

Virtual Museum as a New Reality: The Case of the “Paper Architectures” Rebuild

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The will to experiment architectural design processes on a virtual space is the main feature of this project; in this case the typology of museums has been adopted to investigate the potential of virtual reality on architectural visualization. Its particle structure allows to host a multitude of different collections (3D digital arts, 3D model reconstructions...) and each one of them can be modified or increased during time thank to the flexibility and dynamic state of the museum. It could be seen as a “never-ending” project, or a continuously growing museum. In this contribution it will be presented the first collection prototype, created from the tridimensional reconstruction of some of, as they’re called, visionary architectures: it’s a selection of works, from 19th century to today, born “on paper” and never built. The aim of the first collection project is to experiment a different kind of approach in the field of historical “paper architectures”, trying to increase their value and their suggestive nature and sharing it through the museum structure. Basically the project gives this works the third dimension and through augmented reality allows them to be explored as a building inside a virtual world in which they don’t have to deal with technical issues, and in which creativity can take place as in their authors’ mind.

Key words:

Virtual Museum; Augmented Reality; Visionary Architectures.

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INTRODUCTION

The project of a virtual museum arises from the desire to experiment architectural design inside a non-physical dimension, compared to the one in which it is used to take place: a dimension completely free from any space-time connection and any gravitational reference. The following text will try to provide all the tools to understand the project and its conceptual evolution; in particular, it will try to explain the concept of virtuality and its possible application in the architectural field. Specifically the first section will deal with the analogical-digital-virtual trivium with the purpose to clarify and investigate their nature, the various historical and evolutionary steps between the terms and what kind of relationship there is between them. Then we will try to compare them in the field of representation and in particular in the architectural one, to evaluate, therefore, how the analogical-digital and digital-virtual passages have influenced and changed not only the way of representing and communicating architecture, but also its own design. The second section, in fact, is configured as a real immersion inside the project concept. Fundamentally the research, in this part, aims to finally define the field of investigation and the “place” of the project, to unveil the essential variables, trying to understand, under the light of the considerations made, if it is possible to insert an architectural project inside the “virtual space” or better, if it is possible to design architecture following the virtual reality rules.

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ARCHITECTURE AND DIGITALISM

Digital language has presented itself not as an unexpected guest, but as an answer to certain needs, primarily as a technical solution and as a “representation” of an analogical content. If initially the content was information or a message, slowly the possibilities of variation were extended to innumerable fields of application; digitalism has effectively changed most analog systems. This renovation has made a real change, speeding up and multiplying the way of representing and communicating a content; these changes have obviously affected architecture which lives also of representation (a technical drawing, rendering) and that has faced the possibility of using a new tool, the computer, and a new language, the binary system, to express itself.

Trough a classification [Purini et al. 2003] according to the scope of use, it is possible to understand clearer the connection between architecture and the new digital tools, and how and for what purpose, computer and its language has been exploited by several authors in the recent history of architecture.

The first area can be defined as "instrumental": a series of difficult technical problems found an easier solution in the use of computers. The *Guggenheim Museum* by Frank Gehry in Bilbao (1997) [Genovese 2005] is an architecture born from a “traditional” design that has found later in the digital world: the way to decline through calculation software, the complexity of the surfaces shaped by the architect. In this case the computer is used as a tool and an empowerment and as a technical solution; thus the computer appears later, when the general configuration of the building has already been defined. We can consider that in this example digital tools are not really “organic” to the conception of the architecture.

The second area is the "creative" one, in which there is a definitive eclipse of the “architectural weight” in favor of a continuous construction based on surfaces that meet and interlock; a dimension in which it is no longer possible to distinguish vertical or horizontal support, as in the experiments of Greg Lynn [Genovese 2005]. In this pure digital dimension there is an absolute continuity of the space, a total unity of forms that flow inside these projects almost in the liquid state; such images are quiet difficult to see, their narrative dimension becomes discontinuous and definitely impervious to the observer. In this field the work of Peter Eisenman [1992] is an interesting example. According to some interpretations [Genovese 2005] it is possible to state how deconstructivism has in some way preceeded the more recent Cyber-architecture, considering as points of encounter the use of unconventional geometries, expanding the concept of form, and a visible separation of the binomial architecture/function that has always characterized the design. It is certainly impossible to list a series of authors who evidently marked the transition between these two currents but Eisenman certainly played an important role in defining the computer-architect relationship.

