



Tomás Navarro, True Hologram

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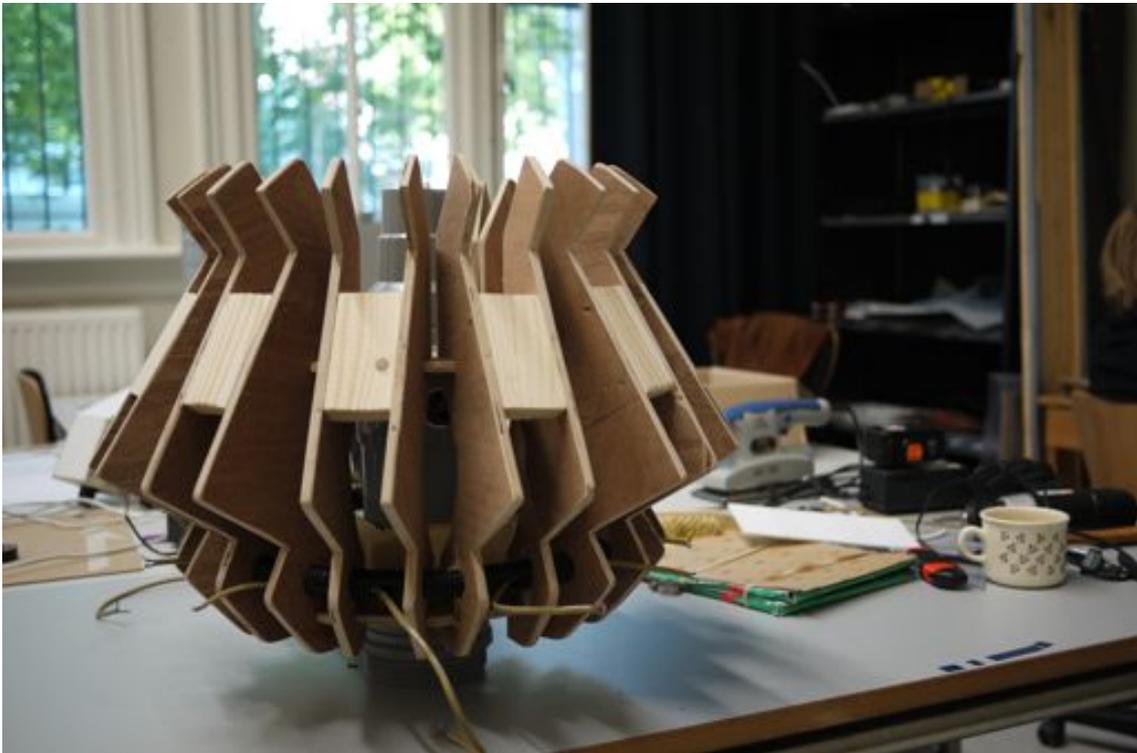
Introduction.

The project True Hologram is a research based on self-directed methodologies for the development of a sustainable, low-tech and artistically oriented 3d display outcome.

The specific target to overcome is therefore 3d displays and widely holography, understood by me as technological boundary in the sociological-artistic panorama that will be removed soon through New Media artistic achievements.

In order to explain correctly the reasons by which I devoted my study in how transcend the above-mentioned frontier in 3d images projection I must stand out the context in which this artwork has been developed and why I'm highlighting specifically holography as a limit (see chapter 2). This text will provide a better understanding of my personal role as images creator on the XXI century and why I aiming for sustainable and alternative 3D display technology in my process.

New media could be widely synthesized as the collateral outcome of contemporary interaction with men and his environment, inevitably anchored on the ubiquitous technological context. Therefore society is embracing new numerical-based (digital) channels of communication as natural evolution of culture and mirroring them back as media production, closing perfectly the vitally process of self-expression and absorbency of culture.



*" [W]e see now that the axioms of a geometry are simply definitions, and that the theorems of a geometry are simply the logical consequences of these definitions. A geometry is not in itself about physical space; in itself it cannot be said to be "about" anything. But we can use geometry to reason about physical space."*

*Joseph Kosuth regarding art as tautology, in "Art after philosophy".*

Our culture, from oral exchange of knowledge, grew up based on linear codes (books and speech's syntaxes) until electronics came up. For centuries our cultural and I mean specifically occidental culture which is the one that indexes history, has been mentally working with reductive, scientific and definitively linear and logic systems: The existence could be determined and analyzed through syllogisms: Socrates is mortal, all men are mortal therefore Socrates is a man.

Symbols are conglomerates of ideas and interactions among humans, synthesized in tautological (self-contained) codes of communication and prepared to be used as a tool for reaching knowledge. New Media implies a de-corporization of the language (traditionally figurative) and a re-corporization in new syntaxes, moreover symbols.

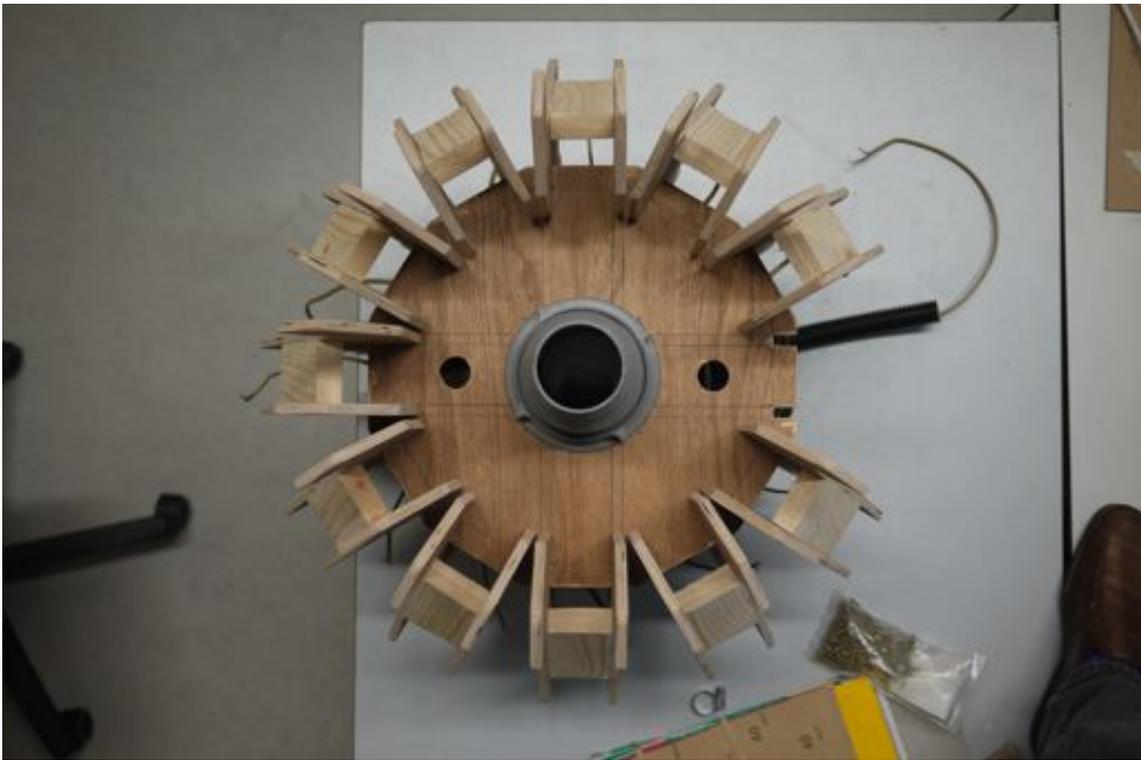
The symbolic lexicon could be therefore much more complete as it gathers fluid significance to each unit of a multimedia and interactive alphabet, rather than indexical sequences of printed significances with a unique and irrefutable meaning (to be agreed or refused). This lexicon aims to be a tautology itself, globally real-time generated.

