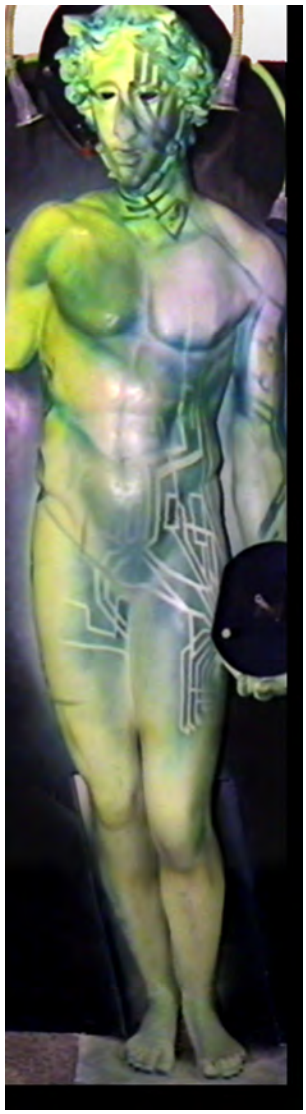
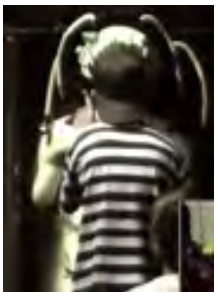
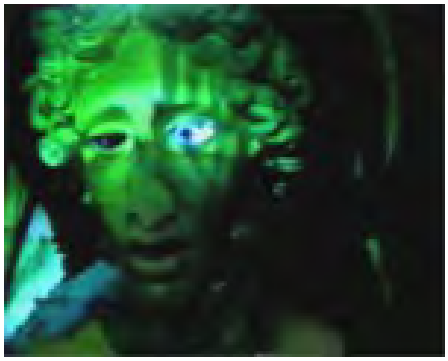
INDEX

Date	1994 -1996 (1, 2, 3 Phases), 1997 -1998 (4, 5, 6 Phases) 2007-2008 (Upgrading, Enriching, Improving) INDEX
Project Name	**LAUTRIV CHROMAGNON | Medusa** [LCM]
Topic/Key Words	Interactive augmented handcrafted sculpture, interactive storytelling, art and classical cultural Greek heritage, intuitive man-machine interactive interface, "skin-like" sensors, touchable/tangible interaction, high-quality analogue stereoscopic video, virtual reality, real time navigation, interaction in real time -local & remote, Tele-presence, sound & holophonic effects.
Project Phases/ Stages	Conceived as a six-phases project
Achievements/Accomplishments	1) LCM interactive augmented installation. 2) Lautriv's Mirror: interactive Tele -presence device. 3) Five Virtual applications have been developed ad hoc for the LCM project: 1) The soul of the network; 2) Lautriv's Karma; 3) Lautriv's City; 4) Medusa's Myth. 4) One Video Simulation (1996) 5) High-end animation/visual effects (2008-2009)
Project Current Stage	All project phases are complete.
Role/Responsibilities (FF)	Author, Production Management
Credits/Collaboration/Partners	GDS Elettronica S.r.l., Cantú, Italy. Museum of the Science and Technique, Leonardo Da Vinci, Milano, Italy. Centro "Enrico Piaggio", Università degli Studi di Pisa/Italy. Director: Prof. Danilo De Rossi, Ing. Claudio Domenici e Ing. Raffaello Francesconi); Universitá degli Studi di Milano (Dario Maggiorini), Milan, Italy. Studio Miti, 3D Sound and Holophonic Effects research, Guastalla, Italy. F.A.B.R.I.CATORS, Milan, Italy.
Awards/Artist in Residence	1995 .Recipient of the Interactive Art Mention Prize: Prix Ars Electronica, Ars Electronic Center, Linz, Austria.
Funding/Grants/Support	See: FF. Awards, Commissions, Prizes, scholarships (selected) Recipient Research, Development and Sponsorship/Award from the National Museum of the Science and Technique, Leonardo Da Vinci, Milano, Italy The Award was granted for the development of one of the initial phases of LSI Project. Subsequently the LSI project was selected to be display in the Exhibit: Innovation of the Year which took place in the same Museum.
Acknowledgments	Museum of the Science and Technique, Leonardo Da Vinci, Milano, Italy. Centro "Enrico Piaggio", Università degli Studi di Pisa/Italy.
Bibliography	See:FF. Publications-5a and 5b
Exhibit/Exposure	See: FF. Exhibit/ Exposure
Conference/Lecture	See: FF. Conferences/Lectures
Web / Links	
Images	
Video on YouTube	http://www.youtube.com/watch?v=Z16ONucTXCM&feature=em-upload_owner
Notes	
Description	See below







Introduction

Interactive installation which incorporate an emotional and intuitive interface embodying elements of classical Art, electronic media, interactive techniques and networking contained in one unique augmented form avoiding a metallic lifeless mechanical outlook; and through which the visitor can experience interactive virtual storytelling with focus in the shift from bi-dimensional to three-dimensional, and from stereoscopic vision to telematics audiovisual experiences.

The name Lautriv comes from the reversal of the word VIRTUAL=LAUTRIV Cromagnon is a word made up of Chroma-key + Cromagnon. Lautriv Chromagnon Medusa is part of the Lautriv community, a family of interactive creatures, digital, physical or analogue, with their own identity, history, dreams, and desires, interconnected between them through the network.

Art&Tech conceptual Design

LCM is a Trans-medial interactive augmented handcrafted sculpture with intelligent skin. LCM's "Intelligent skin", a touchable/tangible intuitive **man-machine** interactive interface **for virtual reality navigation** "Skin-like" sensors using a polyvinylydene fluoride (PVDF) to interface visitors (local and remote) with the interactive sculpture of Medusa. The piezoelectric polymer possesses mechanical and electrical properties sensors able to perform measurements of pressure variation, hardness and surface texture of touched objects, enabling touchable/tangible interaction. In LCM, both sexes are contained in a unique figure, embracing a compendium of element (Greek) classical art forms: The head of Medusa (gorgon with venomous snakes), the chest and hand of the Disco bolus of Myron and the abdomen and legs of Venus of Cenere. Medusa's body serves as an interactive path, covered by "intelligent skin", sensible to human interaction. The visitor interacts and navigates with LC looking through her eyes and touching her "intelligent skin. Her skin painting is a prolongation of her inner electronic life. When you look through the eyes of this gorgon, rather than petrifying the senses it augments and magnifies it. . Medusa's content is articulated by digital, virtual and analogue worlds From the mouths of the serpents, which hang around Medusa's head, emerge three-dimensional sounds and holophonic effects, which surround the visitor as a virtual helmet Emphasis is given to the exploration of the sound, music and holophonic effect association with virtual and analogue motion images navigation and interaction.

LSI Augmented interactive sculpture

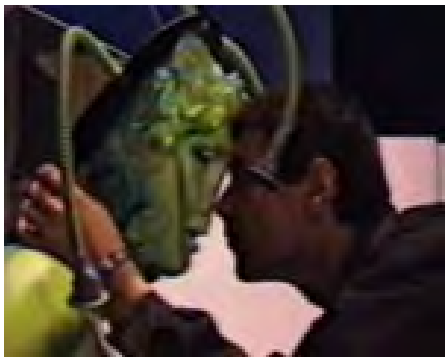
LSI interactive sculpture measures to a height of 200 cm, a width of 130 cm and a depth of 100 cm. The sculpture is made of plaster, metal, rubber, fiberglass and wood. Low-tech and widespread materials are used in forming the body, while high-tech materials are utilized in creating the "intelligent skin". . In its original installation, Medusa was placed in a room 5 x 6 meters large, immersed in a play of shadows, and light projections with an audio system installation designed ad hoc in relation to the requirements of the holophonic musical composition.

Intelligent skin: Tech solution

Medusa's "Intelligent skin", a touchable/tangible intuitive man-machine interactive interface for virtual reality navigation "Skin-like" sensors using a polyvinylydene fluoride (PVDF). "The intelligent skin" consists of a selected array of tactile sensors based on the use of polyvinylydene fluoride (PVDF), a piezoelectric polymer, which possesses interesting mechanical and electrical properties. The high sensitivity of the PVDF coupled with its flexibility allowed the realization of "skin-like" sensors able to perform measurements of pressure variation, hardness and surface texture of touched objects. The "intelligent skin" of Medusa has been realized by using thin strips of PVDF (25 micron thick). From each strip, an array of sensors has been obtained by properly etching a metal surface, while maintaining a common electrode on the opposite side. The arrays are mounted onto a robber substrate in order to give a higher sensitivity and skillfully located on the surface of Medusa in order to detect (discriminate) the position and intensity of soft touch on the body.

Music, Sound and Holophony

The techniques of 3D sound elaboration are realized via two modes of capturing



Robotix, McLellan Galleries, Edinburgh, UK, 1997 Siggraph' 96, Art Gallery, Los Angeles, USA, 1996 Les Vogague Virtuales des 3 SuissesAu Monde de l'Art, Paris, France, 1995 Imagina'95, Monte Carlo, France, 1995 Innovation Gallery, Museo della Scienza e della Tecnica, Leonardo Da Vinci, Milan, Italy, 1995 Art Contribution to supranational culture, Le Zitelle, Venice, Italy, 1995

and placing sounds in a virtual sphere, holophony and a sound space controller. During the recording and mixing of the sounds, the visitor is fully immersed in 3D sound. The 3D sound ambiance can be reproduced through headphones or simply by staying in front of two speakers. Thus, 3-dimensionality can be listened through systems of common use. Understanding holophony is a brain decoder that allows for the reproduction of exactly what a man can hear in 360 degrees in real time. The brain starts decoding while listening, without the help of special equipment. Once the message is de-codified, it can be transferred to traditional sound systems such as: record, magnetic tape, sound motion pictures and digital technology. The only necessary condition for the reproduction of a holophonic message is the presence of two stereo channels. Especially on headphones, the sound takes shape, moves around us, and goes far from us and steps over our heads… Among this movement, the listener is still able to identify the exact position of the sounds and the possible directions of movement. Thanks to the elevation shuttle and the control azimuth, the "3D sound space controller" processor, allows us to move per-registered sounds and play them in any point of the virtual sphere.