The last field of digital use, which concludes this classification, is the "utopian" one in which digital leaves any kind of references to the world of physical forms to become pure immateriality. In this context all digital resources are exploited in the most complete and extreme way, showing “worlds” that are better to imagine than to describe. Marcus Novak [Genovese 2005] shows his relationship with the computer and the digital world through an exclusively theoretical work of pure formalism; his works embody the extreme side of the possibilities of computers, creating non-places, in which there is a complete loss of reality, opening a totally self-referential world, without physics.

“Architecture today is negatively affected by the cultural climate of a society filled by images. These arise from an informational desire, but in the end, an excess of information destroys communication, which would need less data and more concepts.” [Leach 1999]

We can obviously agree or not with Leach’s words, but is quiet certain that our ability to absorb images (informations) is not infinite, our attention, our curiosity, are selective, are sharpened according to intensity and stimulation frequency.

ARCHITECTURE AND VIRTUAL REALITY

As we have seen, digitalism has really changed the method of translating and communicating an analogue image (drawing); the introduction of the virtual tool has meant an extension of representation boundaries not only in the way it looks but also in its content [Unali 2001]. That is because the computerization and the evolution of the processing software has increased the possibilities of experimentation in the graphic field, above all by introducing modeling software that allows a graphic representation of objects inside the

three-dimensional space. Inside the architectural field, the introduction of this tool has definitely facilitated the creative designer process which can not only see, but also pre-view the outcome of the architecture, being able to correct and notice details that sometimes emerge only during the construction phase. Even if it seems easy to define, the virtual world does not expire its strength through modelling software; we should probably ask ourselves what does it actually mean creating a virtual model of something. According to Pierre Levy [2001] the virtualization process consists in the passage between actual and virtual, from what is real to what it could be; it is a kind of process through which we can improve the quality of questions that we can have on something, it is the discovering of a new dimension, a new existential dimension, in which something (an object, a drawing, an architecture) can "live" or actually exist. The words of the Levy [2001] explain how speaking about virtual reality needs not only a technical support, but also a new level of perception, a new way of understanding, because this new dimension dates back, as he said, to a «further problematic field» [Levy 2001] in which there are no "right" answers, no physical rules or designed tools to refer to. Practically, still according to Levy's thought, through the creation of a virtual architectural model it is possible to obtain more information about the project, discovering hidden details, imperfect corners, because basically we ask ourselves more questions about the object we are transforming into a 3D model. In this way all the collected answers, all those information, become important for the success and improvement of the project. We could say that virtualization becomes an "assembly and re-assembly" process in which the "virtualizer" learns and sees all the stratifications and details of the project itself.

Some "creative" examples, in the sense that through virtual and modeling software a perfect ground is found for their imagination, are those of Marcus Pasing, Greg Lynn and Makoto Sei Watanabe [Genovese 2005]; in these cases the boundary between architecture and visual art becomes subtle, showing themselves as creative exercises of pure formalism.

Das Letzte Haus by Pasing [Genovese 2005] shows an exasperated use of the technique of morphing, in which a human skull is transformed into architecture. Greg Lynn continues the belief of Eisenman, in an attempt to give a definition of virtuality through architecture; his architecture born actually from the virtual dimension. So for Lynn, as it was for Eisenman, the computer is not just a tool but a "creative machine". In his projects, there is a loss of the formal recognizability of the architectural project: dematerialization and temporary mobility, become key words for understanding this project. However, Lynn does not forget the lesson of architecture achieved and achievable, so beyond the visionary experiments mentioned above, he continues to defend man as his last architect. Makoto Sei Watanabe [Migayrou and Brayer 2001], who closes this series of examples, is perhaps the one who holds the most "extreme" position; *The Induction Cities* is a self-generating project of an urban settlement through a reversal urban design processes. He draws a mechanism to generate results. The process is a "design without design".