*"[T]he illiterate of the future will not be inexperienced in writing but unaware of the photo "*

*Moholy-Nagy, quoted by Walter Benjamin on "Sobre la fotografía", spanish collection of Benjamin's press-releases.*

By the using of self-invented methodologies and sustainable alternative technology I want to ascribe my work in those contemporary coordinates of tautological praxis; True Hologram could be understood as symbolic: is a definition by itself that no requires specific explanations of what it is.

Also, it sets a discursive base between past and future of photographic language: a space anchored in an epistemological reasoned achievement through personal experience (alchemy) that finally makes the artwork incontrovertible as it generates its own photographic substance. True Hologram not only describes behaviour of physics but definitions of art/media, being its main characteristic the utterance (*from Dennis Oppenheim`s thoughts on arts*).



*True Hologram's device skeleton.*

True Hologram.

True Hologram is a lens-based and self-invented 3d display that projects a photorealistic volume in a column of cold mist. The device gathers DIY methodologies, smart/affordable approaches to 3d imagery and re-adapted sustainable technology in order to achieve a floating volume formed just by the light that is cast, lenses, photographic transparencies and a smoke-saturated medium.



*True Hologram first prototype; long exposure photo-documentation. We can appreciate how the projected volume, a bust, floats in the space.*

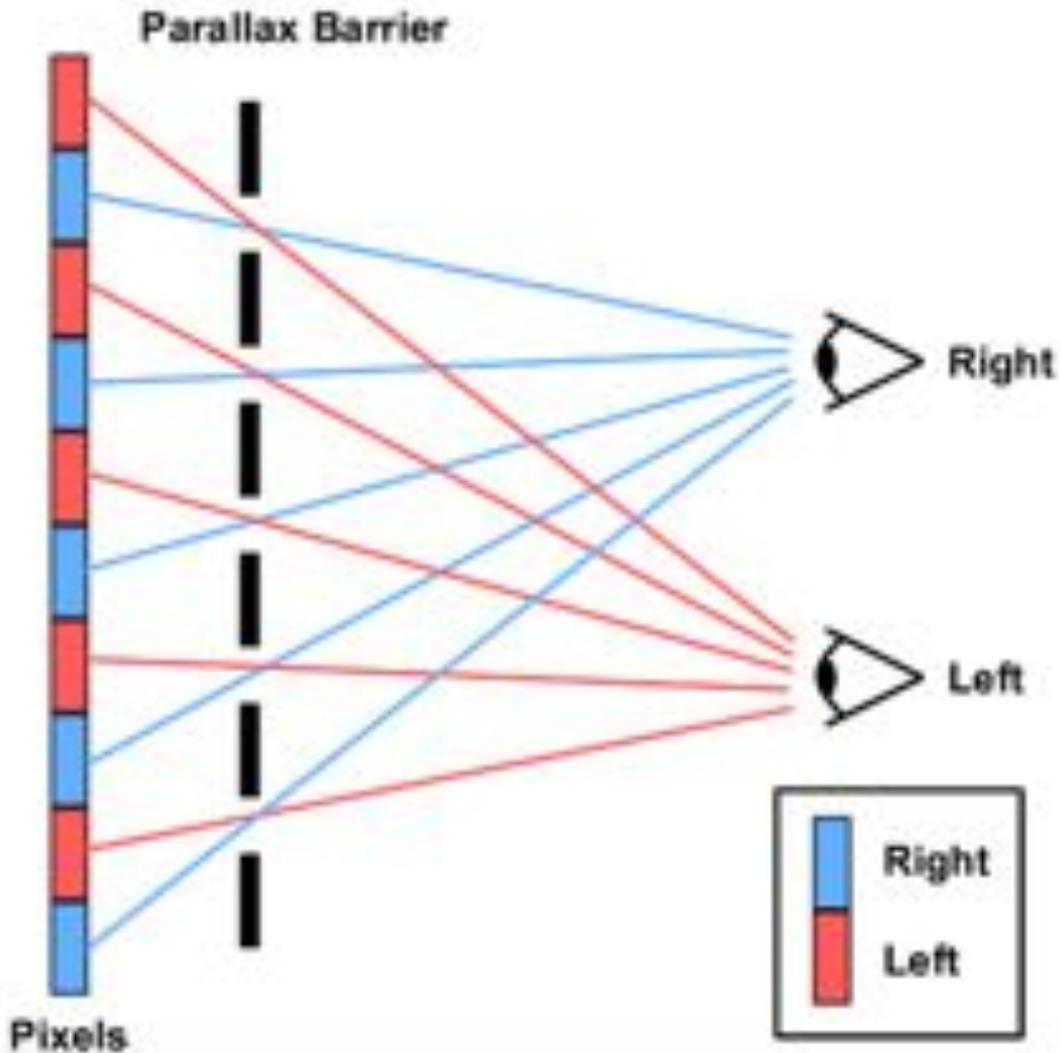
The project is characterized by the theoretical research of the stand-alone 360-projection hologram avoiding any surface of projection and the development of the necessary technology; the final execution of it is an intuitive and artistic avant-garde of the visual culture of our near future.

All of this could be meaningless if not sustained by an accurate technical framework and further formalization as an artistic object that could engage the reaction on the audience.

The very beginning of True Hologram was a simple thought on cinematic achievements, motivated by previous practices about generating 3d spaces from, and integrated with, real-live footage. The question that triggered the research was: what is the real meaning of re-assembling a 3D space from 2D footage's space geometry? And: what I can do in order to go further in the challenge? The answer was obviously to generate a plausible 3D projection from 2D inputs and **break the inevitable flatness of photographic/cinematic media.**

Conceptually the specific technical research of True Hologram began with an approach to previous 3D imagery, specifically the technologies developed to record the volume of an object: holography.

Holography is the process by which we could record the volume of any subject and reproduce a 3D photographic representation of it. However, the media faces the unavoidable flat medium of screening; the volumetric images are formally a "multilayered photography", a flat screen able to show the volume of the subject and inevitably just an illusion of parallax, which is not conceptually different from stereoscopic photography, lenticular vision or others outcomes based on stereopsis and parallax barriers. On the other hand, formally there are differences between holography and stereopsis outcomes, we will be back on it later.



The real improvement of what we know as holography was the effective measurement of the space using laser beamers, applied normally on hi-tech laboratories to challenges that had not that much to do with the images' realm.