User Interaction

Interacting with Medusa is an intuitive action. The visitor approaches her, looks through her eyes, touches her “intelligent skin” and navigates through different content and ambiances in different modes and media: virtual reality, digital mode, stereoscopic interactive 3D vision (analog), and tele-presence (local and remote interactive experience), allowing visitors, to shift from bi-dimensional to three-dimensional into stereoscopic vision, from local to remote, from analogue to digital, and from passive to interactive actions.

Lautriv Community.

Currently, three members of Lautriv's community have been created: a) Lautriv Chromagnon Medusa (interactive sculpture), b) Lautriv Chromagnon I, (interactive sculpture) a synthesis of classical and futuristic forms: Ramses, Venus of Willendof and cyber warrior, c) Lautriv Nem is a digital character in the form of a bulb, with four antennas placed in the head, and the capacity to transform its extended sensors into any instrument in any environment. These antennas can become: microphones, sensors, projectors, telescopes, and microscopes. Nem travels within Lautriv's body and are visible by looking through Lautriv's eyes. Nem has several roles: to play, to travel through the inside of the body, and to establish an ecological relationship between the body and the user.

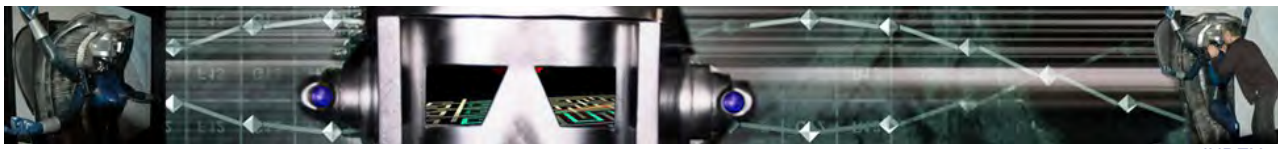
LCM Virtual applications (developed ad hoc)

a) The soul of the network b) Lautriv's Karma c) Lautriv's City d) Medusa's Myth

Lautriv’s Mirror Augmented Telematic Device

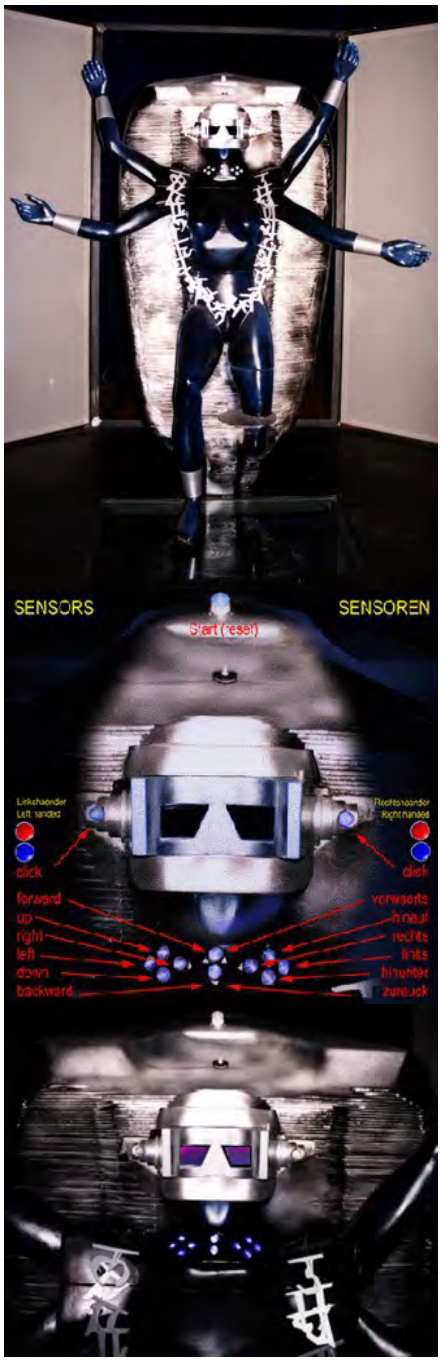
In addition it was accomplishing the networked collateral installation entitled Lautriv’s mirror, which allow visitors (local, and networked to experience telepresence and to enter in contact with LCM installation. Technical solution and development of high-quality analogue stereoscopic video integrated over Ethernet and IP networks with Virtual Reality in real time+ intuitive ***man-machine interface:*** Medusa’s body and eyes (MMI).

KALI – THE GOODNESS OF THE MILLENNIUM



INDEX

Date	1999-2000 (All Phases) 2001-2002 (Upgrading, Enriching, Improving)
Project Name	**KALI – THE GOODNESS OF THE MILLENNIUM**
Topic/Key Words	Augmented Virtual Reality Interactive Installation, Interactive Design, Digital Media, Culture, Arts, Literature, Myth, Cinema.
Project Stages	Conceived as a eight-phase project
Achievements/Accomplishments	See Bellow
Project Current Stage	All phases are completed
Role/Responsibilities	Author, Designer, Project Management
Credits/Collaboration/Partners	F.A.B.R.I.CATORS, Milan, Italy
Awards/Artist in Residence	See: FF. Awards, Commissions, Prizes, scholarships (selected)
Funding/Grants/Support	See: FF. Awards, Commissions, Prizes, scholarships (selected) 1998 .Recipient of a Research, Production and Exhibit Grant from Berliner FestspieleGmbH.The grant and support was provided to create and produce an interactive installation ad hoc (Kali the Goddess of the Millennium) to be exhibited at the Exhibit: Millennium of the City of Berlin: Seven Hills, Images and Signs of the 21st Century, at the exhibit center and museum, Martin-Gropius-Bau-Berlin (1999). The Exhibition was organized by the Berliner Festspiele GmbH and made possible by the Stiftung Deutsche Klassenlotterie Berlin under the patronage of the President of the Federal Republic of Germany, Johannes Rau. The Berliner Festspiele is one of the most important institutions in Germany for cinema, theater, music, literature and new media. Dr. Bodo-Michael Baumunk was the Chief Curator of the exhibit.
Acknowledgments	Berliner FestspieleGmbH. Association for the Exhibit: Millennium of the City of Berlin: Seven Hills, Images and Signs of the 21st Century
Bibliography	See: FF. Publications-5a and 5b
Exhibit/Exposure	See: FF. Exhibit/ Exposure
Conference/Lecture	See: FF. Conferences/Lectures
Web / Links	
Images	http://www.youtube.com/watch?v=HwvEiIpEzCc&feature=youtu.be
Video on Youtube	
Notes	See Bellow
Description	



CONCEPT

KALI is a user-driven multileveled virtual reality interactive installation that incorporates classical media and advanced technology. It is a comprehensive experience in the new language of interactive design, aesthetic interpretation of digital information and use of visual design in the virtual environment. This piece offered the advances of the merging of Virtuality and physicality integrated in one specific installation. The installation is a compendium of content and forms of mythical elements and ancestral memories that extends into the digital era with relevance to the 21st century. Through KALI, the author explores a fusion of digital media, culture, the arts, literature, myth, and cinema. One of the author's main goal were to implement an interactive installation combining the real and the imaginary, 0rient and Occident, the cosmos and the earth, nature and the city, negative and positive, and to represent the metaphor of cause and effect.

The Interactive Installation

The physical interactive sculpture of this interactive installation was inspired in the Hindu God KALI. The interactive installation integrates a virtual reality display system articulates by a three-screen projection and a physical interactive sculpture. Two screen projection of 3x2.2-meter retro-projection screens are placed on KALI's right and left sides, separated by a 2.25-meter glass wall angled at 90 degrees. A third 2x1.5-meter Plasma screen is placed exactly below KALI's right foot, where the visitor also stands to interact with KALI. Stereo-View / Head | Mounted Displays are located in the inner part of "KALI's" head. Liquid Crystal Eyes are fixed inside her eye sockets, which allow the visitor to see in VR stereoscopic through her eyes. Touchless sensors located around KALI's Neck allow the visitors to navigate and interact. The virtual-reality application [KALI's inner world] is possible to the multimedia world [KALI's external world], sees through "KALI's" eyes, whiles the multimedia world [KALI's external world], is possible to see through the three-screen projection system that surrounds "KALI's" interactive sculpture.

Mounted Displays are located in the inner part of "Kali's" head. Liquid Crystal Eyes are fixed inside her eye sockets, which allow the visitor to see in VR stereoscopic through her eyes. Touchless sensors located around Kali's Neck allows the visitors to navigate and interact. The virtual-reality application [Kali's inner world] is possible to the multimedia world [Kali's external world], see through "Kali's" eyes, while the multimedia world [Kali's external world], is possible to see through the three-screen projection system that surrounds "Kali's" interactive sculpture.

The Sensors

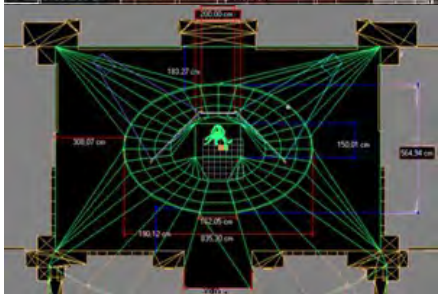
The sensors around KALI s neck were designed and produced ad hoc. They are touch-less sensors, intuitively easy to use and interactive. The sensors are highly reliable, as they are not subject to any electrical contact, movement or electromagnetic interferences.

The first version of KALI was produced ad hoc for the exhibition of the Millennium of the city of Berlin: "Seven Hills... Images and Signs of the 21st Century." The show was open to the public on 2000 at the Martin Gropius-Bau building and coordinated by the Berliner Festspiele. The exhibition theme was "archaeology of the knowledge" The exhibit showcased works of art associated with elements of strength, such as global and cosmic communication and new alliances between Art and Science. It posed questions and project answers such as: How will the human species evolve during the next Millennium and what turn can the human, vegetal and cosmic existence possibly take?

