"Flatness" through Camera: The Implications of Camera Movement in the Digital Reconstruction of Diamond Museum

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Abstract

In architectural design, the explorations using digital modeling and rendering tools do not stop at producing 3D geometries and representations. The spatial implications of the functions provided by these tools need to be interrogated. One of the questions to be asked is, is it possible to foreground architectural concepts "within" the mechanisms of these tools? This study will focus on one single function in 3D VIZ, camera movement. The objective is to examine the spatial implications of this function in the computerized architectural space of Diamond Museum. Camera movement will be studied in six variables. They are: distance, point of view, camera angle, framing, duration and travel speed and sequencing. Further, the architectural concept of flatness will be understood through the movies generated within the space of Diamond Museum.

1 Introduction

With the powerful functions provided by digital modeling and rendering tools, one can achieve representations of realistic and artful spaces, or use digital models to facilitate form generations. What other roles can these tools play in terms of understanding space? To what extent can digital modeling and rendering tools foreground architectural concepts? The key to these questions is not to merely make objects out of digital tools but to interrogate the functions provided by these tools in respect to their architectural implications.

This paper will report a case study on using the camera function in 3D VIZ to explore the architectural concept of Diamond Museum. Diamond Museum was designed by John Hejduk between 1963 and 1967 as one of the three projects of the Diamond Series. Hejduk intended to create a "flat" space in this series. During the design process, Hejduk invented a peculiar axonometric projection system though which the space turns to be flattened (Fig.1).

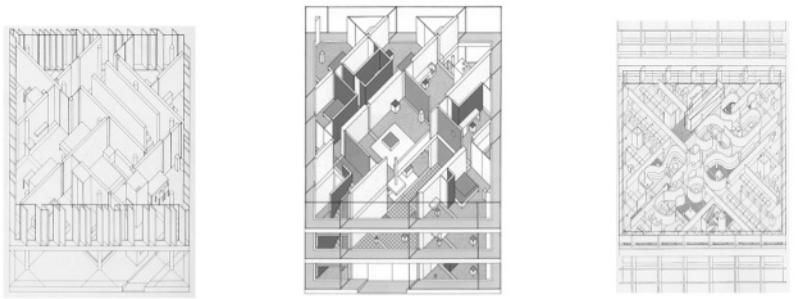

Fig.1 The Flattened Axonometric Drawings of the *Diamond Series*

One may ask, how does the diamond space appear in real space? This question has a deeper implication of the ways of spatial perception than mere curiosity. If flatness is successfully articulated in Hejduk's axonometric projection system, is flatness equally foregrounded in the real space? The only way to tackle this question is to study the real space.

Since none of the three Diamond Projects were built the author resorts to computer models in order to study the experiential aspect of the space. By exploring camera movement within the "building," the author will seek to understand the idea of flatness that Hejduk claimed in this design. In other words, this study will explore the relationship between the mechanism of the camera and the implications of how the space is perceived.

2 Sensational and Conceptual Elements in the Camera

Before any re-construction of the space of the Diamond Museum will be done, one has to be conscious of the mechanism as well as their implications of the camera. A camera is a theoretical viewer. To set up a camera involves various elements, such as proximity of the path to the boundary of the space, the height of the camera, and the location of the target. At a basic level, these elements determine what aspects of the space draw the viewer's attention. At a deeper level, these elements formulate sensational or conceptual images of the space. The visual elements may become an illusion of what one might physically feel in the actual space. These elements may also lead the audience to perceive the form of the space in terms of abstract relationships. Thus, the visual elements of the camera must be understood.

2.1 Distance

A camera provides ways of seeing something. Seeing by its very nature links the registration of texture with the registration of structure. When looking closely at an object, one tends to see and touch the texture. This experience is basically on a level of sensation. When looking at something from a distance, one sees an overview of the object

so that its structure can be perceived literally. Seeing a structure is the basis for understanding the spatial logic so that the experience of seeing from a distance leads to a conceptual level of seeing. This does not indicate, by any means, that one cannot reconstruct the structure in the mind through pieces of "close shots," but the distance of seeing determines if the texture or the structure will be perceived.

2.2 Point of view

A camera defines and controls a spectator's point of view, defining not only how the object is perceived but also where the viewer is located in relation to this object. If the object is architectural space, the point of view then defines how the viewer is located within the space. Therefore, point of view reflects the spatial relationship between the viewer and the space.