On the other hand, as image, the laser holography cannot overcome the category of "artefact"; the final experience is almost the same of what had been done two centuries ago with stereoscopic images, which were pop culture around 1850. However, the laser holography is able to show us more of the parallax (more angles) of the original subject; the viewer is able to slightly "turn around" the 3D illusion. In stereography a specific and static POV is required: we can appreciate the depth of the original scene but not "travel" around it.

The improvement on laser holography regarding imagery is therefore to make the image self-standing as print media and effectively record the volume of the subject independently from the POV as no-camera is involved; also a parallax barrier device isn't needed in order to experience it.

However the inevitable chromatic aberration make laser holography less interesting; still today stereoscopic-based outcomes are a much more complete immersive experience on 3D subjects due to what we see is fully photorealistic (this specific lucubration will be expanded in the second chapter).



1

Parallel to technical features of holography we should briefly recap on what the word means in our culture. As I was born in 1982 I cannot continue without mentioning Star Wars: A New Hope. In the movie, the characters interact with "holograms": volumetric and photorealistic projections of real people (video-conferences) and also virtual images projected as entertainment games, both of them curiously full of artefacts, probably aiming to render them "real" inside the fiction, and explaining therefore that the technology in the future has been developed but is formally still not perfect (equivalent to the 'white noise of the phone or radio). We can agree that today's common understanding of holography is much more related to George Lucas' imaginary than the old-fashioned laser technology.

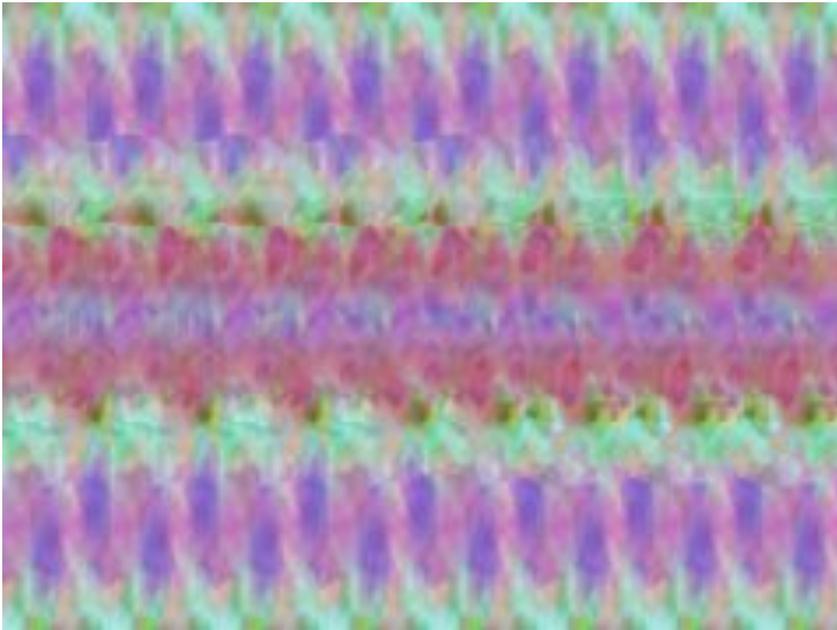
Therefore, commonly defined by futuristic movies, the **true holographic** media is still an utopic challenge; the orthodox, agreed hologram, is the one which projects a 3d object floating in the space, it can be surrounded and "touched" and is not based on the 'after-images' produced through the brains perception, such the autostereograms, widely distributed throughout the 90s and mostly abandoned due to the same lack of compromise with photorealism.

However, we will return to the topic of autostereograms, because their raw material is effectively the core of my research. But before, I want to finish the quick recap of contemporary 3D challenges.

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<sup>1</sup> The Kiss (II), 1974, by Lloyd Cross. Multiplex Moving Hologram. MIT Museum.

<sup>2</sup> USC's spinning mirror 3d display.



Continuing with the photo-real struggle in 3D images we should single out laser holography, which effectively records the volume of an object in the relative space, and unlike other outcomes based on non-telemetric techniques it relies on binocular disparity (the distance between the eyes).

We should start by considering the actual trend of 3D cinema. The goal of it is to offer a much more complete immersive experience in the screening, by feeling the illusion that some objects are close while others are far away. Developed technically many years ago and underutilized due to the very expensive production costs (the same circumstances apply for other big formats such as Cinerama and high frame-rate cinema, to be revived soon), 3D cinema has been revived due to the much more flexible features of digital cinema.

3D cinema is based again on stereography and parallax barrier, a device is required in order to experience it:

the 3D glasses. The old ones, based on anaglyphic images, red/blue or red/green, allow the natural stereopsis of the eye/brain to occur whilst watching a single-channel image which overlays the parallax duality by separating colour channels; but again we're dealing with a uncomfortable chromatic aberration, if photorealism is the intended outcome.

Recent technological improvements, enabled by the flexibility of digital projectors and facilities on raw-materials production, allowed the development of glasses that uses polarizing techniques (vertical and horizontal barriers) and high speed shutters, which perform a better performance in respect to colours.

Conceptually and not merely depending of the methodology, the flat medium, the screen, is still territory of 3D; the intended hologram is inevitably a screened or an apparition printed on **parallax**.

However, new challenges to produce the true hologram have been taken up by researches and designers around the world, with satisfactory results.

The conceptual common ground for all of them is the old parabolic mirror artefact: the total amount of reflections from an object deployed on the mirror gathers in a specific spot, in which we can see a replica of the subject formed by reflected light.

Therefore, in the above-mentioned challenges, spinning mirrors or half-mirror pyramids have been used in order to catch, in a specific spot, a multi-angle projection (cast light) of a multi-angle CGI or recorded image.



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Even if these latest results fully depict a photorealistic 3D projection they cannot be touched; conceptually implies that they are caught in a certain ether or non-natural substance, thus their presence cannot take place in our world; they need the support of an impenetrable apparatus, the hologram is caught inside a cage and that makes them less interesting.

Finished the 3D displays overview I'll now explain the specific theoretical work done for True Hologram. After briefly sketching the parameters of today's technical panorama I should highlight the inspiration of the whole process, which links us again to autostereograms as practical example.

Z-buffer is an extra layer of a **photorealistic** and computer generated image that contains a precise map of the three dimensional geometry of the scene. It's exactly what human stereopsis does: map the depth through binocular disparity.

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<sup>2</sup> USC's spinning mirror 3d display.

<sup>3</sup> Alexander McQueen's mirror hologram youtube footage.

<sup>4</sup> Parabolic mirror hologram youtube footage.

The science behind it is simple, and we can use biology in order to explain it quickly: the owl, when hunting, moves slightly the head from left to right and back again in order to triangulate better the distant from the victim. All animals with binocular vision (the eyes are in the same plane, therefore parallel) are able to do stereopsis and consequently perceive depth, as humans do.

In CGI, the Z-buffer layer is a greyscale render of the image in which gray values are correlative coordinates in the z-axis (depth): white pixels are close to the camera and black pixels far away from it.



Commonly used for emulating photorealistic depth of field in rendering 3D scenes, the Z-buffer is not a stereoscopic image; there's not a binocular duality on it but just a telemetric-mapping graphic to be used in CGI 2D outputs as metadata.