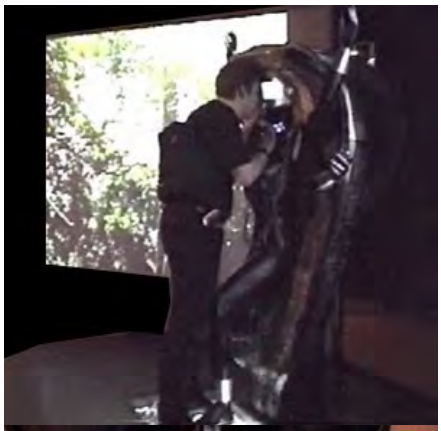
Non-tactile sensors, intuitively easy to use and interactive were designed ad hoc for Kali Interactive Installation. The sensors are highly reliable, not being subject to any electrical contacts, movements, or electromagnetic interference. The sensor

working principle is based on infrared beam reflection on human skin. The sensor is an aluminum cylindrical structure, embedding one IR pulsed transmitter, one receiver, and a blue LED. When a finger is placed close to the sensor, IR beams are reflected and detected by receivers. Blue LED switches off to assess the activated state of the sensor.

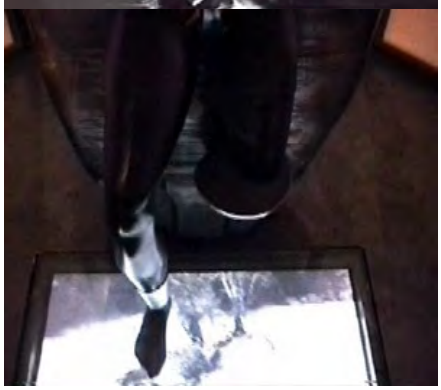
Stereo-View/Head | Mounted Displays are located in the inner part of "Kali's" head. **Liquid Crystal Eyes** are fixed inside her eye sockets, which allow the visitor to see in VR stereoscopic through her eyes. Touchless sensors located around Kali's Neck allows the visitors to navigate and interact. The virtual-reality application [Kali's inner world] is possible to the multimedia world [Kali's external world], see through "Kali's" eyes, while the multimedia world [Kali's external world], is possible to see through the three-screen projection system that surrounds "Kali's" interactive sculpture.



The physical interactive sculpture of this interactive installation was inspired in the hindu God Kali.One of the most ancient figures of Kali bears eight arms, however, for this project was chosen to represent Kali with four arms.

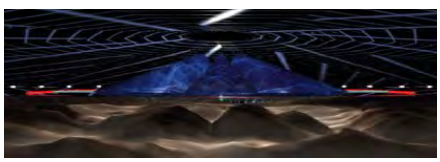


The CONTENT (Summary)
KALI's content is articulated in two main parts, the virtual-reality application [KALI's inner world] and the multimedia world [KALI's external world], the world of causes and their effects, or decision-making composed of videos, sound and interactive animation.

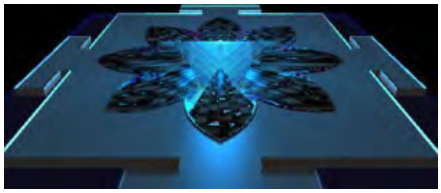


How to interact
The visitor approaches KALI by walking up three steps, lay his face against hers, and look through her eyes and interacting with the Sensors integrated in KALI's neck. Upon the navigation and interaction, the visitor generates inputs, which activate the multimedia world [KALI's external world]. The visitor can generate situations within the virtual world interacting with the virtual-reality application and see the corresponding consequences (effects) in real time, whether in the virtual world or in the multimedia world, projected on the three external screens integrated in KALI's installation. The images that the visitor sees through KALI's eyes are not the same as the images projected on the external screens.
The second version accomplished in 2004, was adapted to the CAVE® virtual-reality theater and other VR display systems, such I- Desk and C- wall.

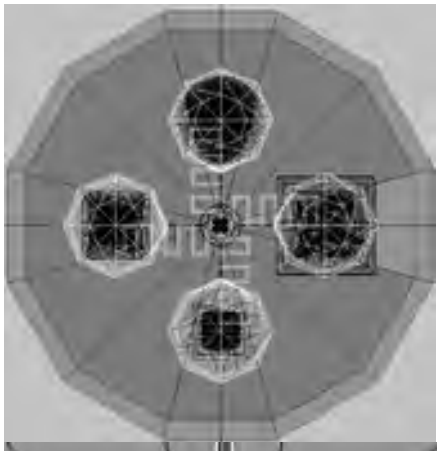
CONTENT DESCRIPTION
Multimedia and virtual worlds
320 video clips, digital images and animated effects were produced for Kali.



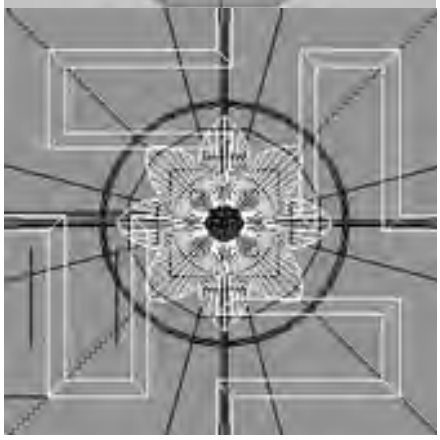
VR-WORLDS - Gateways
The virtual reality application main conceptual approach is related to Kali's manifestations: creation, preservation and destruction. Kali's virtual worlds are articulated by four main categories:



A) Man Destroys Nature
B) Nature Destroys Man
C) Nature and Man Live Together
D) Kali as a Metaphor of the Jungle

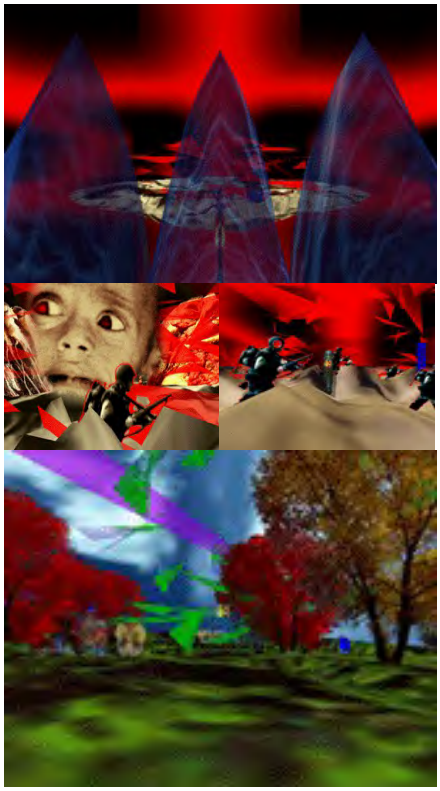


As to the use of Hindu iconography special attention was given to the to Kali's Yantra. The Kali Yantra represents the Supreme Generative Energy emanating from a central point, enclosed by three pentagons (actually five inverted concentric triangles), a circle and an eight-petal lotus. While a triangle within a female deity's Yantra points downward, it points upward in a male deity's Yantra. It symbolizes the oneness of the Supreme Female Principle with the Supreme Male Principle.
The Kali Yantra was studied, modeled and reinterpreted to become the matrix of the virtual worlds, the genesis from which visitors start their exploration and navigation to [Kali's inner world]. Kali's virtual world involves several models, texture maps, and audio clips. It is a large-scale environment, articulated by an extended virtual environments with multiple scenes, from a jungle to the cosmos…from cosmos to war… from war to idyllic gardens ... from the Amazon to India, etc.



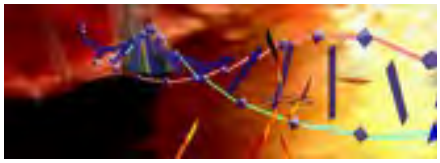
KALI YANTRA | VR MATRIX

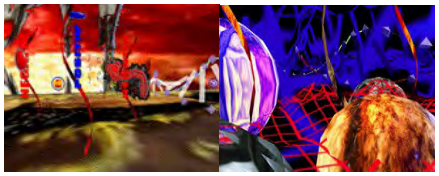
I touch one of the blue buttons of Kali's sensors and slip through layers of transparent, delicate, shiny clouds of petals. The depth of the fields is exalting, giving me the feeling of unimaginable power. There are eight petals that stand for eight elements: earth, water, fire, air, ether, mind, intellect and ego. Each of the 15 corners of the five concentric triangles on each petal is interactive. The 15 corners represent: organs of knowledge, organs of action, organs of perception, organs of procreation and organs of evacuation. I move towards the center of the Kali Yantra. Shiny rings in the form of a Yoni emerge in front of my eyes; it's Shiva! This lotus, Kali Yantra, is the departure world, where I start my exploration and where I access each of the four gateways that conducts me to one of the four main categories of Kali's virtual world."

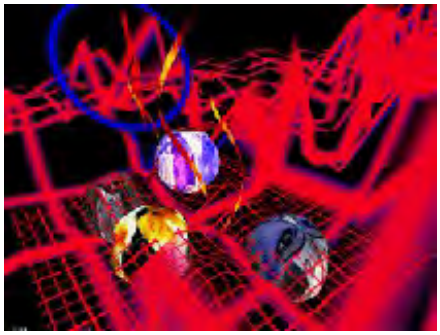


[A] MAN DESTROYS NATURE (VR World)

"I fly inside the tunnel related to "Man Destroys Nature." I enter a vortex with flying objects coming from all directions and intense sounds and music. The tunnel brings me to a world of death and destruction. A skull appears. Is this a city of 21st century? I have the sensation that I am an "interactive camera." "Interactive icons are all around - images, objects, figures - some of them very enigmatic and ambiguous, while others are defined with red or blue points.
The color Red represents negative icons and the color Blue, positive icons. Red points represent Constructive action; blue points represent De-Constructive alternatives.
I find headlines of newspapers with the news of war…destruction of man…man destroying nature, etc. Images appear in front of me like a virtual screen. I navigate within this jungle of horror, interacting with the negative icons, which brings me anguish… I look for positive icons: the "third eye" of Kali. I slip into it to find a solution to the horror! This transports me to a wonderland, where my interactive experiences seem like an idyllic dream. The space compresses illusions, dreams, desires and freedom. I slip into a sort of wonderful forest with vast areas of land covered with red, green and yellow trees. The water is crystalline and the surroundings are like images from oriental dreams… gigantic three-dimensional butterflies of immense size, larger than the trees themselves, appear in front of me".

