Incomplete Architectural Projects – a Digital Repository Based on the OMEKA System

Ewa Serafin-Prusator and Maciej Tarkowski

Digital Competence Center of the University of Warsaw,
S. Banacha 2c, 02-097 Warsaw, Poland
em.serafin@uw.edu.pl
m.tarkowski@uw.edu.pl

Abstract. This article presents the re-creatio project, which involves the building of a digital repository to gather, among other things, blueprints and plans of "unrealised" architectural projects. For more than a decade, unrealised architectural projects have been perceived as fully fledged works of architecture. The change in thinking about this type of project is something the authors of this article cover in brief, in order to then note its influence on the increasing interest in this topic. As a result of this interest, the internet contains numerous websites devoted to unrealised architectural projects and the authors of this text outline the problems inherent in visiting and reviewing these resources, and the factors that affect their usefulness as trustworthy sources of knowledge on the subject. In answer to problems that have been noted, the resulting proposal involves the setting up of a digital repository that will serve as a specific sort of base resource. The article presents the principles that should comprise the foundations of this project involving the development of 3D visualisations of one of the unrealised architectural projects to be made available via the repository.

Keywords: Unrealised Architectural Projects, Digital Repository, 3D Modelling, 3D Reconstructions, Architecture, Graphics Engine, Cultural Heritage.

1 Introduction

For hundreds of years, architecture has been defined in terms of what was actually built. This inevitably went hand in hand with the question of creation and construction that would reflect the ideas that appeared in the minds of the architects involved. This in turn was connected with a sequence of relationships that occur in the process of creating architectural projects. One can summarize these by the scheme: idea – design – construction.

The Renaissance brought notable changes to the relationships between architecture and the art of drawing. Its importance began to grow and became a part of the process of construction. This had, among other things, a connection with new divisions of tasks in the building process. Craftspeople and artists (such as sculptors and painters) became involved, without necessarily having any architectural experience. Architects who have the skills to produce drawings are moved further from the construction process itself, becoming (in modern parlance) managers who coordinate the work of

erecting buildings. Blueprints are the main physical object produced by architects, and something they have total control over. At the same time, draughtsmanship becomes the main medium and role of the architect. In subsequent centuries, this status attained by architectural drawings will eventually be accepted as the norm. Numerous architectural treatises such as those by Jean-Nicolas-Louis Durand from the early 19th century stressed that architecture could not exist without drawing, for it was the natural language in which architecture communicated.[1, pp. 20-29]

The importance of drawing lies in its ability to present ideas that are otherwise impossible to perceive. The alteration of Platonic thinking during the Renaissance, acknowledging that representation was beneath ideas, redefines the relations between ideas and drawings. Art, which also includes architectural drawing, is an external expression of ideas. In this light, drawings therefore could be seen as a neutral medium that transmits undistorted ideas. Many architects, but also art and architecture theoreticians, distance themselves from this sort of thinking. For Le Corbusier for example, the natures of drawing and architecture were separate. It was architecture, and not its graphical representation, which functions in defined spaces, has three dimensions, mass and circumference. According to Le Corbusier, graphic representations of ideas deforms them. It is necessary to note that he did not totally reject architectural drawing, only seeing its meaning and usefulness in a different place and context.[2][1, pp. 20-24]

Thinking that defines the status of architecture expressed as drawing as lower than architecture that exists in physical form was key for modernism, among other things. In Poland this would have been represented by the likes of the architect Juliusz Goryński, who in the 1940s, formulated the division of three types of architecture: built, drawn and spoken, the latter of which he considered to be the most inferior.[3, pp.17-20][4, pp. 26] This point of view had been dominant for centuries. As late as the end of the 20th century, Robin Evans, an architect and researcher, in a posthumously published book titled *The Projective Cast: Architecture and Its Three Geometries* claimed drawing is "weaker" than the ideas it represents. According to him, draughtsmanship is different from actual buildings, which is why they ought to be judged according to different criteria.[5, pp. 14]

