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Virtual Reality between Theory and Manifestations

A Thesis Submitted in Partial Fulfillment of the Requirements of the Master of Science Degree in Architecture

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STATEMENT

I hereby declare that all the information in this document has been obtained and presented in accordance with the academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and reinforced all material and results that are not original to this work.

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ABSTRACT

Virtual Reality (VR), sometimes called Virtual Environments (VE), has drawn much attention in the last few years. Extensive media coverage caused this interest to grow rapidly. We need to understand what are its basic principles and its open problems, as well as the introduction of the new term BIM which came out of the VR womb and evolved really rapidly in the architecture and construction field, and has formed the new VR trend in practical applications

This thesis contains a critical analysis of the way in which the Virtual reality and computer aided visualization techniques are commonly perceived and employed by practitioners in architectural field, reaching to the BIM concept that evolved from the virtual reality womb and analyzing our main case studies done by different BIM tools by the researcher and measuring the benefits and drawbacks of BIM for the architectural field and how it needs to be improved coming out with recommendation for future study concerning the thesis.

Glossary of Terms

Term	Significance
2D	Two dimensional
3D	Three dimensional
4D	Four dimensional
4D-CAD	Four dimensional Computer aided design
5D	Five dimensional
AC	alternating current
ACIS	Alan, Charles, Ian's System (Alan Grayer, Charles Lang and Ian Braid as part of Three-Space Ltd.)
ADT	AutoCAD architectural desktop
AEC	Architecture, engineering and construction
AHU	Air handling unit
APM	Automated people mover
Atari ST	Home computer released by Atari Corporation (ST refers to Sixteen/Thirty-two)
BBC	British Broadcasting computers
BBC Micro	British Broadcasting computers microcomputer system
BIM	Building information modeling
BOOM	Binocular Omni-Orientation Monitor
BU	Boston university
BUMC	Boston University Medical Center
CAD	Computer Aided design
CATIA	Computer Aided Three-dimensional Interactive Application
CAVE	the name is a recursive acronym for CAVE Automatic Virtual Environment
CCT	correlated color temperature
CG	Computer graphics
CPM	Critical Path Method
CRT	Cathode ray tube
CM	Construction Management
DB	Design build
DC	direct current
DHM	Dexterous Hand Master
Direct 3D	Part of Microsoft's DirectX application programming interface (API). Direct3D is available for Microsoft Windows operating systems (Windows 95 and above),it is used to render 3D graphics
DOF	Degrees of freedom
ENIAC	Electronic Numerical Integrator and Calculator
EOG	Electro-oculography

FOV	Field of view
GIS	Geographic information system
GPS	Global positioning system
GC	General Contractor
HITLab	Hitlab Music Company
HMD	Head Mounted Display
HMD	Head Mounted Display
HRTF	Head-Related Transfer- Functions
I/O devices	Input/output devices
I3D	Interactive the dimensional
IAI	International Alliance for Interoperability
ICT	Information and communication technologies
IFC	Industry foundation classes
IID	Interaural intensity difference
IML	Intelligent modeling laboratory
Immersadesk	Electronic Visualization Laboratory Department of Electrical Engineering and Computer Science and School of Art and Design University of Illinois at Chicago
ISO	International Organization for Standardization
ITD	Interaural time difference
LCD	liquid crystal display
LED	light-emitting diode
LEEP	LEEP Online Education, a distance learning program at the University of Illinois
LISP	Locator/Identifier Separation Protocol
LOD	Level of detail
MEP	Mechanical , electrical and plumbing
MIT	Massachusetts Institute of Technology
MR	Minimal reality
MPH	Mills Peninsula hospital
NAC	Natural Area Code
NASA	National Aeronautics and Space Administration
NURBS	Non-uniform rational basis spline
OED	Oxford English dictionary
Open GL	Open graphics library
PC	Personal computer
PDA	Personal digital assistant
PDT	Project delivery team
RFI	Request for information
RFP	Request for proposal

SAGE	Students Academically Gifted Education
SFMOMA	San Francisco Museum of Modern Art
SGI	Silicon graphics Institute
SIGGRAPH	Special Interest Group on GRAPHics and Interactive Techniques(annual conference on computer graphics)
STEP	Standard for Exchange of Product model data initiative
TOF	Time of flight
UK	United kingdom
UN	United Nations
UNC	University of North Carolina
UNC	University of North Carolina
US	United States of America
USNRC	United states Research Council
VE	Virtual environment
VPL	Company founded in 1984 by Jaron Lanier
VR	Virtual Reality
VRD	Virtual retinal display
VRML	Virtual reality markup language
WBS	Word breakdown structure
WOW	Window on world

LIST OF CONTENTS