cyber Cities* (Princeton Architectural Press, 1996).
3. LEV MANOVICH, *The Language of New Media* (MIT Press, 2002).
4. CJ LIM, *DEVICES* (Architectural Press, 2006).

5. MARSHALL MCLUHAN, *Understanding Media: The Extensions of Man* , p. 19 (Ginko Press, 2003).
6. BERNARD TSCHUMI interview on the Melbourne radio show *The Architect on “Sentient City”* edited by Mark Shepard ( MIT Press, 2011).