2.3 Camera Angle

At normal eye level, we may have different camera angles so that one might look straight ahead, upwards, or downwards. Single views can also be rotated so that one can look around or up and down. We can change the eye level and repeat the previous actions as if we were giants or dwarfs. In this current study, the implication of camera angle again focuses on the relationship between seeing and touching. Although viewers inside a space do not have to touch the wall or ceiling, they cannot avoid touching the floor. Hence, the feet are the point from which the sensation of touching originates. Usually, viewers look from eye level when traveling in a space, creating a sensation of seeing coordinates while experiencing the sensation of touching in the feet. These two sensations overlap when they look down, but the sensations are distanced to a large extent when the viewers look up.

2.4 Framing

The first task of framing foregrounds the intention of seeing by including or excluding elements to be seen. The second task of framing is to organize the subjects in certain compositional relationships. Further, from an experiential point of view, framing determines if the object is partially or completely included within a composition, which leads to different readings of the object within a frame. When all objects are completely included in an image, they tend to appeal to the viewer as visual relationships among objects. When the objects are partially included in an image, they tend to reveal themselves in a "broken-down" mode. That is, they might not attract the viewer as objects but instead, as abstract shapes. The relationship among these shapes begins to play an important role since no individual object exists. Thus, framing in fact determines which visual element, the object or the abstract shapes, plays the leading role in a composition.

2.5 Duration and Travel Speed

Duration situates the viewer in a time dimension, indicating how long the viewer stares in the same direction. It also indicates how fast one moves in the space. Once the staring time is long enough, the picture becomes psychologically still. Duration also creates the sensation of rhythm, which may work independently of what one understands the real object is. For example, in a room that is divided into a dark and a light section, one can shoot much longer in the light room than in the dark room, creating a rhythm of dominating light. For this reason, if the rhythm of a space needs to be studied neutrally, the camera must maintain the same speed while traveling in the space.

2.6 Sequencing

Sequencing challenges the mind, essentially involving the relationships among what is seen. It is the organization of scenes, involving the interplay among all the elements that have been discussed previously. Thus, sequencing is not merely about a sequence in time, but about which scenes are connected and which structures are retrieved by the viewer. Two kinds of sequencing are first, sequencing organized by a physical space in which one can literally follow the sequence while moving around in the space; and second, sequencing organized in the medium of film in which one can turn physically disjointed scenes into adjacent ones. The latter is essentially a montage, which represents much more than what is seen literally. It is a statement of what has been seen and understood. However, sequence has two aspects. One, the necessary aspect, determines the sequence, such as the route, if there is no other choice in space; the other, the exploratory aspect, provides multiple possible sequences, such as the rotation of the camera. Both aspects of sequence are integrated and create an utterly continuous experience in space and time.

3 Experiences Documented: Neutral View and Intended View

In this study, a camera is used to document visual experiences within the space of the Diamond Museum. The word "document" does not refer to a non-subjective view of the space. In fact, the nature of the camera is indeed subjective in that it is directed by the personal intentions of the photographer, so the photographer controls the audience's involvement in a work.

Use of the camera in the current study will take place on two levels. The first will consist of pictures constructed from normal points of view as if the viewer had no intention or attraction to anything specific, referred to as a "neutral view," and only the most obvious characters in the space will be captured. The second level will consist of pictures with specific intentions that carry more interpretation of the space. Even though everyone in the space will not have the same view, the pictures at least prove that certain spatial situations do exist, referred to as an "intended view."

The neutral view takes eye level paths throughout the space. The camera always targets the horizontal front when traveling. The lens is set at 45mm. The purpose is to create as

objective an experience of the space as possible. The intended view takes specific settings of the camera.

The camera shots used represent a tiny fraction of the possible views engendered by the design; they document not only (specific) perceptions, but also insights, depending on the choice of viewing positions, angles and frames. The selection of shots is evidently subjective, in that it is not governed by an a-priori method. The function of the shots, however, is to lead to a reconstruction of the principles of possible experience which, granting the initial selection of the shots, is open to scrutiny. What is fundamental to the argument is that the structure reconstructed inheres in the object; no claim is made that it exhausts the object or that it is not open to qualification depending on the selection of alternative viewing frames and trajectories.