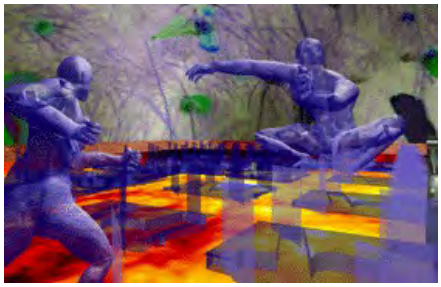


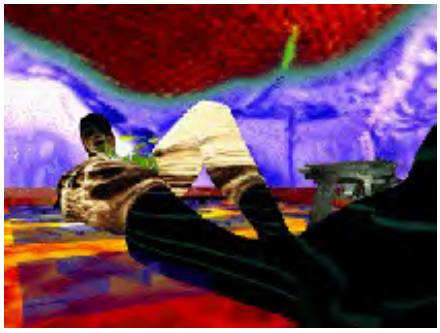




[B] NATURE DESTROYS MAN (VR World)

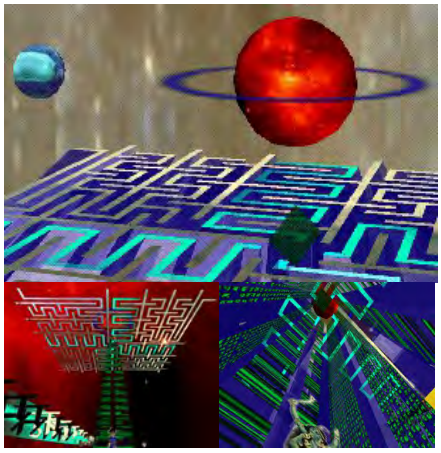
"I decide to go to “Nature Destroys Man.” I fly into a singular micro-macro landscape. The landscape is devastated. I find, within this landscape, a virtual representation of a floating DNA. The vision is both fascinating and frightening.
The shrill music and sound effects give an eerie feeling of expectation and premonition. Does the DNA represent man? Does the devastated landscape represent the future (my present)? Or, to the contrary, does the DNA represent positive “genetic” events, or life? Depending upon how I click, actions occur either in the virtual world or in the digital world that is projected on the external screens.
Within this apocalyptic terrain, I find six incubating eggs covered by a transparent veil. What do these destructive eggs contain? Are devastating natural, catastrophic elements enclosed within them? Each one of them is interactive. Depending on which one I touch, the environment morphs".





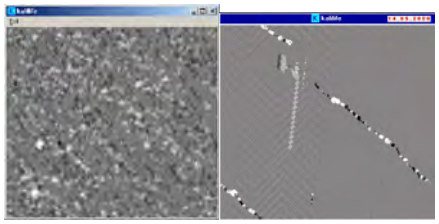
[C] MAN AND NATURE LIVE TOGETHER (VR World)

"Suddenly, I find myself in a vortex of light and images. It is a dreamlike dimension in which the ill fated and the positive seem to collide into a common reality. I turn and move forward to a petrified sea of marble of opaque colors, covered with deadly weapons; I am possessed with fear and horror.
In this world, in which it is not possible for the human intellect to distinguish good from evil or beauty from horror, it is nevertheless possible to have consciousness and make decisions about whether to destroy or construct. The objects are living elements that provoke me to react. I find these objects in this ideal, unique environment, rich in symmetry, color and depth. I navigate among them like a fish; I penetrate, touch and proceed through this virtual world, in which the images are integrated like an articulated world of different layers. The music reacts to my inputs, depending upon how and what I touch, where and how I go. The weapons emerge beneath my feet; they are like a long highway of fear, which, as I travel closer, prolongs the horror.
If, however, I go back to seek flowers, then the smiling faces of children confirm construction. The choice is mine. This is an experience - a surrealistic vision, a space that includes worlds, realities, dreams, desires, fear and horror. And, depending on what I select or what I react to, receive the results are in front of my eyes, as well as on the large external screens. Here I experiment in first person, the concept of cause and effect, as explained by the ancient oriental philosophy, which adapts perfectly to the concept of virtual reality, since virtual reality makes it possible to produce actions that produce, in real time, corresponding reactions that we can experience in real time."



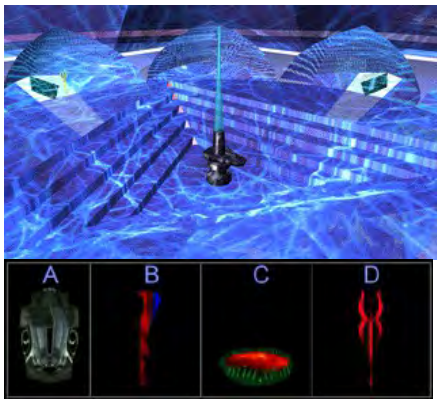
[D] KALI AS A "METAPHOR OF THE JUNGLE" (VR World)

"Gateway". Suddenly, I see myself flying into a sort of labyrinth. Whirlwinds of Sanskrit symbols recall the sounds of the universe; i.e., the sounds of wisdom. I discover that they are flying out of the cosmos to the earth from the tunnel of Kali. A path leads me to a magical space where I can see both a positive and a negative icon. Here I find the cosmos, earth, micro and macro all confined. I can travel endlessly in this fascinating world. Here the sensation of being in the twilight of the cosmos and the jungle is very intense. The depth of the cosmos is intercepted by the deep ambiance of the jungle, in one unique body. This is a metaphor of time that concentrates on cosmic forces of the natural, apparent and real; forces of the real and the virtual - a compendium of intrinsic illusions that goes from the most extreme realism to the most refined of myths.



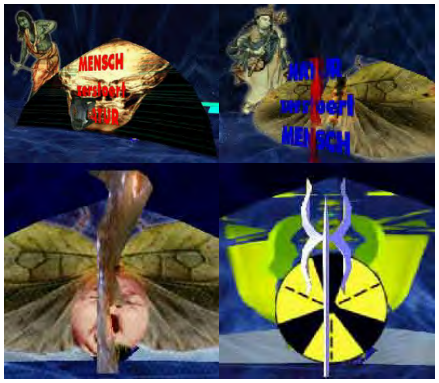
ASVATTA TREE – CONCEPT

Each action by a visitor to Kali's virtual world is assigned a positive or negative number. The numbers are stored in a database and sent in real time to the Kali Tree generation process. Constructive visitor interactions are graphically displayed as a green tree that grows and blossoms. De-constructive visitor interactions are displayed as a red tree that intercepts and overlaps the green tree. The graphics can be drawn in real time following users' actions or can be generated from stored movements in the database. The graphic output is continually updated during the installation operation period and can be accessed over the Network.



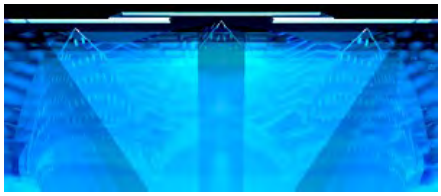
ICONOGRAPHY

KALI's objects/symbols and accessories has been integrated as interactive icons in the VR world. For example, objects she is holding in her four hands became the interactive icons used to gain entry into the four gateways of the VR world. In KALI the arms symbolize the capacity for work, and KALI wears all work instruments (action). Hands are the principal instruments of work, and it is the hands that carry out the actions of karma, or accumulated deeds. Ultimate freedom is attained as the fruit of karmic action. In KALI's first left hand, she holds a severed head. This signifies the annihilation of ego-bound evil, or force. In her second left hand she carries the sword of physical extermination with which she cuts the thread of bondage. In the first right hand she bears the gesture to dispel fear, that is, immunity from fear. The second right hand exhibits spiritual strength. Several of these objects/symbols become interactive icons in KALI's four main categories:



A) Man Destroys Nature **B)** Nature Destroys Man **C)** Nature and Man Live Together **D)** KALI as a Metaphor of the Jungle.

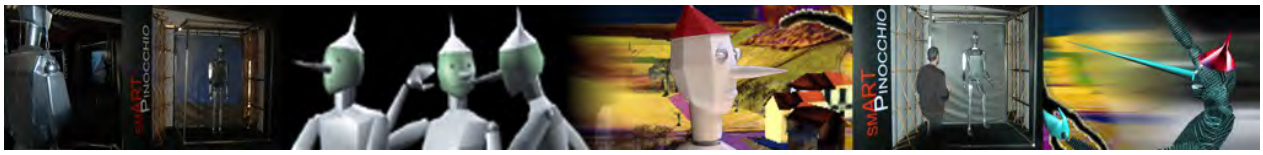
Il lavoro è stato prodotto in Italia, India e Sud America.