After all these examples, we can ask ourselves if it is still possible to talk about "built architecture" as the only place where the "space of perception" experience is possible, considering that the term "virtual reality" is starting to take hold in the architectural field. However even if the virtual reality potential is undoubted, there is always a right measure to use it, especially considering how architecture actually lives on material, perception not only visual but also tactile.

THE PROJECT

From this short list of examples, it is possible to say that the designer, in the virtual world, is no longer just a creator of "spaces", but a designer of experience. Designing virtual architecture means designing the experience of virtual architecture; precisely because of the nature of virtuality as an event, as a situation the user interacts with. [Unali 2001]

Whether we agree or disagree with the various positions about virtuality as a new fundamental tool for architecture, the essential lesson remains that there is no correct application of the virtual tool because its use depends everytime on the personal vision of "architecture" owned by the designer. It may seem simplistic to put the question in these terms, anyway the use of a tool, a technique, remains closely linked to the will of the one is using it: designers can choose to get lost in the absolute freedom provided from the virtual dimension or to use this tool in a functional way when any other instrument fails.

The idea of a virtual museum was born precisely from the desire to experiment architectural design inside a virtual dimension; an experiment of which there were no prepared solutions or verified results and for which it was necessary first to start a deep investigation, and then proceed to the design of its application. The typology of the

museum has been chosen fundamentally in relation to the large contemporary production of three-dimensional artworks, made by of all those artists who work exclusively through modeling software: production that has reached very high quality standards. Quoting some artists we find Adam Martinakis [2009], The French Monkey [Constantin Paschou 2015] or Giacomo Costa [2009].

These authors use the virtual dimension as a white sheet, a space in which imagination finds its shape, in the same way as a painter draws its own fantasy on a canvas; even if their production is characterized by a variety of disciplines, starting from photography, painting and also from sculpture, considering how they sculpt a "material", even if virtual, transforming it into what they have imagined.

Starting from these considerations, it was curious to realize how the tridimensional nature of these artworks, in the moment in which they have to be presented or communicated, is actually flattened on a sheet of paper or on a screen, simply as a photographic image. The artist, after finishing his model, proceeds with the creation of a virtual photographic set; in fact, modeling and rendering software allows not only to plan a lighting set, but also to configure photo-cameras whose settings can be changed like the traditional ones: a real set with professional equipment.

This procedure is not to refer to the author's will but to a simple practical need to communicate the artwork: this artist has to choose and select just some sides of their artwork, they are actually not free to show it completely, but they have to transform a three-dimensional sculpture in a two-dimensional photo of it.

So the idea of a virtual museum arises to provide an appropriate "space" for these artistic creations: a virtual museum which allows these artworks to be visited in their three-dimensional being and not as photographs or an image. A museum which, through its structure, allows these works to "live" without transmutations, in their "natural habitat": a kind of virtual archive of the virtuality.

Obviously, in addition to planning the design of the "box", there was also the compelling need to understand what the "first prototype" collection actually consisted of; so there was the problem of having to create a "container" for a content that was still unknown.

The collection of this "archive" focuses, as a first exposure experiment, on "visionary" architecture. Despite the vastness of the theme, it has been attempted to select those authors and architects whose drawings have shown to be unique in their way of being pure graphic fantasy, without any constraint. They are not architectural sketches or artworks that were planned to be built: technical and practical limitations do not exist, neither obstacles. They are results of an exclusively creative, mental exercise, the purest synthesis of an image or fantasy. And free imagination can only give spectacular and evocative results.