4 "Shooting" the Diamond Museum

> "As the hypothetical observer approaches the architecture, the building simply becomes larger, and the observer sees more and more detail. His position is changed from that of hoverer over the object to one of the object hovering over the observer. It is as if the piece of architecture has swallowed up the hypothetical observer, as if he has become part of its internal gestation system."
>
> (Hejduk, 1985, 69)

4.1 Camera 1: On the Periphery (Neutral View)

When traveling along the periphery, the viewer is set in a logical system with almost all straight lines that are clear and definite. However, what one's body follows is constantly competing with what one sees from a distance as the orientation. A 45-degree rotation is formulated, not on paper, but through the contrast between moving and seeing (Fig. 2).

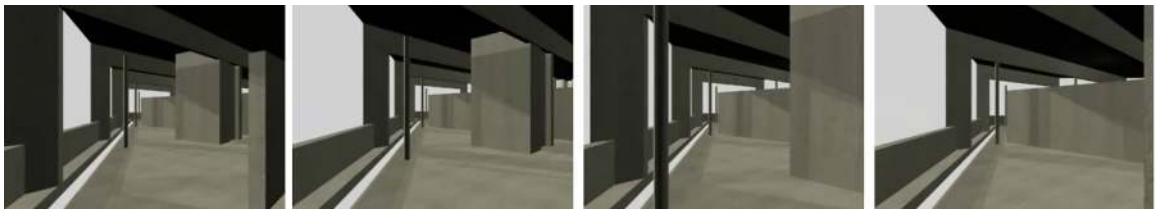

Fig.2 Periphery

4.2 Camera 2: In the Center (Neutral View)

Situated in the center, one is surrounded by curved walls so that the orientation is completely lost. Only by looking at the beams above will one relocate the orientation. The contrast between what the body touches and what the eyes see is pushed to an extreme in the center of the diamond. Actually, one is "outside" the curved walls while "in" the center. The walls all curve away from the center of the diamond so that one continues to get the sense of traveling in between objects rather than being enclosed by them (Fig. 3). The close-up surfaces are separated by body "spikes" of space. As one turns at the center, he or she sees a spike, followed by a close surface and then a spike again. A vista cuts through the position.

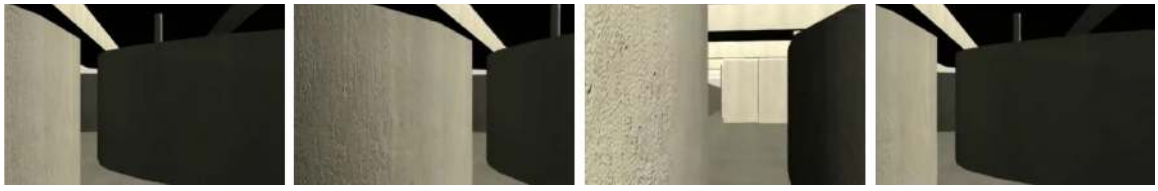

Fig.3 Center

4.3 Cameras 3 and 4: Crossing the Diamond (Neutral View)

Two neutral views are set at eye level, targeting horizontally forward in the Diamond Museum (exhibition level). Both views take paths along the diagonals of the diamond plan, one in the direction along that of the beams and the other in the direction perpendicular to that of the beams.

The result very obviously shows the contrast between what is near the body of viewer and what the viewer looks at. In camera 3, the viewer's body is always surrounded by curved walls, except near the end of the path. These walls force the viewer to meander around rather than take a straight path. The frequent curved turns cause the viewer to lose his/her orientation. However, the viewer sees a consistent system of beams overhead, a way of suggesting the direction towards the other end of the diagonal. Near the end of the path, a straight wall appears, pointing along the direction of the beam system. The contrast between what is close and what is far disappears. One's immediate sensation and one's understanding of the logic of the space are integrated at this point (Fig. 4).