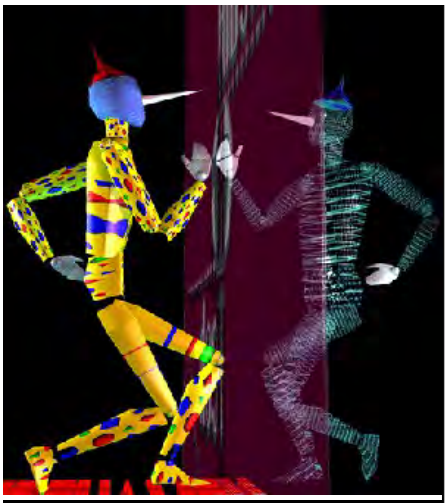


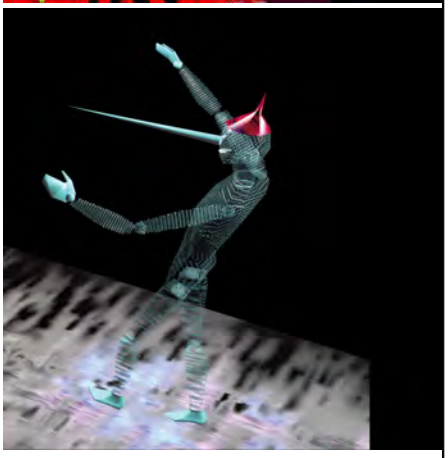
PINOCCHIO INTERACTIVE [PI]

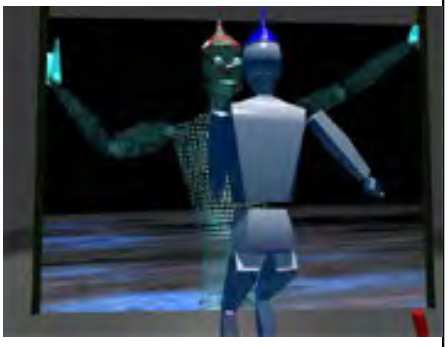
INDEX

Date (Inclusive Date)	1996-1997 2007- 2008 (Updating and Upgrading PI: Smart Pinocchio)
Project Name	**PINOCCHIO INTERACTIVE [PI]**
Topic/Key Words	Virtual Reality, interactive design, robotized puppeteer, physically-augmented marionette, virtual augmented avatars, virtual cloning, digital immersive environments, interaction, mechanical, mobility behavioral design, multilevel emotional interface, physical and virtual worlds,interactive storytelling, virtual storytelling, literature
Project Stages	Conceived as a nine -phase project
Achievements/Accomplishments	See Bellow
Project Current Stage	Five Stages has been completed until date
Role/Responsibilities (FF)	Author, Project Production Management
Credits/Collaboration/Partners	Tuscany Hi Tech Network, Tuscany, Italy, region of Tuscany, Italy; K-Team, Swizerland and LSRO (Laboratory of Robotic Systems), EPFL - Ecole Polytechnique Federale, Lausanne, Swizerland; MAV, the Virtual Archeological Museum of Herculaneum, Italy, Councilor for the Cultural Goods Province of Naples, F.A.B.R.I.CATORS, Italy Partners: K-Team, Switzerland, Regione Toscana and ReteToscana dell'Alta Tecnologia, Florence,Italy, F.A.B.R.I.CATORS sas, Italy,MAV, the Virtual Archeological Museum of Herculaneum, Italy, LSRO (Laboratory of Robotic Systems), EPFL - Ecole Polytechnique Federale de Lausanne, Switzerland.
Awards/Artist in Residence	
Funding/Grants/Support	See: FF. Awards, Commissions, Prizes, scholarships (selected) smART Pinocchio was commisionated by by the Regione Toscana and Rete Toscana dell'Alta Tecnologia, Florence,Italy. The 1rs and 2nd production phase of Pinocchio Interactive has been in part supported. The Robotic and Automatism have been accomplishes in collaboration with K-Team, Swizerland and LSRO (Laboratory of Robotic Systems) EPFL - Ecole Polytechnique Federale, Lausanne, Swizerland. www.fabricat.com/P_VRenvirmnt.htm
Bibliography	See: FF. Publications-5a and 5b
Exhibit/Exposure	See: FF. Exhibit/ Exposure
Conference/Lecture	See: FF. Conferences/Lectures
Web / Links	_____ _____
Images	
Video	
Notes	
Description	See Bellow









Brief description
Interactive installation juxtaposing virtual reality, physically-augmented marionette as a robotized puppeteer, augmented avatar, virtual cloning, digital immersive environments, control behaviors of mobile robots, multilevel emotional interface, interactive storytelling, literature and art.
SMART PINOCCHIO (Pinocchio Interactive) Augmented virtual reality robotics interactive installation

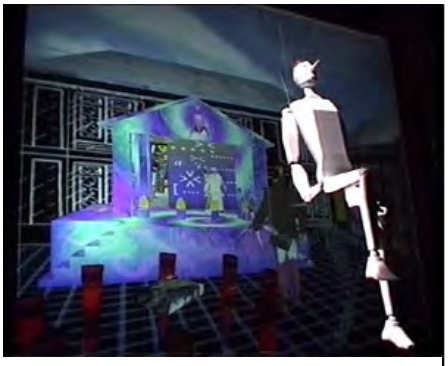
SMART PINOCCHIO is a 2.5 x 2.5 meter interactive installation, juxtaposing: robotics augmented virtual reality, interactive design, virtual storytelling and literature. Pinocchio, the literary universal icon created by Collodi in the 17th century, becomes both a robotic computerized temperamental marionette and a cloned virtual protagonist within an augmented virtual space.

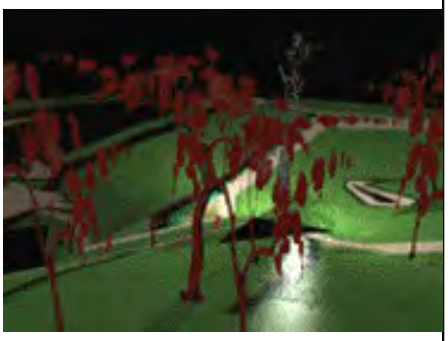
Concept
Pinocchio Interactive integrates robotics, virtual reality and interactive media, juxtaposing classical literature, art and design in a common installation. Emphasis was placed on interface solutions, conception of the intrinsic multileveled interaction, and the controversial and impulsive personality of both: Pinocchio Robot (physical) and Virtual Pinocchio (digital).Virtual reality, robotics and physical space merge together to create an interactive multilayered installation enhancing the storytelling experience based in Pinocchio's original story.

Vision
Pinocchio the literary universal icon, the emotive and controversial wooden boy puppet created by Collodi in XVIII century, becomes both a robotic computerized temperamental marionette and a cloned virtual protagonist in the Electronic Era.

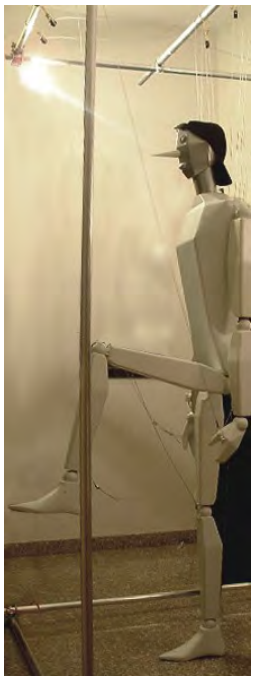
Virtual Storytelling
Through Pinocchio Interactive, the author, Franz Fischnaller, attempts to address his personal dynamics within interactive narrative and to implement new ways of enhancing virtual storytelling as a cultural and social practice as well as an art form. New technologies and the shifting media phenomenon are transforming the way of presenting stories as well as the way of expressing and creating virtual storytelling. Storytelling, concepts, and literature persist through time and space independently of the media, the mode of delivery, and the container. The same story found in a book, a "non-motion" media, can be represented and reinterpreted with interactive media in a manner that not only enriches the content but also the interrelationship and interaction between the visitor, the public and the book's journey.

Goals
Among the goals of the Pinocchio Interactive installation was to link, in an innovative way, classical literature, art, design and technology; to create an emotive interactive journey; to avoid a metallic lifeless mechanical installation; to design a friendly interface with easy access, to implement a common and compact solution for a projection system and an interactive installation with innovative interfaces, allowing for diverse levels of interaction.





The Interactive Installation



The installation is comprised of a real stylized puppet, Pinocchio Robot of 1.8 meters in height, made out of wood and metal. In the scenery where Virtual Pinocchio acts, is an integrated screen measuring 3X3 on which the new life of Virtual Pinocchio evolves. The personages, the adventures and the scenery, where the story takes place, become virtual environments; possible to navigate and interact in real time. Pinocchio Robot is a robotized marionette, suspended by wires that control its movements. It hangs before a 3X3m screen showing virtual environments and Pinocchio's virtual clone. Five motors one or more cables connected to its arms and legs control eight interactive points of Pinocchio Robot. These interactive points are connected by means of threads to the computer and obey the impulse of the visitor. The visitor can interact with both the physical and the digital Pinocchio using the joystick, located under the scenery where the projection screen and Pinocchio Robot stands.

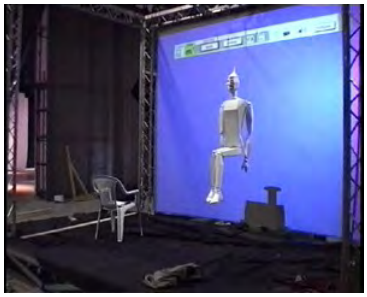
The movements of Pinocchio Robot conserves the original concept of marionettes, however, are now commanded through a robotic system. While threads connected the original juggler's hand, the electronic juggler is connected to a computer. The juggler has been substituted by a computer. His new source of life is the computer and the juggler is the executive robotized system becoming a virtual extension of the author.

How to interact

In its original set up, the Pinocchio Interactive Installation is placed in a space of 3x3 meters, immersed in a play of shadows, light projections and an audio system installation designed in accordance with the conceptual and technological requirement of the installation.

Upon entering, the visitor will find himself inside a theatrical scenario, with a soft illumination and light sensors. A spotlight focuses on Pinocchio Robot standing. The screen projection shows, in slow motion, several little Pinocchio's randomly jumping out from a large piece of wood. Stumping his right foot impatient Pinocchio Robot says *"ummm... Come forward my friends."*

The visitor has the freedom to explore and participate in an active mode with the installation through Pinocchio Robot, which can speak, move, comment, obey, become irritated or react with great charm towards the visitor. He is the main interface between the physical and the virtual world.