The selection has to be understood as critical, made out on the vastness of options inside architecture history; the red thread that binds the chosen artworks is their characteristic to be fantastic and pure imagination and, precisely because of that, they have remained on paper. These works live inside the museum under a new perspective, the one of three-dimensionality; they live in the true meaning of the word, they become actually real buildings that welcome real visitors. In this case the virtual instrument shows itself as the only possibility for these works to relive their three-dimensional nature, born in their author's imagination. So the selection has been made according to the nature of the art-work itself, fantastic and utopian, and to their capability to be represented into three-dimensionality.

Having clarified the nature of the collection we proceed with a more accurate analysis of each art-work.

The specifications below, in order to make the presentation of this exhibition more complete as possible, are corrected by obvious personal points of view that motivated each work individually.

- Louis Boulleé: [Tafari 1976] Cenotaph of Newton (Fig.5). The "revolutionary architects", Ledoux, Boulleé and Laqueu [Kaufmann 1993] formed such a compact and actually revolutionary group to give a real poetic shock to the academic architecture of the time. «True architecture is born from a creative inspiration [...] must be the free creation of fantasy» Boulleé claimed. This spirit, the same with which he will imagine the Cenotaph, motivates his inclusion in this collection; through elementary forms, titanic scales and light, the author searches the suggestion on the visitor; and through the memory of ancient temples and gods he celebrates the new illuminist god of the 18th century: Sir Isaac Newton [Kaufmann 1993]. Free from practical implications Boulleé looks for a new "order" inside architecture's world, creating an architecture that, more than a building, becomes an "expressive painting" full of "enchanted poetry".

- Antonio Sant’Elia: [Banham 2005] Drawing for Centrale Elettrica (Fig.6) the "cathedral of the energetic religion" is another selected artwork. In the fast, mechanical and technological delirium of the futurist impulse, Sant’Elia makes his way, becoming the official architect of this new avant-garde: he refuses the past and the academic state of architecture, going further, towards something completely new. The power station is one of the symbols that for Sant’Elia represent the future, a new and dynamic age. Also in this work we can see a rupture, a desire of detachment from a present considered old and obsolete. Sant’Elia shows us a new relationship between the inhabitant and the city, which becomes more similar to the one between worker and factory. A new vision, extreme and rebel in which he openly declares architecture as a mirror of society.
- Haus-Rucker-Co: [Choi 2015]Big Piano (Fig.7) The Viennese group can be inserted into that radical architecture that makes its way in Europe between the '60s and' 70s: they show an interesting point of view on the city, on man and on the link between them, constituted by architecture. A cinematographic architecture, much closer to a scenography, which underlines, in an alienating and perhaps inconsistent way, the role of man as a spectator but firstly actor inside their architectural theaters. They try to find a new perspective of perception, considering human being as the central node of architecture. Even to reach a cloud, the visitor must interact with the architecture, must climb that staircase. A search for something new, a new architecture that gives man the chance to get away from what is ordinary.
- Brodsky & Utkin: [Nesbitt 2003] A bridge over a precipice in the high mountains (Fig.8). “A chapel with glass walls, glass roof and glass floor, which stands on the incommensurable and infinite gap between two abysses, above and below.” This is the description that the authors include with the considered artwork. This architecture, together with other drawings, recalls, both for the technique and for the graphics, a bygone past; past to which the "paper architects", so called, come back through these utopian journeys, escaping the desolate and austere architectural present of the 1980’s Soviet Union. An escape that this time goes to the past and not to the future, escapes from the “modern”.
- Giacomo Costa [2009]: Orizzonte. (Fig.9) Giacomo Costa is mentioned as the last author inside this succession, but he’s actually the closest, both temporally and for the graphic techniques, which belong to the modern digital world. This author could be an example closest to the eventual function of this museum, as an archive for 3D artists’ artworks. From the interviews collected, he declares how the architectural element is something that has appeared naturally in its artistic path; Costa does not actually undertake studies in the field, but he firmly believes that architecture is an art in which the change of man and his society is reflected in a greater and clearer measure. Changes that are readable in each of his artworks, showing one time a post-apocalyptic chaos or in this case the solitude of a place in which there’s nothing for man, except for loneliness.

