



## **" USE OF VIRTUAL REALITY TECHNIQUES IN INTERACTIVE 3D DOCUMENTATION OF PHARAONIC TOMBS"**

**Dr. ASHRAF A. GAAFAR**

Assistant Prof. of Architecture - Faculty of Engineering – Shoubra – Zagazig University

### **Abstract**

The ancient Egyptian treasures in general and the pharaohs' tombs in particular suffers from pollution and urban worsening, which cause a serious deterioration in the engraved ornaments and colors on those treasures walls. The tomb ornaments are affected more severely than temple walls, on account of temples have better ventilation that removes water vapor and carbon dioxide resulting from visitors breathing. The ornaments that saturated excessively by water vapor eventually suffer deterioration and falling apart. Therefore, the digital technology provides an alternative to minimize the physical existence of the visitors inside the tombs, by using interactive 3D models allow the tourist to navigate the tomb by Virtual Reality techniques. The virtual reality models with cutting edge audio and video projectors allow the user to navigate the tomb with no place or time constraints in a conditioned comfortable environment. If a visit to this tomb is needed after all that will be a fast one and will not affect the tomb severely. The paper present a case study supervised by the researcher, that study is a generation of a complete virtual reality model of Pashedu tomb, one of the best tombs in the West Bank of the Nile in LUXOR. The paper suggests a complete technique of the model make starting by shooting the required pictures, generating the 3D model, the programming process, and finally a scientific and historical narration with proper background music.



-

:

[ ].

: -

[ ].

[ ].

[ ].

[ ].



[ ].

: -

" "

\_\_\_\_\_

: \_\_\_\_\_

J.C.R. Licklider

. (Modeling)

Ivan Sutherland Licklider

(The Father of Computer Graphics)

[KALAWSKY, 1993]& [LEVY, 1995] "The Ultimate Display"

(HMD)

[LEVY, 1995] .

:

(3D & Standard Input/Output Devices) -

(Head-Mounted Displays) -

(Immersive)

(Wide-Angle Displays) -

(Non-Immersive)

(Head and Body Trackers) -



-

(Binocular Omni-Orientation Monitors) (BOOMs) -  
 (Stereo Scopic Viewing Device)  
 (Data Glove) (Control Devices) -  
 (Sensors Bodysuit)  
 (Tactile Feedback Facilities)  
 (Navigation Devices) -  
 [KALAWSKY, 1993]& [WODASKI, 1995]& [LARIJANI, 1994]

[WATKINS, 1994]& [IOVINE, 1995]

UNC  
 “Brooks’ Group of “Sitterson Hall”  
 Researchers”

( Animation )  
 (Head Mounted Device) -  
 - (with LCD Screen)

[PIMENTEL, 1995] .

[IOVINE, 1995] .

(Stereoscopic Images)

( Stereo )

[PIMENTEL, 1995] .



\_\_\_\_\_:

\_\_\_\_\_:

Schiaparelli

[            ].  
[            ]. .

[            ] .  
[            ].



(Getty Conservation Institute)

[ ]

].

[

:

-

-

-

[ ]

:

-

-

---

-

[ ]

].

[ ]

[

[ ]

( )

[ ]



(Cool Light)

(Microclimate)

[ ].

---

---

( )

(VIRTUAL REALITY UNIT)

" "

[ ].

\_\_\_\_\_

" " " "

( )



[ ]

:" "

---

[ ]( )" " " " . [ ]

" " ( )

( ) ( )

" "

[ ] .

---

**(Virtual Reality)**

(3D-Modeling)

-:

(Modeling)

(Textures)

-  
-  
-  
-  
-  
-





(Programming)

-:

-:  
-----

-:  
-----

-:  
-----

-:

(Over Lap)

.( )

.(Day Light Lamp)

(Exposure Meter)

(Polarizing Filter)

(  
(Sky Light Filter)      (Ultra Violet Filter)



(Big Format)

:

-

(Roll Film)

. ×

(Sheet Film)

-

× )

.( , × × ×

-

(Shifting Lens)

(Day Light – Artificial

-

.Light)

(Photo Flood 500 watt 3200 Kelvin)

-

(Day Light Lamp)

-

(Cool Lamp)

.(High Resolution Scanner)

-

-(Modeling)

-

World

3D Studio

3D

..... SINCE 8

Up

-(Textures)

-

(Faces)

-:

(Texture)

-:

)

(Over Lap) ( )

(

(Level of Details)

(High Resolution)



-: \_\_\_\_\_ -

-: \_\_\_\_\_ -

(Path)

:

: \_\_\_\_\_

(Path)

( )

: \_\_\_\_\_

-(Programming)

: \_\_\_\_\_

: \_\_\_\_\_

: \_\_\_\_\_

(Navigation Tools)

: \_\_\_\_\_

(Free Navigation)



-

.