Twentieth century computer technologies were to influence a change of thinking about the status of drawn architecture. This came in particular with the initiation, in 1989, of virtual reality. This was the development of technology making it possible to create almost perfect visualisations of buildings or settling virtual worlds on utilitarian levels (a well-known example of such activity is a project initiated by the group Asymptote Architecture, which created a virtual Wall Street trading floor). This ability to recreate in virtual form the physical world and architecture created the need to redefine the categories of space.[6, pp. 227] For example, in a 1992 article titled *Cityspace, Cyberspace, and Spatiology*, Michael Benedikt contends that space is a collection of data. It can be thought of solely in reference to other things. Space as such does not exist. It is always information selected and analysed by people. In research theory, space is co-created by architecture, which is also a means of conveying data.

Randall Walser in his article *Elements Of A Cyberspace Playhouse* posits the thesis that virtual reality appeared at a time in history that was not accidental. This was a

time that saw a questioning of the dualistic division between abstract thinking and physical experience. Virtual reality cuts through this division. In effect, architects today are creating a new architecture. Its central characteristic is fluidity, changeability and dematerialisation.[1, pp. 117-128]

In the context of these changes, we should mention the largest architectural event in the world organised in 2008, the XI Venice Biennale of Architecture. It was devoted to everything that is to be found in architecture except actual building.[7] In an exhibition manifesto titled "Out There: Architecture Beyond Building", Aaron Betsky, the biennale curator, contends that architecture is not the same as construction. It is all that which goes beyond building, which is connected with it. The role of architecture is to give grounding in the world. And so it refers to natural experiences that human beings have and our basic needs. In conclusion, architecture is a way of thinking about buildings, the very idea of them. According to Betsky, we can do without buildings, but not without ideas.[3, pp.19-22, 33-34][8]

2 Diagnosis

The changes described here in brief outline how architecture is perceived and the sequence “idea – project – construction”, means that the limits of what we understand architecture to be are becoming much broader. We then become open to the things that previously would not have been considered to be architecture. Architectures that are drawn and uttered begin to be perceived as being of equal value compared to actual physically erected architecture. Architectural visions that have only been preconceived as virtual projects are assigned the status of fully fledged architectural works.[3, pp. 17-32]

This change of perspective has led to a growth of interest in that which was only announced through images or words, but was never actually built. More and more often this becomes the topic of books, art projects, exhibitions, theatrical performances, mainstream essays and lectures, documentary films or phone apps. A number of examples may be cited, like books written by: Philip Wilkinson “Phantom Architecture”[9], Grzegorz Piatek “Najlepsze miasto świata. Warszawa w odbudowie 1944-1949”[10] the project conceived by Aleksandra Polisiewicz titled “Wartopia”, which was a virtual reconstruction of Warsaw according to Nazi designs and plans that were never made real, but were fully drawn up in the first years of World War II[11][12], exhibited in 2004 at the Royal Institute of British Architects, or the exhibition “Fantasy Architecture: 1500-2036”[3, pp. 34]. Another example is the experimental stage text penned by Jarosław Trybuś and Grzegorz Piątek “Jeśli nie możesz zbudować, wysadź w powietrze” created as part of the Wystawy Mówione / Spoken Exhibitions project[13]. The theme is also reflected in popular science lectures by Jarosław Trybus *Warszawa Niezaistniała* between 2006-2007 that took place in the Museum of the Warsaw Uprising in Warsaw, and documentary films such as *Widma Warszawy Niezaistniałej* (2007) by Piotr Boruszkowski and *Porwanie Europy* (2009) by Jadwiga Kocur. There is also the phone app Archimapa (2015) (a guide around non-existent Warsaw).[3, pp.34] The internet also has many examples of online resources devoted