The original logic of the project structure (Fig. 1) is linked to two concepts: first of all the concept of “depth”, meant as the capacity of exploration, interaction with a situation and experience, secondly the term of “possibility” or freedom of choice.

Depth and exploration are represented through an “iceberg” structure: two levels are designed as two levels of perception in which the lowest one is the one that can be explored; so the idea of “discovery” becomes a practical experience for the visitor. Users may or may not find out what is beneath the tip of the iceberg, if not interested they can go further, while if fascinated they can find out what is hidden at the level below. In this way, the concept of possibility and choice finds each other: inside *Level 0* the visitor will see the tip of the iceberg and it will be able to make his choice whether to go down to *Level -1* or continue the path looking for something more captivating.

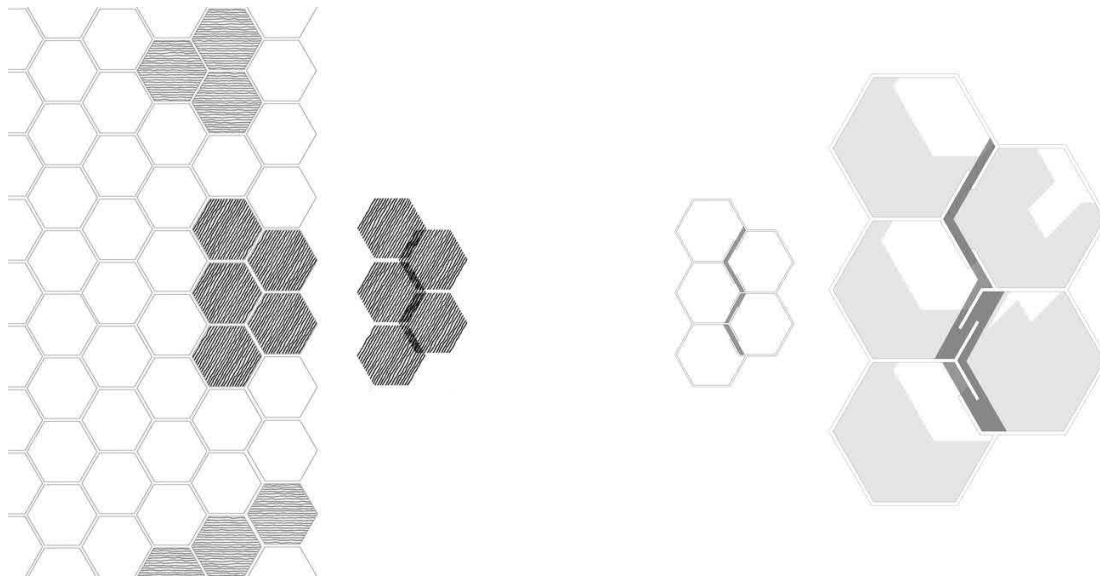
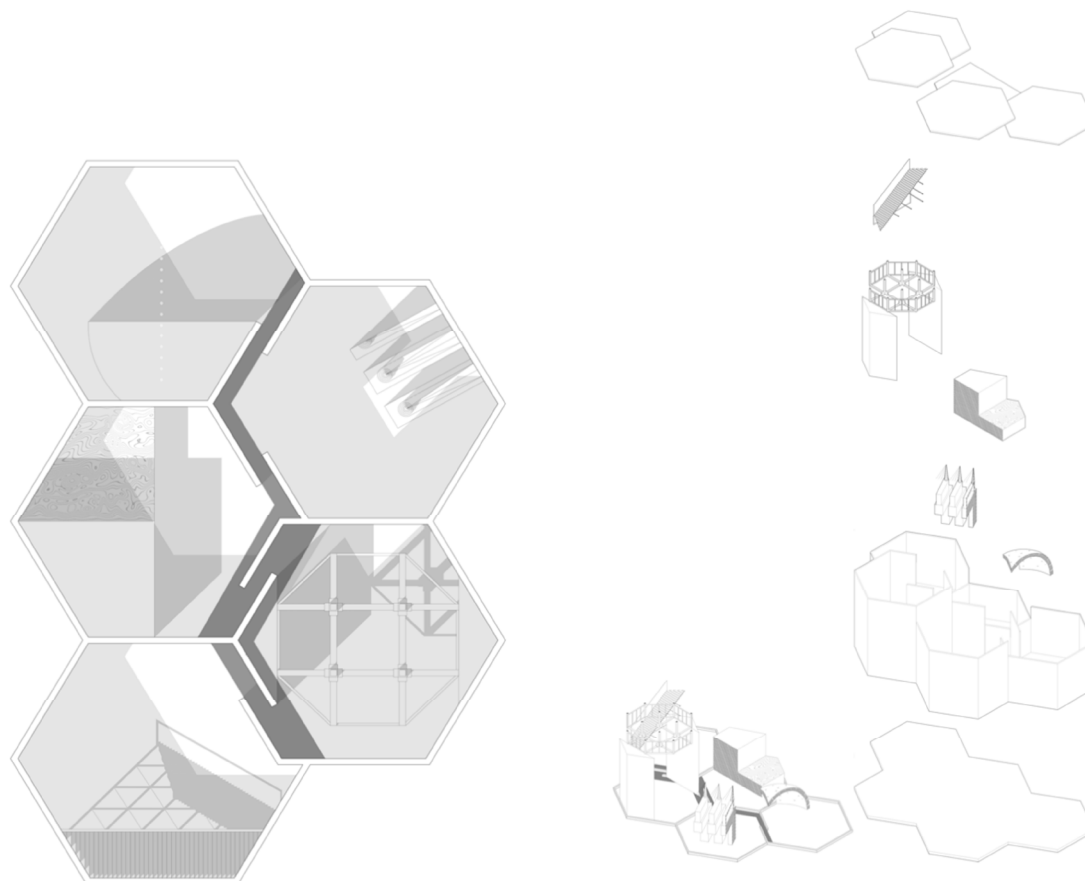