However, Z-buffer renderings have been applied to autostereograms (SIRDS), which basically codify the parallax barrier of stereography by using a mathematical algorithm, being able to synthesize the barrier on a single image by using a pattern based on pairs (correlative to left and right eye). In SIRDS outputs the stereopsis doesn't requires a device; the 3D illusion is formed directly in the brain as "after-image".

We could perceive the illusion of volume just by focusing our eyes parallel as looking through the image towards an imaginary horizon. Autostereograms requires practice and concentration. Technically, SIRDS images uses a random dot pattern, algorithmically generated, that creates pairs of pixels that are correlative in the space. The brain, by distorting the normal features of binocular disparity, recombines those pixels and forms the illusion of parallax aligning left-eye pixels and right-eye pixels. Once the user is able to properly trick the brain, an under-layered 3D model appears from the apparently chaotic pattern.

The specific object we can see on autostereograms is indeed a Z-buffer render from a 3D model.

Almost artistically (as media tautology) the content of the 3D autostereogram is the z-buffer, which in itself is nothing more than a graphic representation of a depth mask and not an 3D image at all at first sight.



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<sup>5</sup>Meditation space, single channel 3D artwork. Animated autotereogram. Tomas Navarro, Rotterdam 2012.

In a previous work, "*Meditation Space*", I proposed an animated SIRDS single-channel 3D screening: hidden behind the apparently "magic carpet" lookalike video-output, through the zen-like practice of logical suspension (concentration and negation of the ego), a three dimensional image can be apprehended.

Meditation Space proposes a 3D cinematic experience that needs the active participation of the audience; autostereograms implies that the brain must overcome the automatic coordination between focus and convergence. Therefore the artwork requires a certain state of mind, practice and discipline.

Z-buffering and parabolic mirrors were indeed the inspiration for the first concept sketches of True Hologram. The idea was to set up a parabolic projection in which each pixel is aligned in a relative point of the z-axis in the same way the z-buffer rendering greyscale is correlative with values of depth, being able consequently to cast focused light in specific points of the projection space.

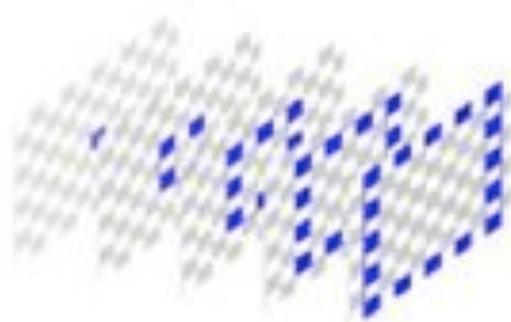
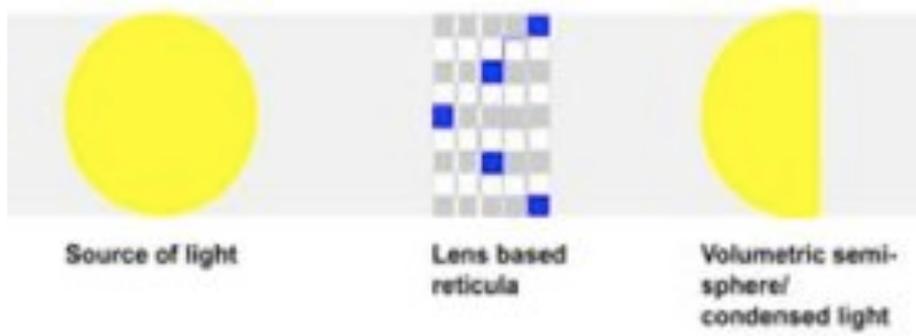
The aim of this method was to work with a grid of concentrated-light pixels in which each pixel, more than depicting colours and luminance, would also describe the depth relative of those pixels onto space (z-axis). Each light pixel is formally a tube that works as a simple collimation device, with a plano-convex lens in a specific distance from the source of light. In that way, the more complex the grid is, the more It will be able to concentrate points of light following an specific order in the three Cartesian axis of the space (x,y,z).

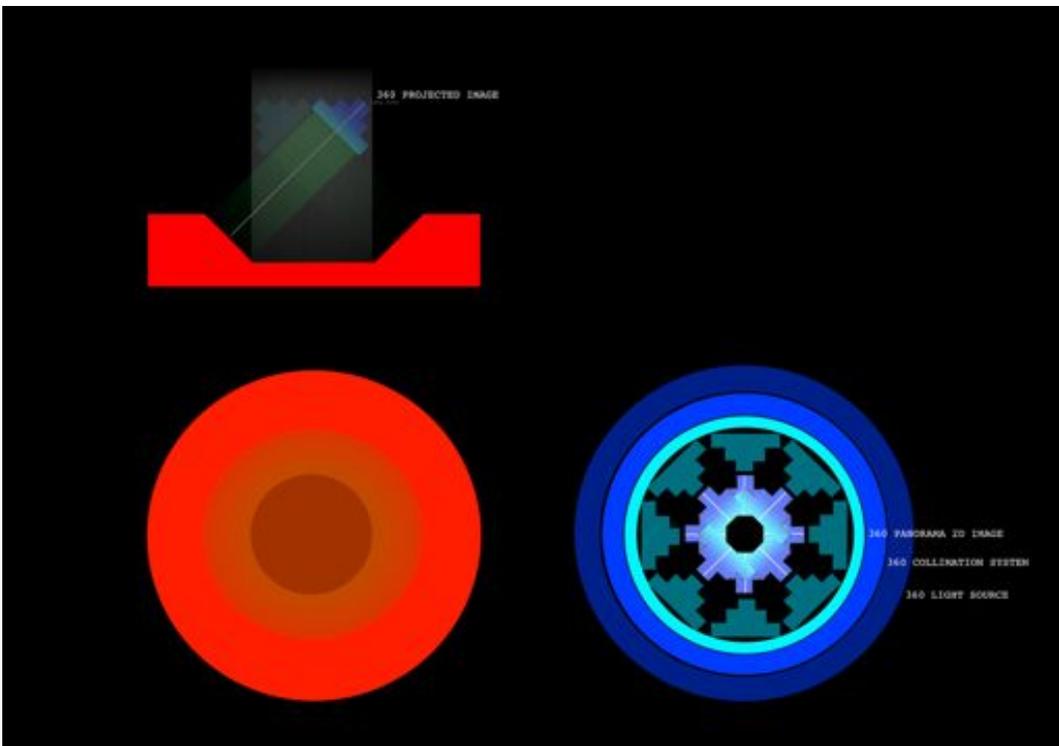
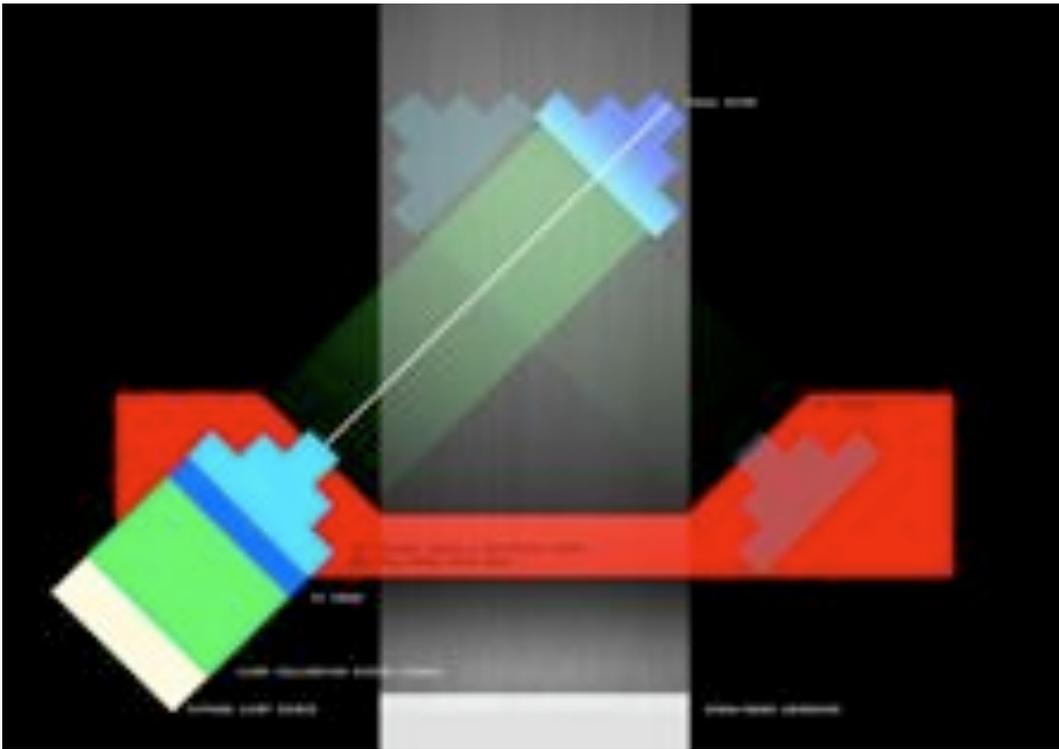
After the very first tests of focusing beams of light, using 35mm negatives and magnifying glasses, I soon encountered two main problems. The first, the extreme complexity of building a grid of mini-lenses with available materials and secondly, the weakness of light and its inevitable continuity in space when cast as a beam.