to unrealised architectural visions. Many of these, such as “Fotopolska”[14], are designed to be accessible to mainstream audiences, but there are also digital repositories where architectural projects preserved as blueprints stored in libraries and archives are made available to the general public[15]. A review of existing websites shows that these are often focused only on projects created by individual architects, specific works or topics. The materials thus presented are gathered in disorganised ways, often being fragmentary or insufficiently well researched in terms of metadata, which is at times completely missing. At times, there is a lack of description of the gathered architectural projects, and in addition the architectural sketches are of varying quality. In addition, many of the drawings or texts expressing the visions of architectural projects that were never erected in real life have never been digitalised. And so we find ourselves lacking a resource in which we can gather and describe architectural projects that were never actually constructed – a space that could serve as a secure and trustworthy source of knowledge. It is this need that has led to the idea of creating a repository of unbuilt architectural projects called re-creatio.

3 Solution: Re-Creatio, the Concept

The team behind the repository of “unbuilt architectural projects” is convinced that architecture is not just, paraphrasing James Donald, a matter of bricks and mortar[16, pp. 8, 17], and the reasons why designs were never actually built in real, physical spaces are not down to lack of technical know-how. Architecture that was drawn and which was written up is for us of equal value to that which has been erected – the fact that for centuries “unbuilt architectures” have been poorly reviewed makes them even more worthy of our attention.

On the one hand, they conceal mysteries related to the intellectual, social and political activities in which their creators were involved, becoming testimonies of mutual interactions and societal and ideological relations (seeing as these projects were often developed in national and international teams). On the other hand, they reflect the eras in which they were created, as symbols of times gone by, helping preserve and retain the rules, ideologies and values they were born out of. They tell of the world views relating to the people who lived in times gone by, revealing how people of the past understood themselves, how they crafted their own identities, what mattered to them, shaping their decisions, and how they saw the reality surrounding them.

Architectures that are drawn and described combine micro-histories with macro-histories, allowing us to understand the relationships between “small homelands” and the “greater homeland”, between the lives of whole nations, societies and worlds. They allow us to grasp the relationships between various aspects of civic, economic and cultural lives, as well as the mechanisms of governance, geographic and natural environments, etc... and thus to describe unique historical contexts. [17][3, pp.30-32]

We perceive “unbuilt” plans featuring architectures as a palimpsest containing fictional architectural visions, along with views and ideas relating to those they referred to, the ones they entered into a debate with. In this palimpsest, realities interweave with fantasies, while timelines blend with layered spaces. This reflects the tension

between sensory experience and intellectual understanding.[3, pp. 30-32] Re-creatio will be a unique repository of ideas, revealing their continuity, the use of which we see as a unique, unrepeatable and pleasant intellectual pursuit. The repository will be a space where architectural projects that were never "made flesh" will not only be collated and described – it will also be a space for a dialogue between the dead and the living.

4 Re-Creatio: Project

Re-creatio is a long-term undertaking that will take many years to develop. As of mid-2020, Stage I of its development is being financed by the *Excellence Initiative – Research University* scheme managed by the University of Warsaw. The repository contains Polish and international architectural projects that were never physically constructed – expressed in the forms of drawings, blueprints, plans, texts, etc. dating from the 16th century up to the present. We would like it to contain the works of both well-known, renowned artists, as well as those drafted by artists who are little known or even totally obscure.

Stage I of the project – lasting up to the year 2023 – will involve the creation of a digital repository that will then be enhanced with at least three "unbuilt" architectural projects. These will be: the Villa Laurentina, the Museum of Fine Arts in Warsaw and the Temple of Divine Providence. Each of these three projects will, alongside blueprints and drawings showing how they were to appear, be enhanced with descriptions penned by experts and metadata. We will also create a dictionary of meta-tags and an advanced search option. Subsequent stages of the project development will involve an expansion of the repository to include descriptions of the architects behind projects that were never erected, a bibliography covering the "unrealised" architectural projects in the repository, data visualisations showing the relationships between individual figures and their projects, allowing us to explore previously unseen links relating to social circles, spheres of influence and genealogies of never-completed architectural projects. The repository will be available in Polish and English language versions.