Fig.1. Museum Structure. (Graphic Design by Authors)



Figs.2-3. Level 0: Plant, Axonometric View. (Graphic Design by Authors)

Level 0 (Figs. 2-3) is configured as a "traditional" museum in which there are a series of rooms containing artworks, while *Level-1* exploits all the potential offered by virtuality configuring itself as a completely immersive level in

which the visitor sees the artwork as an actual "building". Summing up, if at *Level 0* (Fig. 4) we observe "A" from a specific point of view, at *Level-1* we are actually "inside A"; the artwork itself becomes a gate between these two levels and it's the visitor himself who chooses whether to give himself to the adventure by descending into the artwork he selected, discovering it, or giving up to look for another architecture.

The virtual tool, used in this project is linked to the function of the project itself, a virtual container of the virtual: a "place" suitable for those artworks that actually born inside it. In this sense "virtual" becomes the only instrument capable of communicating and exposing these artworks according to their nature.

From the specific architecture point of view, the virtuality is configured as a resource exploitable, but not totally understandable, as an instrument certainly, but far from being a poor technical expedient of visualization or the latest fashion in terms of architectural representation: it means possibility of multiplying perception.

The designer of virtual architecture, therefore, becomes a creator not only of experience, as we said, but also as a perception designer; a multiplied perception, increased thanks to the potential of the virtuality.

