

# PROJECT HVECT

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## Abstract:

Holovect is the emerging technology in the visual communication and 3D imaging. It is the initiative of the very big project of 3D viewing of images and videos in our naked eyes with 360 degree of viewing angle. Holovect is also capable of 360 degree viewing but it can display only the vector images. It is done by controlling the air temperature and pressure to vary the refractive index of the air. It works on the concept of reflection, refraction and total internal reflection of the laser beam. The vector images are loaded to the system which controls the air modification and the motion of the LASER. There are many applications of Holovect. It can be used in the 3D viewing and learning of machines structure and working. Thus Holovect is indeed in all the field.

## I. INTRODUCTION

Holovect is the 3D projecting technology which is used to project the vector images. The projection of the image is by projecting the LASER beam in the were there is modified air. The modified air chamber is called as the draw box. The laser beam gets reflected in the draw

box at different angles. So its visible in all the angles for the viewer. The motion of the laser is controlled by the main computer. The main computer gets the input via the pen drive. And the input image may be in the format of the STL format then it is converted into visualizing code which is readable by the processor of the main computer. By reading the code the processor controls the motion and angle of the laser. Thus the beam is deviated to the required place with required angle inside the draw box. Thus the image is formed. By reading the code the processor controls the motion and angle of the laser. Thus the beam is deviated to the required place with required angle inside the draw box. Thus the image is formed.

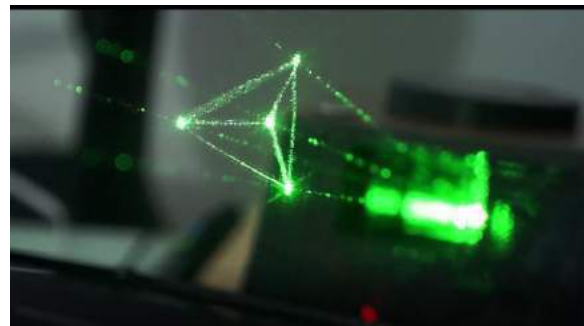


Fig 1: Holovect of a pyramid

## II. VECTOR IMAGES

The vector images are the images which is drawn by just joining the vector points in the 3D space. The vector images drawn in the holovect just starts with the single point and the two points are joined together to form a line. And the more points in the same plane are joined to get the vector plane image. Then by joining the points of the vector coordinates at different planes makes the 3D object. The planar vector image of the square is given in below image, which is drawn by joining the 4 points of the same plane.

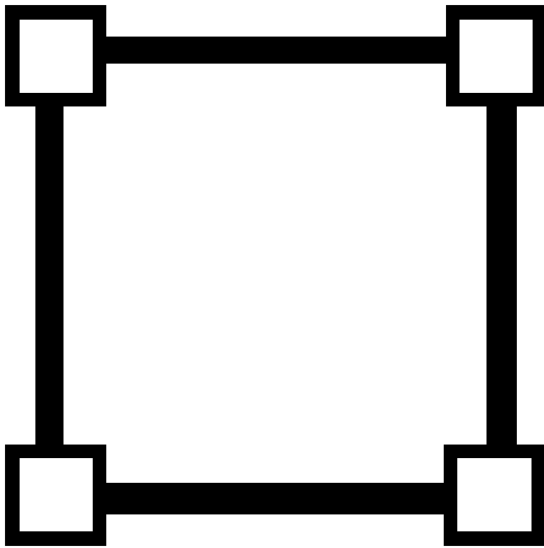


Fig 2: Vector image of a square.

## III. HOLOGRAPHY

Holovect images are NOT holograms but instead volumetric vector images projected onto modified air (i.e. projections in space). This distinction is due to the fact that a hologram is a

recording of interference patterns on film or glass plates that contains three-dimensional information about an object (Greek root "holo" means whole or complete, and "gram" means record). However, since Holovect images contain three dimensional information and are free-floating objects in air, they are most certainly holographic. They are real 3-D projections.

## IV. MIRRAGE TECHNOLOGY

The principles are simple. When light travels between two different mediums in most cases you get three different effects to some degree: refraction (bending), reflection, and/or diffusion, depending on the different "refractive index" (RI) of the materials. An example of this are mirages, which occur when a portion of air has a different RI than its surroundings, causing light beams to bend and be reflected in unexpected ways. This can happen because of temperature or pressure differences from one region to the next. With the holovect technology, we have invented how to control air within a box shaped section of space to precisely modify the RI within specific regions to refract and reflect a laser beam. This modification raises the "albedo" which is defined as the proportion of the incident light that is reflected by a surface, as well as the refractive properties at the boundary between the modified and unmodified air. Therefore, by simultaneously controlling the aim of the laser and the position of a modified air column, a computer can place a volumetric pixel or voxel of

light anywhere in 3D space. Then by keeping a laser beam on as it aims from point A to point B a line is drawn which is a 3D vector, and by joining many vectors in a sequence a holographic vector object can be generated. The Holovect is capable of drawing a complete image 50 times per second within a 12cm by 12cm by 12cm cube we call the “drawbox”. Outside of this box things get messy, unpredictable and, in general, not useful.