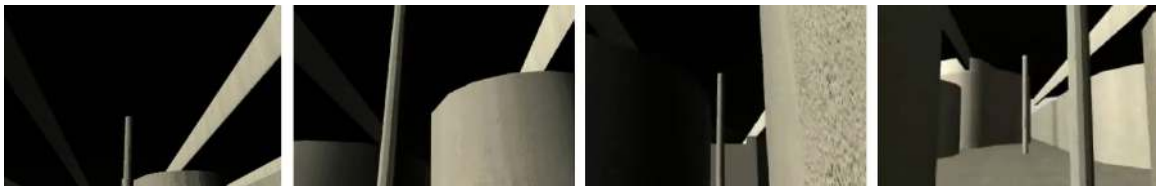

Fig.4 Crossing the Diamond Space (A)

In camera 4, the contrast still exists but with a much shorter duration. Straight walls appear both at the beginning and at the end of the path. A viewer will find his or her orientation through the awareness of walking perpendicular to the beams instead of parallel to the beams. The viewer starts from a clear system with a piece of straight wall and the beams suggesting a logical system. At the center of the path, three pieces of curved wall appear. The immediate direction near the body is challenged. However, one's body is not confused since another straight wall can be seen at a distance most of the time while he or she is traveling among the curvilinear walls. In addition, the beam system above always provides a sense of left and right. At the end of this path, straight walls re-appear so that the contrast between the immediate experience of the body and the distanced experience of the eyes disappears. In this case, the wall and the beam represent more than just structural or dividing elements. Hejduk assigned their roles in spatial experience by virtue of their different closeness to the viewer's body (Fig.5). The difference between the two views is indeed strong, which has to do with how dominant the curvilinear partitions are along the path.

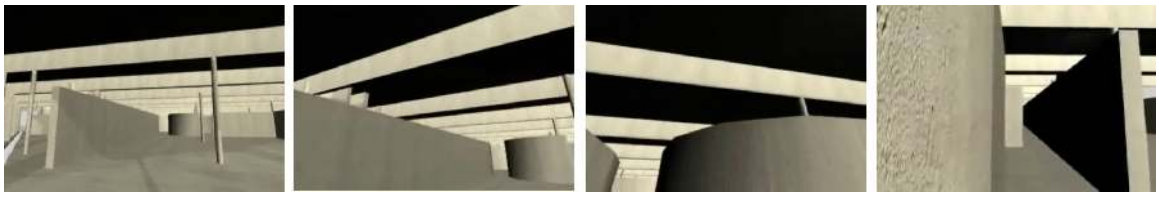

Fig.5 Crossing the Diamond Space (B)

4.4 Camera 5: A "Near-sighted" Travel (Intended View)

We intend to create a view along the same path as camera 3, but the camera is set at waist level facing forward. In this way, the camera documents the sense of touching through seeing. Ideally, it would be a blind man's experience. Seeing is boiled down to close-distance touching. However, a camera cannot be used to document touching. The solution, as discussed earlier, is to take close views as if one has a very limited vision in distance (Fig.6). Clearly, during the spatial experience, not only does one see the logical structure "hanging above," but one's body also feels the building objects with vagueness.

Fig.6 Crossing the Diamond Space (C)

5 Shot Juxtaposition

The juxtaposition of shots is an exercise in the mind based on a recollection of sensual experiences, ones that must take place in a linear sequence and that are arranged in parallel structure. The co-presence of shots highlights relationships among the space.

5.1 View of Composition 1: Center versus Periphery (Fig. 7)

Putting cameras 1 and 2 together, one understands the contrast between the two diagonal directions. One is clearer and more straightforward than the other, but exhibits less contrast between the challenge of the body and one's understanding of the space. If rotation was the intention in the translation from Mondrian's diamond compositions to Hejduk's Diamond Museum, it is articulated at the level of spatial intelligibility. The two diagonals are indeed in contrast between "meandering along" and "cutting across," with more disorientation in the former than in the latter. Grid is more present in the latter, and only unfolding in the former.