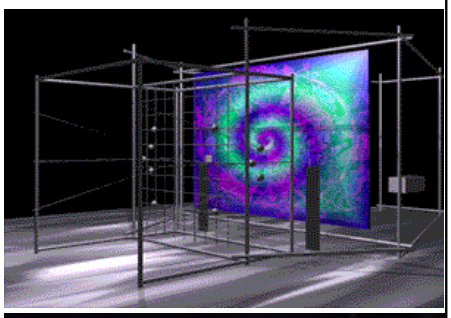



PINOCCHIO ORIGINAL STORY
ABC DEF GHI
LMN OPQ RST

TRACKING THE NET [TTN]

INDEX

Date (Inclusive Date)	1996-1997 (1, 2 Phases) 1998 (3, 4 Phases) 1999 (5, 6 Phases) 2000 (Upgrading, Enriching, Improving) 2001 (Upgrading, Enriching, Improving)
Project Name	**TRACKING THE NET [TTN]**
Topic/Key Words	Multi-User Interface Platform: multi-user touchable interactive interface platform, real-time full-body optical motion capture, virtual reality, Interactive teams, shared environment, local and networking team interaction, Virtual reality associated with animation and videos, virtual reality and tangible interface
Project Stages	Conceived as a six-phase project
Achievements/Accomplishments	See Bellow
Project Current Stage	All phases are completed
Role/Responsibilities (FF)	Designer, Project Management
Credits/Collaboration/Partners	
Awards/Artist in Residence	
Funding/Grants/Support	See: FF. Awards, Commissions, Prizes, scholarships (selected)
Acknowledgments	MediARTech'99Florence, Italy Tuscany Hi Tech Network, Tuscany, Italy Region of Tuscany, Italy
Bibliography	See: FF. Publications-5a and 5b
Exhibit/Exposure	See: FF. Exhibit/ Exposure
Conference/Lecture	See: FF. Conferences/Lectures
Web / Links	
Images	
Video	
Notes	
Description	See Bellow



Description

Tracking the Net is a collective, a multi-user interactive interface platform that combines motion capture and virtual reality. The installation has been projected to host interactive teams, which can experience a shared environment in local and in remote locations through networking.The visitors are not required to manipulate any electronic devices to navigate and interact. In [TTN] Virtual Reality and physical structures merge to give form to a common integrated space. Several users can interact in real time, simultaneously. The installation is projected to host interactive teams, which can experience a shared environment in local and as well in remote locations through networking. One of the major goals is to allow remote interactions between visitors and to focus on collaborative VR, with high performance and to give emphasis to enable teams to participate in distant locations: to share, interact, navigate, work or just have fun and share experiences as if they were in a common, virtual space.

Tracking the Net installation, an interactive, elastic, netted cube of 3X3 meters with rear-projection onto one wall-screen with high-resolution image. A metal frame cube structure into which, an elastic string structure is framed. Twelve markers are applied in the elastic string and are placed almost horizontally and rotate 90 degrees on their sides.

Each camera sees five markers. Visitors can freely interact and navigate within the different virtual environments by touching, pulling, and stretching the "Net". Visitors and teams can navigate, interact and share a common virtual environment in real time by touching, manipulating, pulling, and stretching the elastic "net" that constitutes the physical interface of the platform. When the interactive visitor deforms the elastic net, he/she activates the X/Y/Z translation rotation or scale of parts of the VR world or objects.

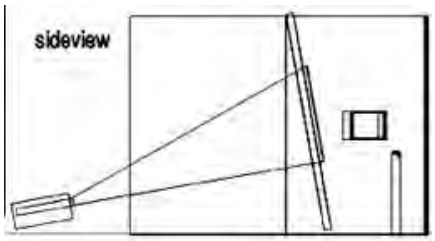
These structural modifications of the virtual environment trigger other actions, e.g. other structural modifications, key-framed animations, video sequences or sounds. The interaction requires physical effort and co-ordination but the user can always deform the net to an extent depending on physical strength on coordination capabilities. Visitors can freely interact and navigate within the different virtual environments by touching, pulling, and stretching the "Net", enabling touchable/tangible interaction.

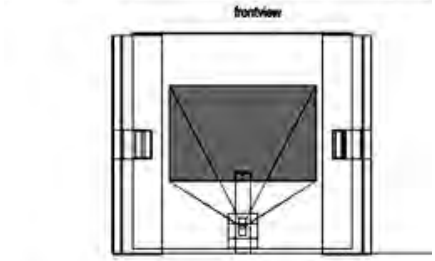
The interactions between the subjects and the "Net" are identified with the motion capture system based on Qualisys motion captures devices. These devices make use of infrared beams to detect, in real-time, the bi-dimensional coordinates of reflective elements (‘markers’).As the markers and cameras grow in number, the capacity for participation of interactive visitors increases proportionately, in number. Any movement is captured with precision (up to 0.1 mm resolution). The sensors are applied to the elastic band, which compose the platform. Two 3D infrared cameras detect position of small infrared beam reflectors placed at different points of the elastic network. A computer-based process generates real-time, 3D positional information about reflectors, and issues commands to another computer, which hosts VR software. The system collects the movements of each visitor and integrates this data, in real time, driving particular events into the virtual world.

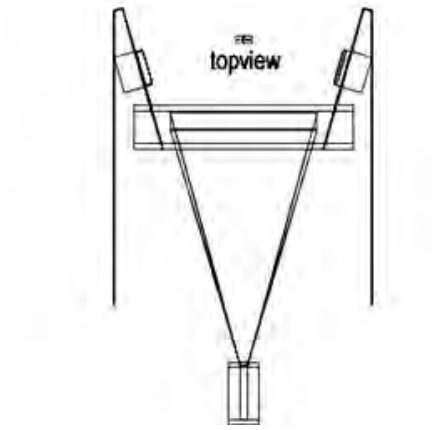
The visitors can identify themselves within the virtual world and can interact in it, in real time, by acting on the elastic structures placed at different points of the installation. A C++ program performing the tracking, written for Windows Operating System (Borland C/C++ compiler). A C program (Microsoft C/C++ compiler) which constitutes the software connection to the virtual reality rendering (Division). The "plug in" connection with the virtual reality rendering Maya, Photoshop, Premiere, etc.Hardware: PC , Qualisys AB Goteborg, Sweden

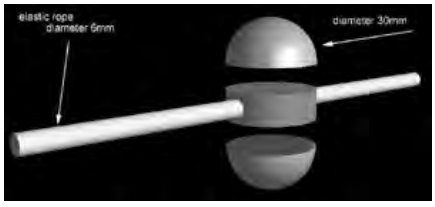
Tracking the Net- basic The installation

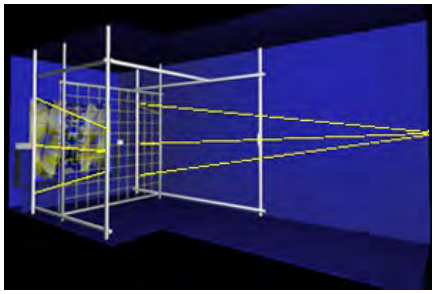
Tracking the Net structure can be modified both electronically and from a mechanically standpoint, the content and applications can be specifically developed and produced in different formats in accordance with requested











typology of use, navigation and interactions. The system can also be used as a multiple degrees of freedom joystick to drive standard PC games.
Basic format is 3x3 meters with one rear projection onto one wall-screen with high-resolution image. Larger structures with one or more rear projections are possible to be produced ad hoc and can be developed up to the "Y-Version", that can host more than 1.000 visitors interacting in real time. Visitors and teams can navigate, interact and share a common virtual environment in real time by touching, manipulating, pulling, and stretching the elastic "net" that constitutes the physical interface of the platform. When the interactive visitor deforms the elastic net, he/she activates the X/Y/Z translation rotation or scale of parts of the VR world or objects. These structural modifications of the virtual environment trigger other actions, e.g. other structural modifications, key-framed animations, video sequences or sounds. The elastic structure is a net, flexible, robust and easy to manipulate. The interaction requires physical effort and co-ordination but the user can always deform the net to an extent depending on physical strength on coordination capabilities. Results are always attainable by anyone, in a safe way. The deformation of an elastic net can be shaped and sized in many different ways, and is subject to the action of hundreds of users.

How to Interact

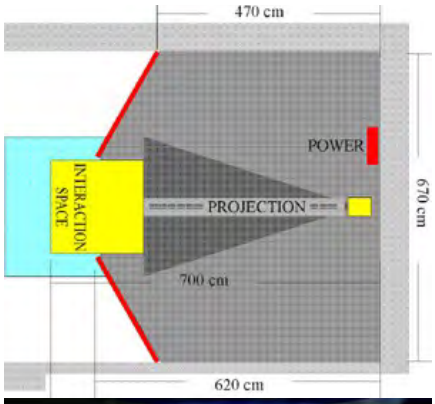
Visitors can freely interact and navigate within the different virtual environments by touching, pulling, and stretching the "Net". The visitors are not required to manipulate any electronic devices such as joystick, mouse etc. They can use their own limbs, their motor capabilities and intuition to navigate through the VR environment, manipulate objects, move between scenes and play with sounds. Different virtual environments among which Sounds and Planet S.R.A.M. was developed, featuring different content, though all were based on common architectural standards that connect the 3D rendering to the interface itself.

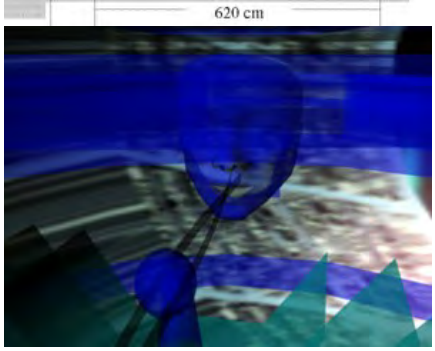
The installation

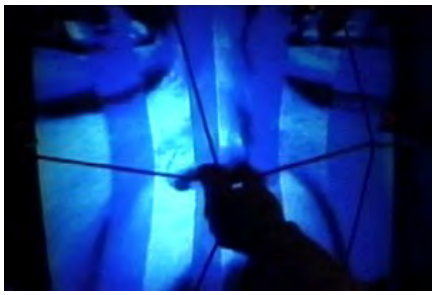
Tracking the Net structure can be modified both electronically and from a mechanically standpoint, the content and applications can be specifically developed and produced in different formats in accordance with requested typology of use, navigation and interactions. The system can also be used as a multiple degrees of freedom joystick to drive standard PC games.
Basic format is 3x3 meters with one rear projection onto one wall-screen with high-resolution image. Larger structures with one or more rear projections are possible to be produced ad hoc and can be developed up to the "Y-Version", that can host more than 1000 visitors interacting in real time.
Visitors and teams can navigate, interact and share a common virtual environment in real time by touching, manipulating, pulling, and stretching the elastic "net" that constitutes the physical interface of the platform. When the interactive visitor deforms the elastic net, he/she activates the X/Y/Z translation rotation or scale of parts of the VR world or objects. These structural modifications of the virtual environment trigger other actions, e.g. other structural modifications, key-framed animations, video sequences or sounds. The elastic structure is a net, flexible, robust and easy to manipulate. The interaction requires physical effort and co-ordination but the user can always deform the net to an extent depending on physical strength on coordination capabilities. Results are always attainable by anyone, in a safe way. The deformation of an elastic net can be shaped and sized in many different ways, and is subject to the action of hundreds of users.