The unrealised architectural projects published in our repository will be categorised in ways that capture the reasons why the projects never became physical reality. We are currently considering categories covering 1) architectural projects that were never intended for construction, and meant only to exist in a theoretical sphere, and 2) architectural projects that were meant to be built in real-life, but for political or historical reasons were in the end not erected. It is however worth pointing out that further categories will appear along with more "unrealised" architectural projects being added to the repository. These will go on to help us define further categories.

The first category will include the Villa Laurentina project, inspired by Stanislaus Kostka Potocki (1755-1821), a Polish politician, educator, Freemason, literary critic, journalist, cultural and art historian, poet and playwright. This remarkable Polish humanist, working with Giuseppe Mannocchi, Vincenzo Brenna and Franciszek Smuglewicz, between the years 1777-1778 created a drawn version of the reconstruction of the Villa Laurentina (seaside residence of Pliny the Younger [61-113 CE],

located about 20 km from Rome, near Ostia). This was based on literary descriptions and reconstructions functioning in the 18th century as creations by well-known European artists, such as Vincenzo Scamozzi, Jean-Francois Felibien des Avaux and Robert Castell.[18]

The second category will include: the Museum of Fine Art in Warsaw and the Temple of Divine Providence. The project Muzeum Sztuk Pięknych / Fine Arts Museum, authored by the aforementioned Stanisław Kostka Potocki, was a vision of the first ever art museum to be established in Poland.

Blueprints with drawings presenting the Museum of Fine Art in Warsaw project were an appendix to the Villa Laurentina project. For political reasons, however, the project was never brought to fruition. Even so, the idea behind it persisted, and some of the elements it contained can be found in the columned gallery of sculpture created in the University of Warsaw History Department.[19] The next project belonging to the second category – the Temple of Divine Providence – was to be an expression of the celebration of the enactment of the Constitution of the 3rd of May 1791 by the Four Year Seym in Poland. This resulted in what is today considered to be the first open call for an architectural project in Polish history. In the year 1792, the winning design for the Temple of Divine Providence (authored by Jakub Kubicki, 1758-1833), involving the creation of a church based upon the shape of a Greek cross beneath a cupola set upon a cylindrical base, had King Stanislaus Augustus Poniatowski placing the cornerstone in the planned foundations. Two weeks later, the Polish-Russian war broke out, putting a halt to the construction process.[20][3, pp. 238-247]

We are most interested in ensuring the repository is constructed in line with the most important standards and best practices related to online publishing. The repository will be developed using the OMEKA system, which is a free, open-source content management system for online digital collections. OMEKA is based on the popular PHP-ZEND framework, allowing us access to many plugins that can expand the system functions. During development works, we will make every effort to adhere to standards and ensure interoperability with the resources gathered in various digital repositories thanks to (among others) OAI PMH and API.

It is thought that the contemporary standard for digital publishing of cultural heritage collections is also to publish them as collections of data in line with the rule known as COLLECTIONS AS DATA. As a result, our repository will be viewable in two distinct ways: in a graphic format (allowing access to blueprints, drawings, clicking links, etc) and the API layer (programming interface, allowing access directly to data and resources without unnecessary graphic elements).

The first stage of the development of our project will be finalised with the creation of a 3D model reconstruction of an architectural project chosen from our repository. At present, considerations are being given to creating a reconstruction of the Villa Laurentina. The 32 spectacular colour blueprint designs are in themselves an almost complete architectural project – of both the villa and the gardens surrounding it, located in a broader spatial arrangement created in the form of literary descriptions and functioning reconstructions of the villa authored by leading European artists. The surviving architectural designs, facade and interior wall projections, details of wall, floor and ceiling decorations, as well as elements of interior fittings and detailing,

create a coherent whole. Drawings and numerous blueprints involving two historical scales, as well as cross-sections of buildings amounting to a large-scale architectural enterprise, along with the decoration designs, allow us to recreate the vision of this Enlightenment era thinker as a three-dimensional space.