:

:-

.

.

.

.

.

(Cave)

(Head Mount)

(Projectors)

( ) .

( ) (Surround)

(subwoofer)

:

\_\_\_\_\_

.( )

-

-

-

( ) .

( )

SINCE 8 World Up & World Tool Kit (WTK)

-

“Hardware Independent” ( )

(PC 486,50 MHz)

“SGI”

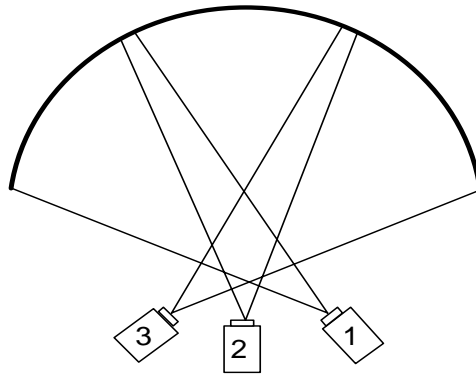
“Graphics Accelerators”



(Silicon Graphics Workstations)

C

[KALAWSKY, 1993]



( )



( )



( )



-

\_\_\_\_\_

)

.(

.

.

( ) .(

)

( )

\_\_\_\_\_

.

.

.

.

(VRML)

.

.

.

)

(

.



( )



( )



- \_\_\_\_\_ - Shin Maekawa Nevill Agnew . \*

(Scientific \_\_\_\_\_ : \_\_\_\_\_ American) \*

\_\_\_\_\_ : \_\_\_\_\_ - R. ENGLBACH- . \*

\_\_\_\_\_ - ( ) \*

\_\_\_\_\_ " \_\_\_\_\_ - ( ) \*

\_\_\_\_\_ " \_\_\_\_\_ \*

\_\_\_\_\_ " \_\_\_\_\_ ( ) \*

\_\_\_\_\_ : \_\_\_\_\_ - ( ) \*

\_\_\_\_\_ " \_\_\_\_\_ " \_\_\_\_\_ - ( ) \*

\_\_\_\_\_ - \_\_\_\_\_ - ( ) \*

\_\_\_\_\_ " \_\_\_\_\_ " \_\_\_\_\_ - \*

\_\_\_\_\_ : " \_\_\_\_\_ " \_\_\_\_\_ - ( ) \*

\* IOVINE, JOHN **STEP INTO VIRTUAL REALITY** , pp.4-21.Windcrest – McGraw-Hill Inc. 1995.

\* KALAWSKY, ROY S. **THE SCIENCE OF VIRTUAL REALITY AND VIRTUAL ENVIRONMENTS** ,pp.8,9,20,43-202,234,311-343. Addison-Wesley Publishers Ltd. 1993.

\* LARIJANI, L. CASEY **THE VIRTUAL REALITY PRIMER** ,pp.18,29-51,99-108,179-184. Carl Machover, Series Editor – Aldous Huxley. 1994.

\* LEVY, J. & BJELLAND, H. **CREATE YOUR OWN “VIRTUAL REALITY SYSTEM”** ,pp.xxiv,xxv. McGraw- Hill Inc. 1995.

\* PIMENTEL, K. & TEIXEIRA, K. **VIRTUAL REALITY "THROUGH THE NEW LOOKING GLASS"** ,pp. 60-72,91-110,150-154,231-234. McGraw- Hill Inc. 1995.

\* WATKINS, C. & MARENKE, S. **VIRTUAL REALITY EXCURSIONS “ WITH PROGRAMS IN C** ,pp. 2-42,83-85. Academic Press Inc. 1994

\* WODASKI, RON **VIRTUAL REALITY MADNESS 1996** ,pp. 79-88,104-107,818-819. Sams Publishing. 1995.