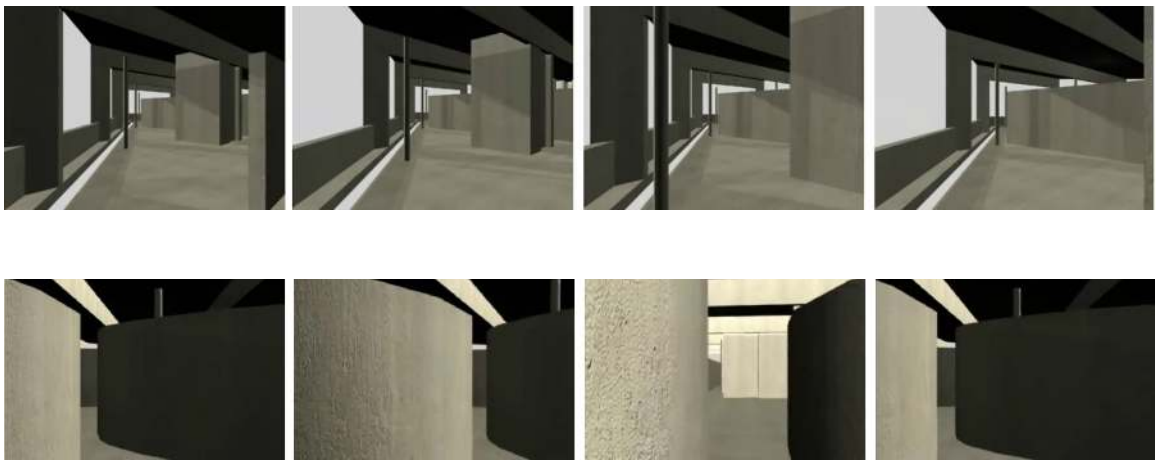

Fig.7 Center versus Periphery

5.2 View of Composition 2: The Four Corners (Fig. 8)

Four rotating views are generated on each corner of the Diamond Museum. The co-presence of these four views represents the contrast between clarity and ambiguity. When one faces the corners, the views are either framed or sliced by the columnar elements and the beams. When one faces the center, clarity and regularity decrease. The frames are interrupted by organically- shaped walls as well as by long straight walls that not only follow the perpendicular direction but also "float" in the regular grid. Furthermore, the co-presence of the four corner views suggests a sense of direction. The east and the west cameras show much more clarity than the south and the north cameras because most elements in the east and the west are linear. Rotation is illustrated in the perpendicular relationship between the beams and the linear walls. The southern and the northern views

are challenged by the ambiguous curvilinear elements. Compared to the eastern and the western views, the distances between these elements and the corners are shortened, so it is harder to obtain a big view of the surroundings. This enhances the ambiguity of space.