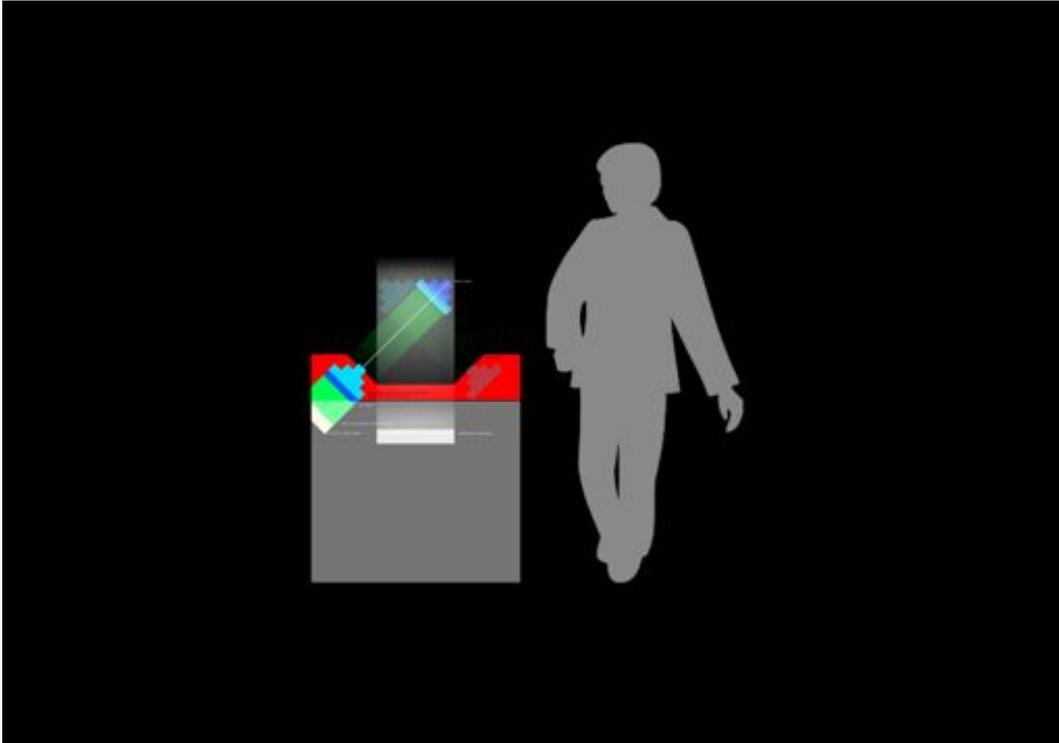
I was therefore forced to catch the light in a reflective substance; (ideas of using high frame-rate strobe lights in order to render the illusion that the beam stops at a certain point from the source of light was refused as impossible or improbable), so the alternative was to work with a smoke-saturated medium in which the projection is contained.

Slowly the True Hologram concept was approaching its final prototyping form: a 360 degree projection with groups of lens-based reticula (not related to pixels but to areas in order to simplify the device), aligned in the z-axis, and a column of smoke in the middle of it, providing the ethereal projection surface.

As working material I drew a few sketches in order to explain my ideas regarding images' sourcing and how the lens-grid worked on a theoretical level. I aimed to replicate the z-buffer function by linking, through a lens-based additive layer, the photographic image with the correlative depth mask. My supposition was that the lens-based depth mask would be able to focus the source image in several focal planes, therefore creating the illusion of volume in the smoke.