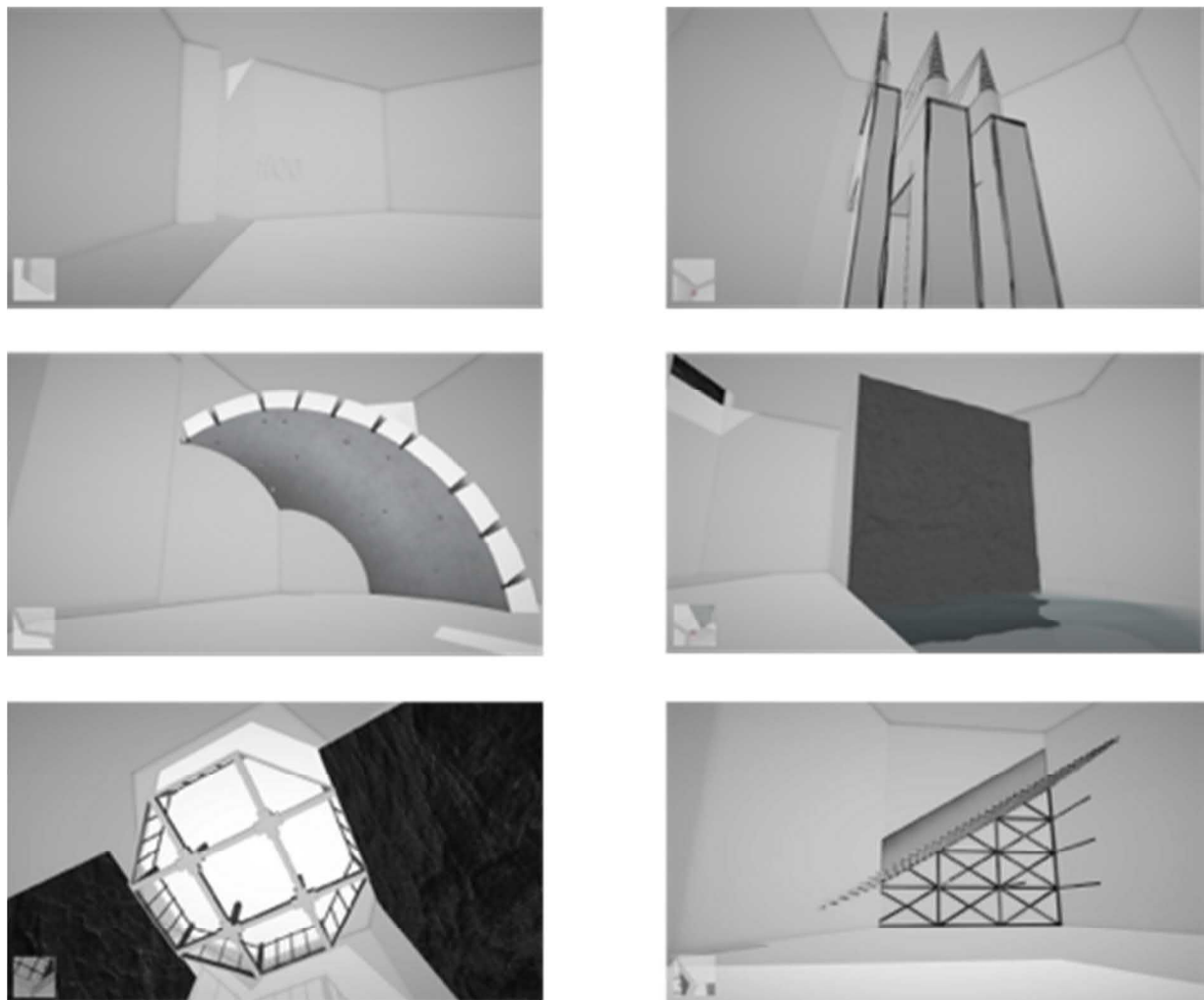


Fig.4. *Level 0 Structure (Graphic Design by Authors)*



Fig.5. Level-1: Newton's Cenotaph reconstruction. (Graphic Design by Authors)



Fig.6. Level-1: Centrale Elettrica reconstruction. (Graphic Design by Authors)