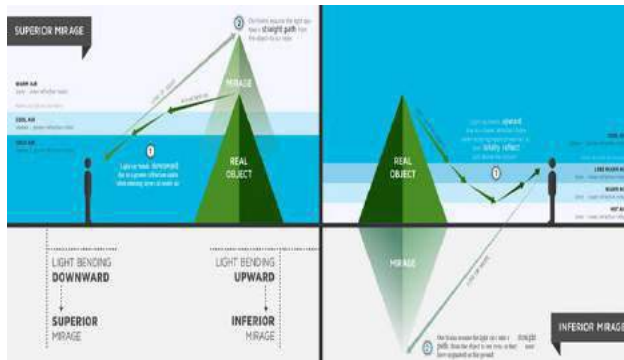


Fig 3: Mirage technology

## V. DRAW BOX

The draw box is the part of the holovect where the vector image is actually drawn. It is the small 12cmX12cmX12cm space in the air. In the draw box the air inside it is modified. The modification air is with respect of the pressure and temperature of the air inside the draw box. The modification of the air is controlled by the main processor which has the input. It gives the information where to modify the air and to what level it should be modified. The draw box actually plays the major role in the holovect

projection. Without the draw box nothing can be done. The movement and the spinning of the image is controlled by the draw box. By changing the position of the modified air. That’s why draw box plays a major role in the holovect. The draw box is in the particular slope with parallel to the straight beam of the laser as shown in the below image. This is for the easy view of the viewer and for the ease of the control. The air in the draw box is controlled by the heater and the air blower at a particular speed, to control the pressure of the draw box. The temperature is regulated by a thermostat present at the bottom of the draw box. This process is too complicated and to be done with more accuracy for better result.



Fig 4: Draw box

## VI. LASER BOX

The laser box is the portion of the holovect from where the laser beam is projected. The laser box is connected with the main processor which gives the command to the laser box. The laser box controls the laser actions, such

as the left, right, top and the bottom extent of the laser beam and the angle of the laser beam. The laser beam from it projects as the vector image in the draw box. The laser angle is controlled by the servo motor. The servo motor controls the angle of the laser beam in both X and Y direction so that the beam can be projected to any point on the draw box. The laser box contains all the controllers and the processors required for the action.



Fig 5: Laser Box

## VII. VECTS

“Vect” objects are the data-structure developed for the Holovect. Put simply it is a list of 3D coordinates that result in lines drawn in a head-to-tail sequence in space, which are compiled into Vect class objects. The files are straightforward and easy to create using a variety of online tools, spreadsheets, or good old pencil and graph paper. Once loaded, vects can be rotated in three axes and moved around within the cubic canvas. These objects can be manipulated using the control knob, preset functions such as

spin and move, or used within your own applications. The vects are simply the point that are to be joined to get a vector image. This is feeded to the computer via the pen drive. The software then processes the data of the vects and they are send i.e. the data is send to the laser box and the draw box for the required action of them. The vects are drawn in the software called plotly and are processed by the codes written in the python language. Plotly is the software used to make the charts and are can be collaborated with the python for the control of the servo motor and the heater for the projection of the vector images. The plotly is very easy to use and to draw the required images as of our wish. The python is the easiest programming language evolved in the recent times.

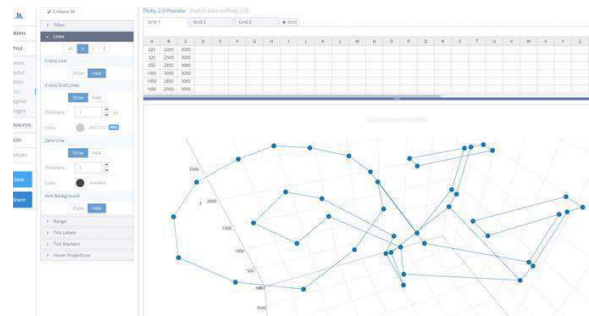


Fig 6: Vects of a vector image (copter)

## VIII. 3D PRINTING PREVISUALISER

Holovect can be used to visualize CAD models in STL format before 3D printing. This can be done in two ways: importing STL files and convert them to Vect format, or visualized directly. Depending on the desired visualization,

converting the STL will result in a volumetric wireframe projection, whereas direct STL visualization slices the model into layers which is ideal to inspect for potential manufacturing errors and revise inner structure in hollow parts before printing. This volumetric pre-visualization ability increases design and manufacturing efficiency by saving time and printing material before committing to a long printing process. The previsualizing of the vector image shows the planar image i.e. the 2D image. As it is simple to project. After inspecting the 2D image, the long process of the 3D image printing can be carried on.



Fig 7: Previsualizing of the 3D image

#### IX. APPLICATION

The holovect is used in many applications, some of them are listed below:

1. The holovect can be used in the designing and viewing of machines and 3D models before production.
2. It can be used for the branding of companies and for the advertising of products.

3. It can be used to view the working of the machine before production.
4. The holovect can be used in the study of human body too.
5. It can also be used in the field of civil, for planning and modelling of building before its construction.
6. It can also be used in gaming.

#### X. ADVANTAGES

Since it is the first progress of the 3D projection there are no specific advantages in the holovect

#### XI. DISADVANTAGES

The disadvantages of the holovect are as follow,

1. The initial design cost is very high.
2. Since it depends on the modified air (by temperature and pressure it cannot be used in all the environment.
3. The design of this holovect is a very complicated one.
4. No references are available for this project from any source.

#### XII. CONCLUSION

Thus the holovect can be used to draw the vector images on the space using the laser and the modified air. The image can be drawn only in the draw box of the given size. It basically works on

the principle of the reflection, refraction and the total internal reflection. The holovect is the initiation of the holographic field. This is very complicate, but an interesting field. The holovect is going to have a great future. It is a demanded project in all the field.

## REFERENCES

There are no references for this project.