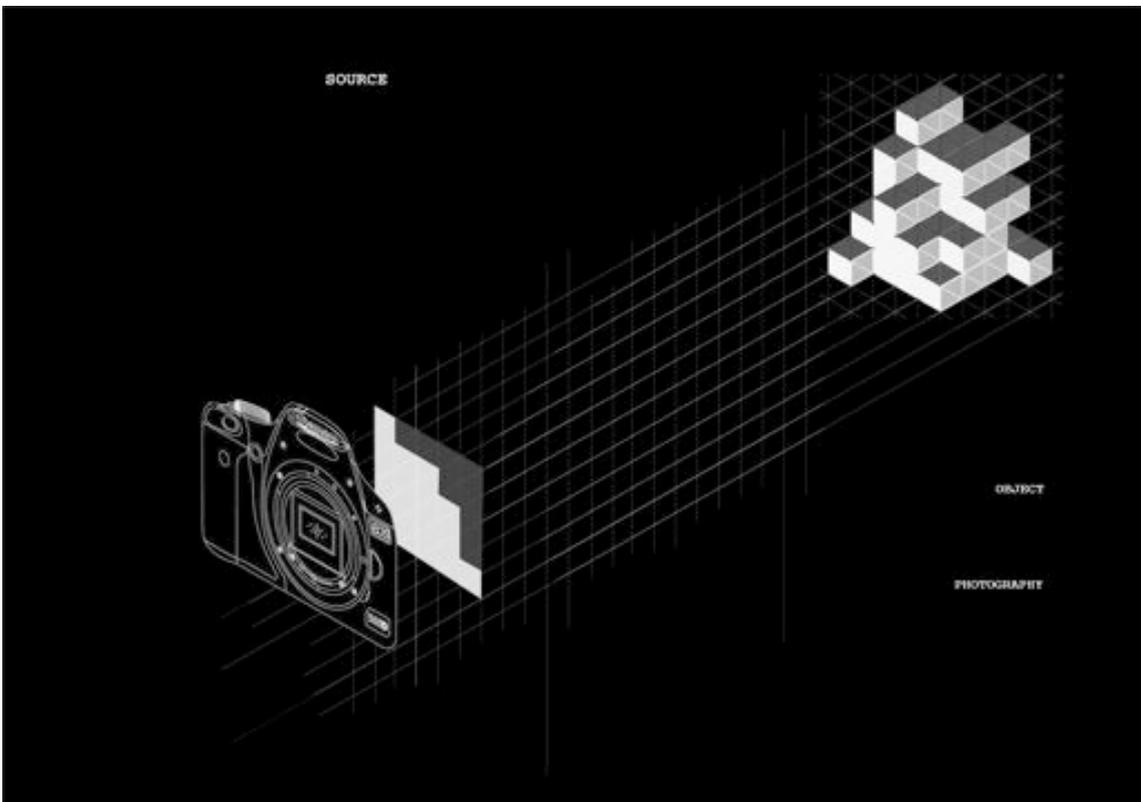
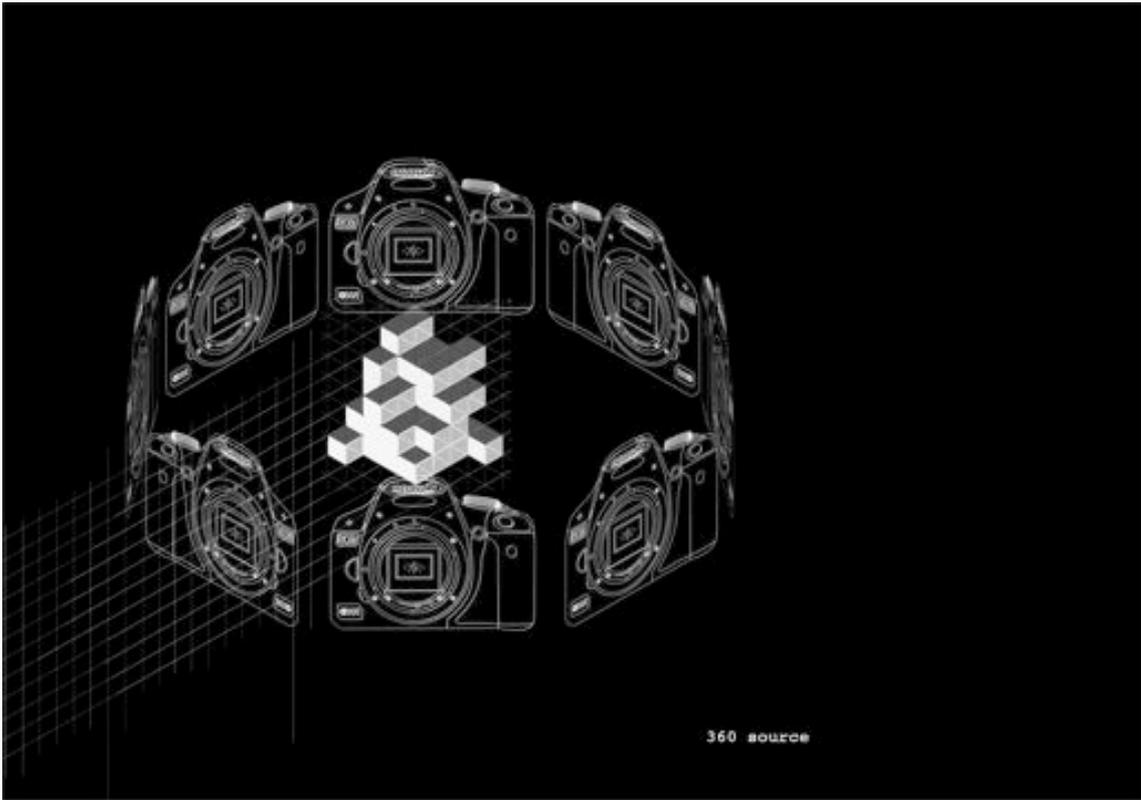


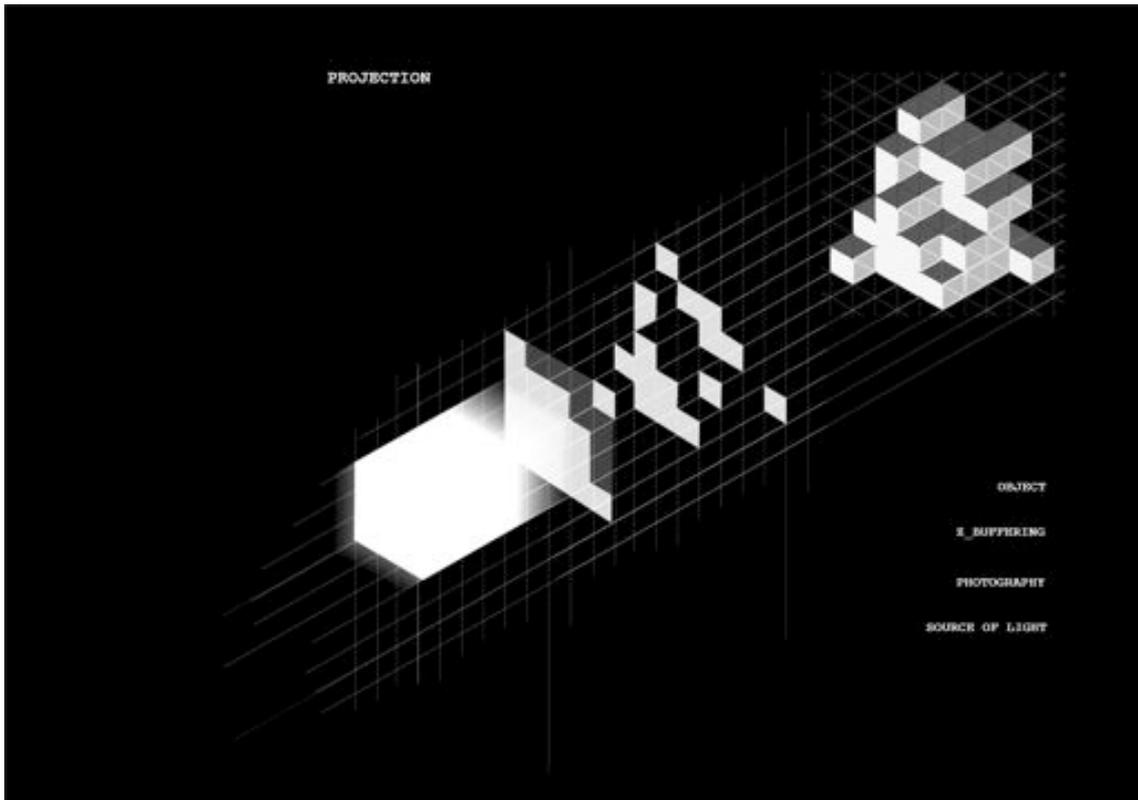




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Theoretically it was almost clear in my mind that the technique could work; through basic experimentation I was successful in testing the plausibility of perceiving the multiple focal plane on smoke. Even if the projected image extends its forms in the beam's space, the combination of a narrow column of smoke and the precise sharpness of the focused projection is enough to create the illusion of distance between two differently focused parts of the image.