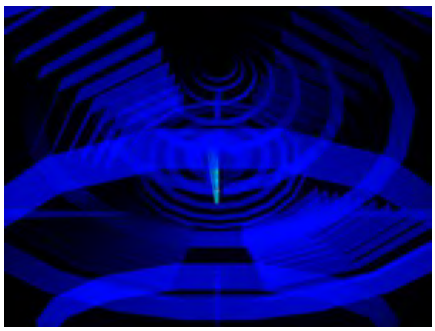
Tracking the Net (TN) - Virtual Reality Applications

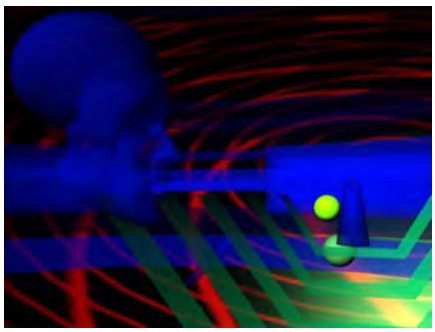
1) ***SOUND***
Virtual Reality application for the multiple-user interactive Tracking the Net (TN)
Topic/Key Words: Multiple -user interactive virtual reality application, multi-

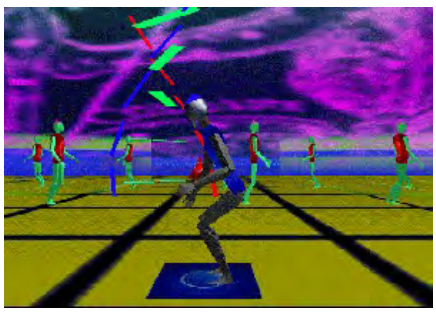












user touchable interactive interface platform, real-time full-body optical motion capture, Interactive teams, shared environment, local and networking team interaction, Virtual reality associated with animation and videos, virtual reality and tangible interface-

Aim: To produce a multiple users musical virtual reality applications suitable to a multi-user touchable interactive interface platform such us Tracking the Net, combining multi-user interactivity, real-time full-body optical motion capture motion capture with virtual reality and tangible interface.

Achievements - Abstract-Description:: Musical and visual stereo creative environment that allows the visitors to create music on various levels, individually as well as within an interactive team articulated by six participants. Sounds appears in front of the visitors like a musical satellite floating in space and surrounded in an angle of 360 degrees by musical chords, a sort of a virtual harp. The visitors can interact and navigate through this cyber harp, generating like this collisions and therefore sounds and visual effects in a 3D VR environment. The more synchronized and intense the collaboration among the visitors, the more astonishing is the response. A gateway conducts inside the building of Sound Space. The visitor can enter into a sort of a musical palace with transparent corridors, musical elevators and sonorous stairways, in which all the objects, the angles, are interactive and become instruments. The visitor is able to play the virtual piano, enter in contact with the cyber-jumpy, small, melodic, digital creatures that coexist in a digital space, ready to play and interact with the public. Each sensor is attached to an instrument, a specific chord, and depends upon the reciprocal collaboration among the visitors…

2) ***PLANET S.R.A.M.***

Virtual Reality application for the multiple-user interactive platform

Topic/Key Words: Multiple -user interactive virtual reality application, multi-user touchable interactive interface platform, real-time full-body optical motion capture, Interactive teams, shared environment, local and networking team interaction, Virtual reality associated with animation and videos, virtual reality and tangible interface

Aim: To produce a multiple users digital storytelling and virtual reality applications suitable to a multi-user touchable interactive interface platform such us Tracking the Net, combining multi-user interactivity, real-time full-body optical motion capture motion capture with virtual reality and tangible interface.

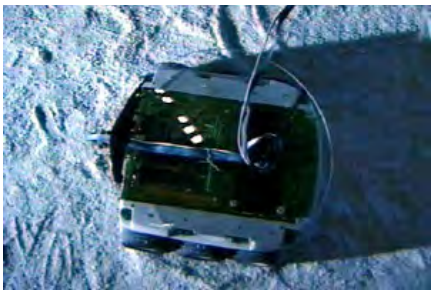
Achievements – Abstract-Description: PLANET S.R.A.M. is an interactive narrative pathway referred to the human condition in which, virtual reality is associated with animation and videos.

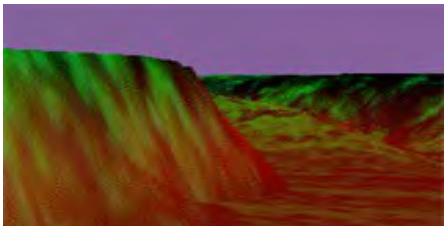
To get into Planet S.R.A.M. it is necessary to go through a premonitory tunnel. A sort of cyborg parades through the tunnel controlling, step by step, the inhabitants of Planet S.R.A.M. The creature repeats his steps over and over, delimiting the space… The planet is a giant open space enclosed by high walls, which float in space, like an abandoned pyramid. There is one entrance (the tunnel) and apparently, no exit from Planet S.R.A.M. The visitor will encounter inhabitants devoid of identity and individuality producing the same movements, actions and gesticulations, over and over, with their individuality nullified, programmed as pseudo-artificial beings, executing very monotonous and mechanical movements, one is identical to the other, one moves identically like the other. The inhabitants are a sort of unique clone, of a unique memory… of a unique way of thinking, the only difference is that each one possesses an individual body nevertheless, identical to the other. The visitors can "play" with the inhabitants as if they were not human beings … but toys. They can interact with them, eliminate them or substitute them with other, human-like creatures, which at the same time generate other, distinct movements.A large centered DNA is hanging at the center of the pyramid. The inhabitants move always around it. Here the DNA represents the common memory of that civilization. It is a common DNA, which, lives outside the skin of this human-like community that inhabits Planet S.R.A.M. Planet S.R.A.M. recalls a sort of "Kafkian vision" or can bring to the memory, a vision of a passage of "A Brave New World" by Aldus Huxley... The collective mechanization, the loss of our identity and individuality, the mechanization of the desires, the lack of intellectual liberty, all conditioned by an implacable system… which system? The real? The virtual? Or is this simply just … virtual realism?

ROBOTS AVATARS … DREAMING *WITH VIRTUAL ILLUSIONS*

INDEX

Date	1997 (1, 2 Phase) 1998 (3, 4 Phase) 1999 (5, 6 Phase) 2009 - 20010 (Upgrading, Enriching, Improving)
Project Name	Robots Avatars … Dreaming with Virtual Illusions (RADVI)
Topic/Key Words	Mobile robots, mobility and autonomous behavior, physical, augmented environment, robotized avatars, physical augmented avatars, virtual cloning, digital immersive environments, visualization displays and immerse projection technology, human-machine interface local and remote interaction.
Project Stages	Conceived as a six -phase project
Achievements/Accomplishments	See description bellow
Project Current Stage	All phases are completed
Role/Responsibilities (FF)	Author, Designer, Project Manager
Credits/Collaboration/Partners	• PERCRO Perceptual Robotics Laboratory Scuola Superiore Sant'Anna, Pisa, Italy. • K-TEAM mobile robotics, Switzerland. • F.A.B.R.I.CATORS, Milan, Italy.
Awards/Artist in Residence	1999 .Recipient, Interactive Art Honorable Mention Prize for Prix Ars Electronica, Ars Electronic Center, Linz, Austria.
Funding/Grants/Support	See: FF. Awards, Commissions, Prizes, scholarships (selected) Recipient of a technical Research, Development Grant Support from The Tuscany Hi Tech Network", Region of Tuscany, Florence, Italy; (Project: Robots Avatars Dreaming with Virtual Illusion- RADWVI).The Award was granted to develop the initial phases of development of the RADWVI project and the implementation of the first prototype of the interactive augmented installation which has been then that has been displayed in the first edition of the international Art Exhibit: "Virtuality and Interactivity, Digital Renaissance" (V&I-1998), supported by the Regional Government of the Tuscany Region, Florence, Italy.
Acknowledgments	MediARTech'98Florence, Italy Tuscany Hi Tech Network, Tuscany, Italy Region of Tuscany, Italy
Bibliography	See: FF. Publications-5a and 5b
Exhibit/Exposure	See: FF. Exhibit/ Exposure
Conference/Lecture	See: FF. Conferences/Lectures
Web / Links	
Images	
Video	
Notes	
Description	See bellow





Summary

Robot Avatar Dreaming with Virtual Illusions (RADVI) is an trans-medial augmented interactive installation that integrates an enigmatic intuitive interface, combining and intersecting mobile robots, with autonomous behavior, physical, virtual augmented environments, robotized avatars, physical augmented avatars, virtual clones, digital immersive environments. The visualization displays system and the interface solutions have been designed and developed ad hoc.

Interactive Installation

- **Real World**: The real ambiance of the installation is represented by a physical structure in the form of an telematics- Arena.
- **Virtual Worlds**: The virtual ambiances are embodied by eight different worlds or cities contained in Ying & Yang the Mother City.
- **The characters**: The main personages are:
- Koala=robot live and interact in both the Real and the Virtual worlds and virtual space.
- Ying and Yang : avatars inhabit the Virtual worlds and interact in both the Virtual and the Real World

The Installation (Real World)

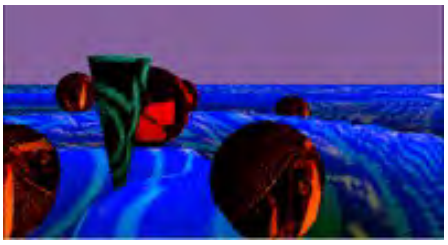
The real ambience of the installation n consists of a physical scenario under the form of an Arena with labyrinth pathways, made of mirrors, metal, wood, sand and stone. A screen of 5x5 MTS hangs from the ceiling allowing for visual projection of the VR worlds, and real time visitor interaction.