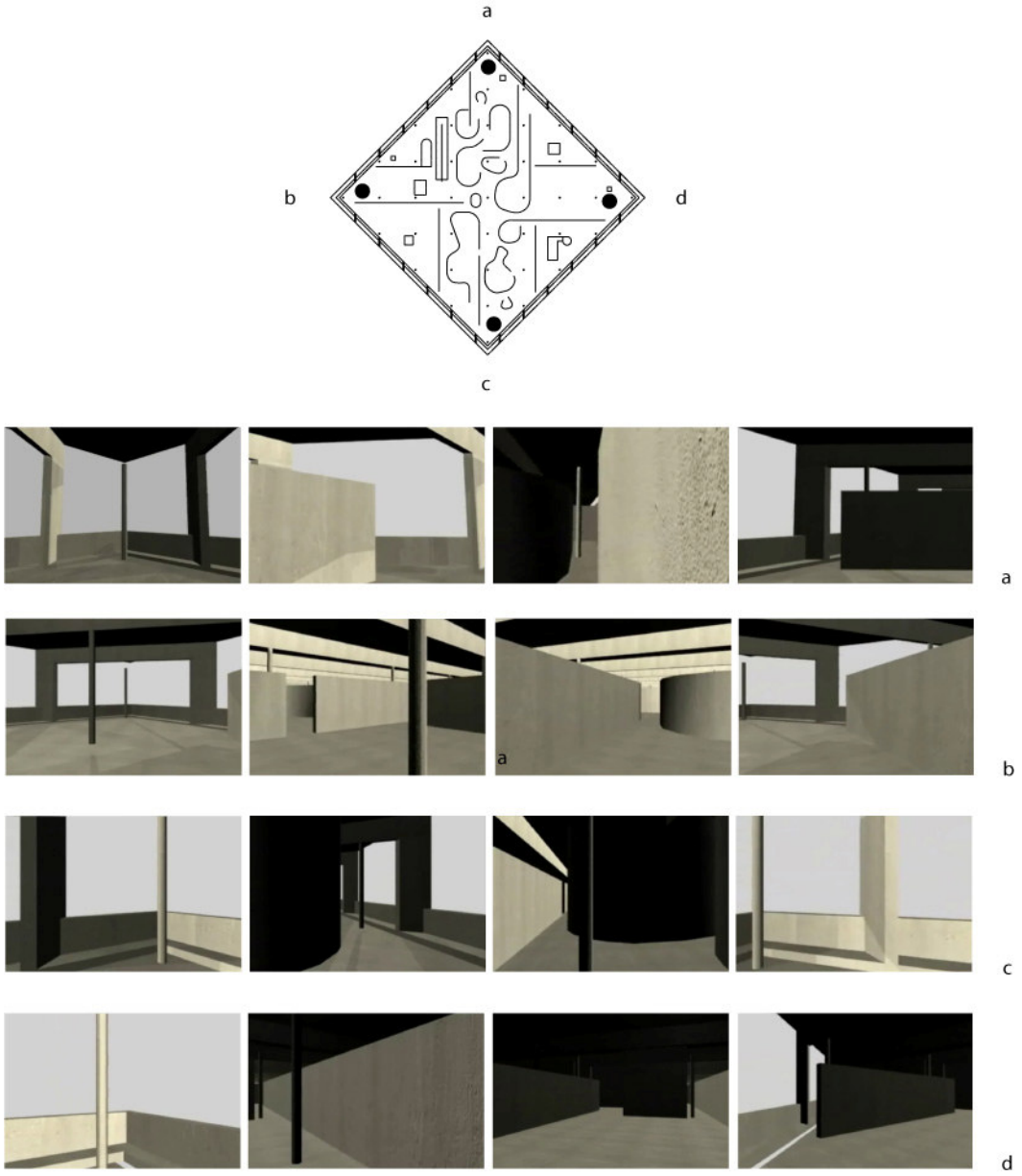

Fig.8 The Four Corners

6 Where is Flatness Spatially Registered?

We have explored the camera movement in the un-built Diamond Museum. However, we still have not answered the question if flatness can be experienced in spatial movement. The answer to this question lies in how the viewer perceives the space as a diamond instead of a square. The perception of a diamond shape or a square is interchangeable, depending on the viewer's orientation. In this circumstance, the orientation of the inner partition walls becomes crucial in that these walls suggest an underlying grid whereby a viewer must employ as his or her default orientation. It is only through perception of the rotation of the fins with respect to the periphery that the observer can recognize the shape of the whole space as a diamond rather than a square. This can be best illustrated in the movie of Camera 1. Retrospectively, one perceives a tension between the flatness as defined in relation to the handling of the hypotenuse and his/her path within the diamond space. When moving from one corner of the diamond to the opposite corner, the angle sustained between the observer and the two side corners is flattened out exactly as the observer crosses the hypotenuse.

Moreover, Hejduk's Diamond Museum exemplifies tension between the periphery and a neutralized center, which becomes obvious in the movies of Camera 3, 4 and 5 as well as the view composition 1. In Diamond Museum, the articulation of the center and the periphery involves two different kinds of wall elements: freestanding walls, which possess a strong indication of direction; and curvilinear walls, which form enclosures and challenge the orientation. A viewer occupying space enclosed by curvilinear walls would perceive him or herself with no other frame of reference or orientation than the unfolding of the surrounding curves. In the Diamond Museum, freestanding walls are positioned near the periphery while curvilinear walls are in the center. The strong sense of direction creates tension on the periphery as the 45-degree rotation is foregrounded. When the direction is neutralized by the curves in the center, tension disappears. As a result, the observer experiences the neutralization of spatial tension at the center of the diamond, and flatness is extended to the collapse of spatial tension.

7 The Role of Digital Modeling and Rendering Tools

In Hejduk's axonometric drawings, flatness is seen. In the computerized space, flatness is also seen. However, the interiorized "seen" of the latter differentiates itself from the externalized and distanced "seen" of the former. Because seen from interior, one cannot perceive the whole space at one glance. Time and sequence is involved. Therefore, in order to perceive flatness of space, one still has to retrospectively construct the space in his or her mind.

Reconstructing movies within the space best documents the characters of seeing from within the space. More importantly, seeing is taken beyond merely visual. Digital modeling and rendering tools play a role at a conceptual level of exploration.

References:

Gibson, J. J. (1979). *Eological Approach to Visual Perception*. Boston: Houghton Mifflin Company.

Hejduk, J. (1985). *Mask of Medusa: Works 1947 – 1983.* Rizzoli Press.

Hillier, B, and Hanson, J. (c1984). *The Social Logic of Space*. Cambridge University Press.