Meanwhile theorizing the volumetric projection on smoke I immersed myself in extensive research into optics, DIY projectors, smoke machines and structural materials in order to build a more accurate prototype and also explore the possibilities of being successful with a more sophisticated machine, as described in the previous sketches.

At this point, being clear the circumstances and the goals I wanted to achieve for True Hologram, I can conclude the summary of the study and begin the practical process; I will also approach this chronologically.

*"[T]he invention of an hypothesis in order to explain a certain natural process, then the arranging of conditions under which that process may intentionally be brought about in accordance with the hypothesis, and finally, the justification or refutation of the hypothesis, depending on the outcome of the experiment".*

*From Picatrix, regarding the scientific experiment method.*



The first step was to build a couple of DIY beamers for still images projection. The experiments with 35mm photo film and magnifying glasses were productive but unstable and uncomfortable, so I decide to have better apparatus with moving parts, proper optics and versatile features. The basic materials are: a LED bulb, a white diffusion photo filter (paper), a magnifying glass and two pocketsize acrylic Fresnel lens. The body and frames are made using cardboard and foam board, the size of the device is

conditioned by lens size. No part was glued; all the frames can very easily be moved and fixed again.



The bulb cast a beam of light onto a white diffusion frame, the diffused light incises on a Fresnel lens, which condenses the light, and continues through the frame that contains the image. The beam is finally projected due to a combination of a second Fresnel lens and a magnifying glass. I observed that a third Fresnel lens between the two optical elements helps to remove vignette effect and chromatic aberration (produced by low-quality plastic lenses).

After finishing the two projectors I decided to engage myself in a simple test: project a dual-angle image on a column of steam in order to achieve the illusion of parallax in the projected "stereographic" image. The test didn't use depth mask properties yet as the goal was just

to perceive the parallax in a stand-alone projection, by moving slightly around the projection space.



The focal plane was set at 16.5 cm; the size of the projected image is almost the same as the framed print (5.5 X 3.7). The image I selected for the experiment was a self-portrait "stereography", quickly achieved by using a webcam and easily hand-painted onto an acrylic sheet. A boiler and teapot provided the smoke medium.

I deemed the experiment to be a success because the parallax was there, the projections produced two angles of an object; as studied before, the beams extends in space, but both focal plain and condition of the smoke creates the illusion of a volume floating in a specific place. Some days later I wrote in my notes:



*[A]s conceptual deduction I should establish a discrepancy with others stereographic practices. Here's not involved any "brainy" process of gathering two images through parallax but simply perceive the unified projection moving from one angle to another. And definitively that's the main goal: a true holographic illusion in which the object is formally in front of you and could be touched. So, the stereopsis is relative, as I'm not using the binocular disparity but on the other hand those values of stereopsis are applied to the images sourcing process.*

*The main problems I want to fix are the instability of the smoke medium (is really difficult to appreciate the qualities of the images on a tiny and moving column of steam) and the roughness of the source image (hand painted acrylic). Also I realized that triangulating a stereography is not as easy as I expected so a better approach for imaging should be found: the angles are wrong (binocular disparity too forced).*

That experiment was really important as it sets up three main keywords for the next outcomes: the necessary improvement on the smoke medium for a better performance, to continue working on transparencies, and to respect my intuition.

As I wanted to expand the test I built three more projectors, up to five, meanwhile searching for an adequate smoke machine. As I had at that point a clear idea of the requirements I finally decided to buy an ultrasonic humidifier; a simple and small device that uses ultrasound to atomize water. The resulting "cold mist" is a stable, ultra-dense, white smoke. I was also interested in the feature of using just tap water as a source, not glycerine-based machines or dry ice, which were unaffordable or not suitable options. I also noticed that movement of the steam was necessary in order to remove "grain", produced by water particles in the projection.

The great idea came at the right moment. I was struggling with the depth mask (z-buffer) feature; the lens-based concept, even if working with the PVC Fresnel lenses, was expensive and complex. At some undetermined point I realized that, rather than working the z-buffer concept applied the lenses focusing system, I could easily apply it directly on the transparencies-based source image by separating it into multiple layers.



It may sound obvious now but at the time it was a great improvement, which kept the work as simple as desired and the approach to source image much more engaging and flexible. By using Photoshop, some basic notions on drawing and printable transparencies I was able to create multilayered source-images, that, placed each layer at the correct distance on the beamer replicates the form-volume of the original subject in its projected replica.

The binomial thesis of True Hologram 3D display was at this point already announced:

- 1. The projected image performs as laser holography: it shows multiple angles of a subject depending of the POV of the audience.**
- 2. The source image is a photographic slide with z-buffer properties in order to beam the illusion of volume trough multiple focal planes.**



6

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<sup>6</sup> True Hologram first prototype video documentation.

Now it is time to make a small leap in time and jump directly to the explanation of the first True Hologram prototype, tested on 02/04/2012: a functional device that beams approximately 120 degrees of a bust (self-portrait), which can be half-surrounded and touched.



The first prototype is composed by 5 transparency beamers, 5 multi-layered self-portraits showing 5 angles of the subject and electronic humidifier that generates a column of cold mist, channelled by using a small 12v fan and a tubular system.

Technically the process for obtaining the 3D display consist of projecting 5 angles of a subject, aligning the horizontal and vertical axis (x,y) in the middle of the cold mist column. The z-buffer methodolgy applied to the slides emphasise the volumetric perception, which is correlative to the volume of the original subject in the space (z-axis).

The audience, by placing themselves on the same projection-plane (horizontal) and moving around the mist column could apprehend the volume of the original subject as a scaled down replica.

We can see in the photo-video documentation how difficult it is to record the hologram as it presents a noticeable iridescence. This quality is less prominent in plain sight, in real-live the experience of the image is much more detailed.

In its final form True Hologram is a 360 projection expanded experience in which the main improvement is the separation between the projection plane and the resulting floating volume; using the first test horizontal morphology, a 360 projection is unviable because the projected volume is aligned with the beamers, where the best performance of it happens. The goal of the final device is to effectively set the hologram slightly separated from the device by using mirrors and prisms; therefore the audience is able to watch it as a stand-alone phenomenon without any obstruction.

Conceptually the research links the astounding panorama of optical artefacts that science developed since the invention of the camera obscura, during the Arab renaissance on tenth century of our era. The Étienne-Gaspard Robert's Phantasmagoria and the scientific objectiveness of photography sustain the phenomenological qualities of True Hologram, when viewed in retrospect. In fact, True Hologram in its actual form could have been realized two hundred years ago with magic lanterns, hand-painted glass slides and smoke. I'm not using any contemporary technology at all, however, I have been supported by the New Media context: the artwork might not be possible to realize without the inspiration and previous study on 3D contemporary achievements and the liberation of modes of production into individual self-guided processes, supported by the interaction of the global-mind and easy access to resources, which allows us the create "functional models": re-assembling pre-existing ideas and facilities into new devices with unexpected functions.