The most recent 3D reconstruction of the Villa Laurentina was created in 2007 by Maciej Tarkowski as part of a grant by Ministry of Culture and National Heritage[21] and did not contain visualisations of all the interior spaces.

We will create a complete three-dimensional reconstruction of Villa Laurentina as part of our project. The assumption is that two versions of Potocki's vision will be developed – models needed for the 3D visualisation closer to reality and optimised models, designed to be exported into a graphics engine. The first stage of our work will be to transpose the 18th century blueprints with drawings into the appropriate program used, among others, for architectural and engineering purposes. High-resolution blueprint scans will be uploaded into an AutoCAD program, where precise vector drawings of blueprints, projections and wall extensions will be prepared. We should mention that the blueprints designed according to measurement scales of the time (*palmi romani*, *bracia polacche*) allow a shift to a metric scale, which will also be binding for the whole process of creating this particular reconstruction. The 3D Max program created by Autodesk will be used to create 3D models and their visualisations by using the implemented rendering module. The foundations of these 3D models will be pre-designed vector plans and cross-sections imported from the AutoCAD program. 3D shapes will be modelled anew: villas, garden pavilions, cryptoporticos, architectural detailing and individual elements of the landscape designs. We propose that the flora found in the reconstructed gardens and surroundings will be generated by the 3DMax Forest Pack plugin.

The project's complexity, along with our desire to faithfully render the original (including the capitals, cornices, door openings and fittings) implies the models of individual spaces be built in separate files. Each room is to be completed in accordance with the same preset rules. Structural models of each interior space will be modelled based on their detailed plans and cross-sections, to then be precisely added to the building model. The addition of materials and textures to the models will be an important stage, affecting the way the whole functions visually. In order to retain the original's artistic qualities, in the majority of cases we will use scans of the original, coloured drawings from the Potocki project. [22][23]

The work detailed above will be conducted in two stages, considering we also plan to export models of reconstructions into the Unreal Engine graphics engine. All the models will be optimised for the graphics engine that we will select for the project. With this in mind, three-dimensional form models and their textures will be simplified, which will allow us to limit the amount of data needed to create a 3D image and its transfer into online settings.

New, updated visualisations of Potocki's reconstructed vision will be calculated using Arnold rendering[1]. We are assuming a choice of parameters that will facilitate

[1] Arnold Render is a rendering engine created by Solid Angle which, following a fusion with Autodesk, has been implemented in graphic 3ds Max and Maya programs, replacing Men-

effects that mirror natural sunlight. The opportunity to input geographic coordinates, dates and hours allows realistic simulations of the Sun's natural movement across the skies in a given part of the planet. Taking into account the fact that the blueprint showing the full layout of Villa Laurentina contains a wind rose, we will use this information as we input lighting parameter data.

The version of Villa Laurentina from the year 2007 was made available in the form of static visualisations and animation. Introducing interactive elements will be a completely new experience. With this in mind, we will use the gaming Unreal Engine launched in 1998, still being developed by Epic Games. Optimised reconstruction models will be exported into this engine, allowing users to freely roam the villa, pavilions and gardens in real time.

Currently, work is underway to combine the OMEKA system with the already designed graphic layer of the repository. It was assumed that the project would be accessible and navigationally functional, while the architectural projects that would be added in time, often of various proportions and colour schemes, would integrate smoothly with the graphical elements of the repository.

The three dimensional reconstruction of a "paper" project that we have prepared as part of this project will be the continuation of drawn architecture and the start of a discourse with the ideas it communicates. Utilising new tools will create a new analytical situation that can result in the need for new perspectives on the theory of the project and its redefinition. Being aware of how extensive this topic is and the limitations of our resources, we are inviting others to work with us in building this recreatio.

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talRay which was no longer being developed by its programmers. Rendering is a process of generating images based on information contained in 3D scenes, which include: 3D models, materials, textures, lighting and moods. Programs calculate all the key relationships between these elements and virtual camera according to input parameters.

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