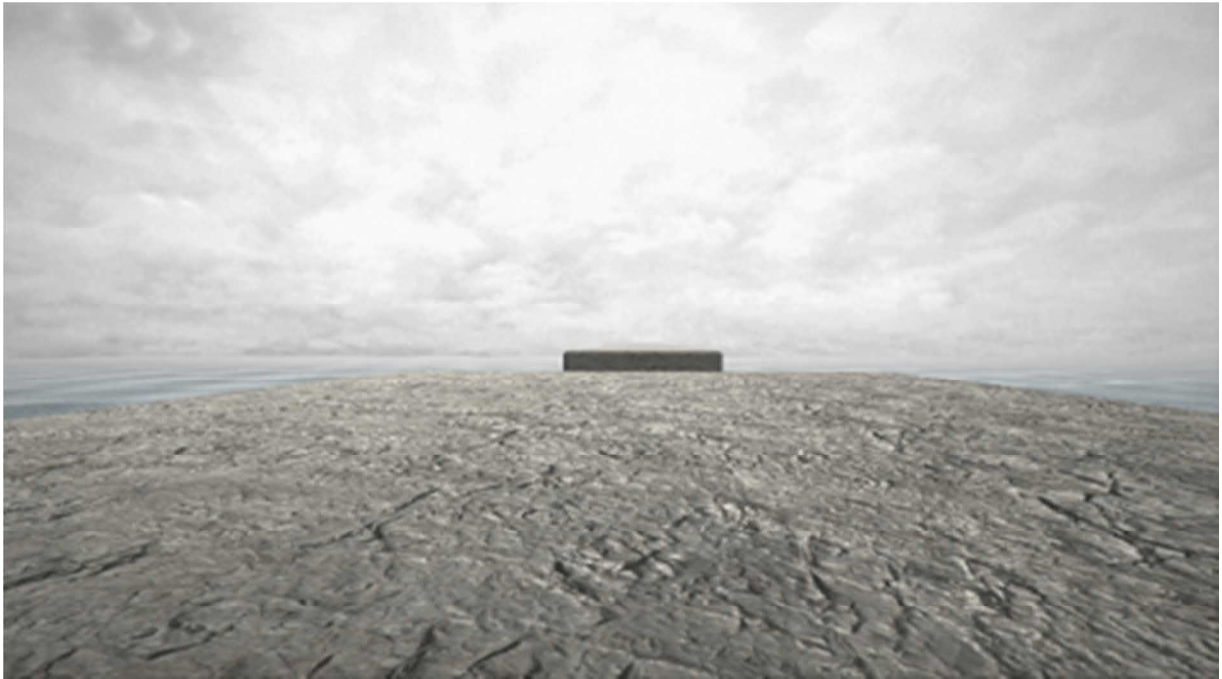


Fig.7. Level-1: Orizzonte 18 reconstruction. (Graphic Design by Authors)



Fig.8. Level-1: A bridge over a precipice reconstruction. (Graphic Design by Authors)



Fig.9. Level-1: Big Piano reconstruction. (Graphic Design by Authors)

CONCLUSION

As we have seen, it is not possible to establish a right and correct behaviour to approach the virtual instrument. That is because it is very hard to minimize such a wide and deep concept to just a technical tool; through this brief resume of technological development we have found that if on one hand digitalism was created to solve certain problems (creating a new language), virtuality is firstly a concept (a kind of philosophy) and only later an instrument. This difficulty has split its use in many experiments: presenting virtual reality as a tool or as the real theme, the poetry, that builds unthinkable images.

With this project we have exactly tried to melt these two aspects into a process that brings both, the technical potentialities and the depth of its concept, into a structure made of virtuality for virtual experiments, without any distortion or manipulation. Three-dimensional remains three-dimensional, even if we have to place it in another dimension.

But it is this new, alternative dimension that gives those images a new life.

We don't know if Virtual Reality is actually the real future of architecture or representation in general; we have seen the failure of who has tried to present architecture under a new, "modern" light. The *Guggenheim Virtual Museum* [Rashid 1999] is a ghost that somehow still stimulates most curious minds, but at the same time it shows that probably we are still not ready for a new dimension in architecture, for a virtual museum.

We hope things to change, but mostly our first goal designing this project, has been the will to give something more to discuss about, new stimuli and ideas, for those, who cannot wait like us to see what is next.

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