The understanding of the praxis came from circumnavigation and *bricolage*.

It seems logical to predict that technology will expand the desired immersive experiences of images, which today is still a fantasia in a plentiful 3D environment. My work will support an approach to this that uses DIY methods and individual technology development, which should be open-source and prepared to be shared, replicated and improved by others.

Sampling.

I want to finish my thesis by adding a final chapter, after contextual, conceptual and technical exposition of the research, dedicated to artistic praxis and specifically the use of photography in contemporary culture. Moreover, new ideas regarding actual coordinates in images conception will be integrated to the discourse, finally dialoguing with those general points expressed in the first chapter.

I'll recap, as a starting point, some notions of photography as a sociological phenomena. Because one of the aspects in the case of study is holography I selected this small definition by way of introduction:

***Hologram: 3D representation in photographic form.***

The adjective photographic implies a realistic image, therefore a faithful record of the zoe, which is the amount of all the entities of our empirical experience (zoe: life/existence). Thus I'll briefly explore why photography has been accepted as the objective tool for knowledge and communication and consequently established as orthodoxy within visual culture.

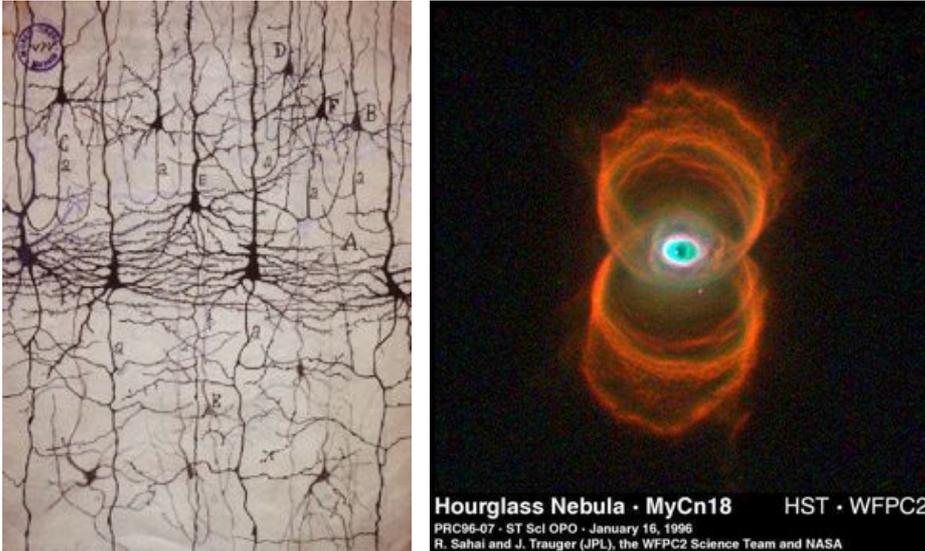
Photography is strictly referred to as the specific technology able to faithfully mirror empirical reality. Consequently it is common sense to say: 'that painting is photorealistic', or, 'the effects of that movie are truly photorealistic'. Photography is a compromise with reality.

However, different compromises with reality were executed before by applying optical techniques to fine arts, aiming for the same function of mirroring existence and memorial permanence faithfully.



Nevertheless those reality projects never reached the scientific effectiveness of the photograph, its main differences being scientific objectivity, the permanence of time and the reproducibility of the images through mechanic and chemical processes.

However both reality projects and photography share the same function: empirical cognitive experiences although, only photography was suitable for the scientific criteria of the modern era. Consequently, the primarily function of photography has mirrored our concerns with the objective realm; being also able to trespass our physiological limitations and help us to record what is vanishingly small or immeasurably far away, magnifying the range of what is possible to measure (the great concern of scientific method). In cinema and chronophotography that concern is applied to movement and time; a slow motion take is always appreciated as we are allowed to see reality in a way that is not physically possible for us. Equally Marey and Muybridge's researches were transcendental as they depicted for the first time biological mysteries and curiosities.



Nevertheless, the contemporary era transcended that first objective/scientific statement of the photographic medium; the analysis of that transition will help us trace the mind-space of visual culture.

In contemporary art praxis and theory, the ontological nature of the photograph (Barthes) has been discussed extensively. A common place for many artists and writers is the indexicality of the photographic medium. Dennis Oppenheim summarizes it simply by affirming that a photo is an index of the original event. In his work "Second burn degree" the presumably painful image on Dennis' body is incontrovertible: is an index, symbol, of the original causes and consequences of the event, synthesized in two photos capable of communicating emotions and the specific mind-space provided by the artist.

Roland Barthes said that the power of authentication exceeds the power of representation. That means that the values added by the specific circumstances of the audience are indeed the real significance of the medium (interpretation); the audience is responsible for the transition from image to reality and it happens, as said in

the first chapter, in the intimacy of our brains; even if we can share a photographic event, the true meaning of it, the translation synthesis (lecture), is individual. This condition defined our figurative visual culture; we will discuss how New Media can deal with the photorealistic medium at another level.

In the beginning of the cultural history of photography, the developers and photographers were overcome by the medium; there was no artistic aims in the photo; it was just an optical-chemical awesome process capable of record reality: consequently the photo was devote to satisfy the scientific objectiveness as that was his prominent characteristic.

The integration of linguistics and semiotics on it, the development of an epistemological discourse, came years later with the acceptance of photo as art/design and entertainment; supported by the production of affordable equipment and the consequently democratization of the media; the photographic medium was accessible to people who started to just "play" with it, without any anthropological or scientific purpose (Marien).

At this point we can pin the art theories of Bourriaud: relational aesthetics, which highlights that art practise is based on the sphere of inter-humans relations. As a relational tool the photograph traces a specific axis in which it operates:

Zoe ---- Perception ---- Intention ---- Index



7

Recap: we accept the photographic medium as a true testimony of our accumulative visual culture. The culture is constantly re-shaping the perception of reality and the intention by which it is observed. Therefore the above-depicted axis can be retraced as a circle (reality defines photography and photography re-defines reality).

Artists, thinkers and designers, in the deep core of innovation, always tried to break the limits of determinism by transgression. The formalists tried to expand the category of art definitions by expanding the format and the material qualities of the artworks. On the other hand conceptualists as Joseph Kosuth, Sol Lewitt and Land Art artists tried to expand the art experience by making the

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<sup>7</sup> A line made by walking, Richard Long, 1967. From "El arte ultimo del S.XX", Anna Maria Guasch.

artwork a stand-alone linguistic event: an idea, a symbol, a metaphor or an specific geometry.

Is now my responsibility to understand in which way the outstanding outcomes of modern imagery will transcend the **accepted ideology** in order to define a revolutionary future's culture, not feeding a model of ideas-immutability. Through my thesis I have been flagging the possibility of being creative in technological resources, as intuitive and artistic approach for outcomes that gathers past, present and future.

True Hologram is therefore indexing New Media as photographic device that depicts faithfully our environment in an unexpected and more complex way (alternative 3d display), the execution of the work in strictly DIY coordinates makes it a self-contained personal experience about images and technology in contemporary challenges that we can authenticate as genuine and symbolic.

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