The Virtual Environments (Virtual worlds)

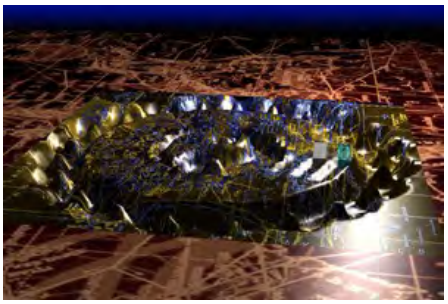
The virtual ambiences are embodied by eight different worlds or cities contained in Ying & Yang the Mother City. The main personage in this installation: Koala=robot exists in both real and virtual space. Ying and Yang are avatars that inhabit only the VR world.

The Personages:
Koala (Robot) the main personage coexists both in the “real” world [The Installation] and in the “ virtual” worlds. Koala is strongly tied to virtual space through Ying.
Ying (avatar) Ying inhabit only in the VR world. And represents the feminine principle. She is strongly related to Ying the avatar through the “real” world. She is Koala’s alter ego.
Yang (avatar) Yang inhabit only in the VR world represents the masculine principle.lives alone, by him in the limbo of the virtual space and

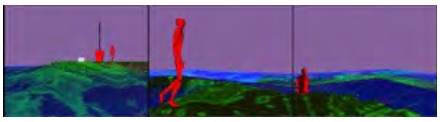
Koala, Ying and Yang, creatures of ambivalent nature with post-realist behaviors are the personages of this ‘Telematic arena’.



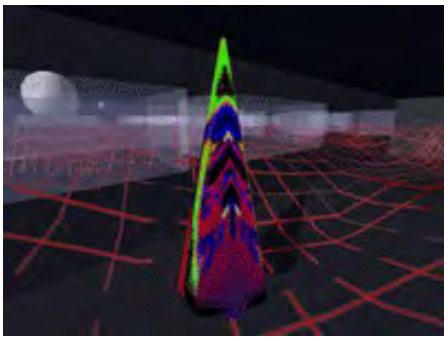
Koala, a robot that lives in a broken labyrinth, can only dream through Ying, his alter ego and avatar, which exist in a virtual terrain that reproduces his broken labyrinth and the metaphor of a virtual dream.They have a relationship yet one inhabits the "real" world, and the other inhabits the "virtual". Koala and Ying coexist and interact from and within a two layered-space, the "real" and the "virtual", which juxtaposed give form to a third layered- oniric space



The "oniric" compresses and extends simultaneously and infinitely, juxtaposing “virtual" and "real" realities. Yang, the third personage, is an avatar who dreams in virtual illusions, within the limbo of ten cyber cities contained in one unique matrix: The "Mother City".



Both mobility and autonomous behavior played key roles in this work and were also quite symbolic: the physical robot and its mobility are symbols of the real, visible world, while the behavior of the robot serves as a link between the physical and virtual worlds connecting the robot/avatar and the visitor. The preference was for a non-ready-made projection system, a personal interface and a projection display suitable to the nature of the artwork itself.

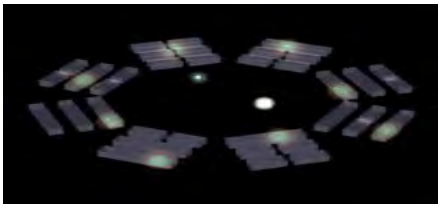


How to Interact

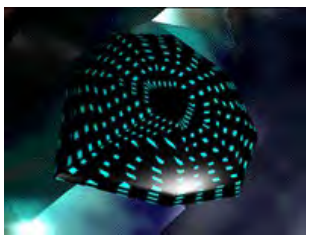
There are two joysticks; one to navigate, conducts, and interacts with Koala in the virtual world, and the other, to interact with Ying and Yang (the avatars).

The public can command the actions of Koala and consequently, the actions of Ying in the Virtual Worlds. Ying, the avatar, will operate in the virtual worlds and Koala will follow-up, step by step, what his alter ego does, generating the same actions in the real world (The Arena).

Koala is cloned with its Avatar Ying. Koala is present in the virtual world through his avatar... Ying…to the computer and obeys the impulses of the visitors. Koala, the robot has its own, autonomous behaviors, which are associated with the actions of the avatars, in the virtual world, and modified by means of interaction with visitors.



One of the most intriguing relationships between the robot and avatar is one of shared vision. The robot can avoid obstacles seen only by the avatar in within the virtual worlds resulting in an enigmatic behavior to visitors only able to observe in the real world.



The installation is carried out in the C language with Microsoft Visual C++ - Windows NT 4.0. The part dealing with the graphic has been developed with the VC Division library.

SOE | QUANTUM CITY

INDEX

Date	2005 (1 Phase) 2006 (2, 3 Phase) 2007 (4 Phase) 2008 4 Phase)
Project Name	**SOE | QUANTUM CITY - Virtual Reality Augmented Sound Installation** (SOE-QC)
Topic/Key Words	Multilevel, mixed virtual and augmented reality sound installation, Interactive 3D surround-sound environment, Mobil augmented Virtual Reality system, motion tracking system, intersecting physical and virtual responsive architecture, design, technology, music, human interaction and new generation's connectivity.
Project Phases/ Stages	Conceived as an eight-phase project
Achievements/Accomplishments	See Bellow
Project Current Stage	4 Phases has been completed
Role/Responsibilities	Designer, Project Production Management
Credits/Collaboration/Partners	F.A.B.R.I.CATORS, Italy
Awards/Artist in Residence	
Funding/Grants/Suppor	See: FF. Awards, Commissions, Prizes, scholarships (selected)
Bibliography	See: FF. Publications-5a and 5b
Exhibit/Exposure	See: FF. Exhibit/ Exposure
onference/Lecture	See: FF. Conferences/Lectures
Web / Links	
Images	
Video on Youtube	http://www.youtube.com/watch?v=_zgt1nXmrXk&feature=youtu.be
Notes	
Description	See Bellow

Figure 1: SOE-QC|VRASI Installazione

The Installation

This installation mixes and overlaps bi-directionally the real (physical) and the artificial (virtual) environment, enabling users to access through interaction with seamlessly integrated information either from the virtual and the physical environment. It is articulated by the Physical scenario: SOE-QC Master Plan, interactive mock-up, the Virtual scenario: SOE-QC simulation and the VR Star sound application. The Installation represents a 3D surround-sound environment under a vault of leds and below the physical mock-up of the Master Plan of SOE-Quantum City, a structure made in Plexiglas and metal with the dimensions of 400x400x50cm; on top is placed a 300x250cm retro-projection stereo display showing the user's real time interaction. The visitor can experience and interact with and within the physical and virtual environments. SOE-QC|VRASI is an augmented VR system; computer real-time generated images are overlaid by moving the mobile SOE-QC device which is tracked by the integrated sensor and gives the user the possibility to see the virtual model beamed on the projection system. The Viewing device comprises a 7"display screen, with an integrated sensor for tracking, to render the orientation dependent movements, and a 2 buttons interface allows interacting within the VR scenes and Sound environments. It enables the user to read the CG information [VR environment] without turning his eyes away from the real scene.

Figure 2: Installation: Front view. © Fischnaller 2008

The Viewing device for Augmented Reality comprises a 10"display screen, a tracking sensor so that the selection of displayed images is dependent on orientation of the device, and a 2 buttons interface to interact within the VR scenes and Sound environments. It enables the user to read the CG information [VR environment] without turning his eyes away from the real scene. An additional 3D stereo projection screen [120", 173x234cm] is hanging above the physical mock-up for viewing the augmented reality scene. A real-time audio rendering system combines a full room-specific simulation for virtual acoustical imaging.
To address the convergence of the artificial and virtual reality in the physical environment, intersecting bi-directionally the digital and analogue world, the "real" with the "virtual" giving form to an "augmented territory", to the extent that the convergence generates a fluid narrative, a "real" Virtuality;
To generate a first-hand experience of interacting, navigating and creating music with the stars in outer space, allowing the users the sense of bringing Space on Earth, one of the main-goal of **SOE-QC** Project.

Summary |Concept
SOE-QC|VRASI is a multilevel, mixed virtual and augmented reality sound installation, intersecting physical and virtual responsive architecture, design, technology, music, human interaction and new generation's connectivity.

The installation is articulated by: **Physical scenario**: SOE-QC Master Plan interactive mock-up, **Virtual scenario**: SOE-QC simulation, **VR sound application**: Star Clusters sound installation.

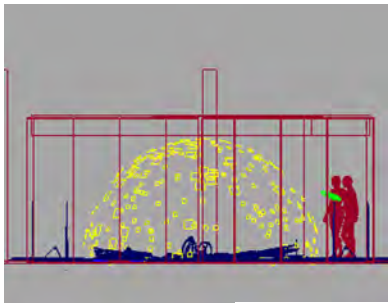


Figure 3: Installation Side view

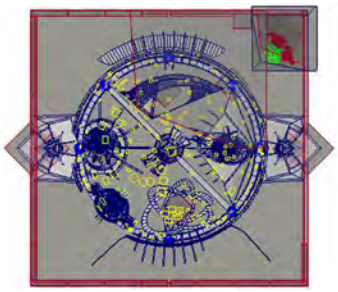
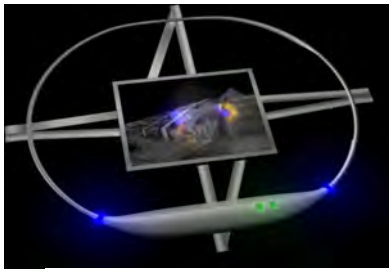


Figure 4: Installation& Mock-up top view.© Fischnaller 2008.

In the center of the room, immersed in a field of light and sound, below a vault of networked star clusters is placed the interactive physical mock-up of SOE-Quantum City Master Plan, embodying the icons of the buildings.

The mock-up is 4x4 meters and is made of Plexiglas and metal. A 3 x 2.5 meter retro-projection screen rests on top of the mock-up for visual projection of the VR stereoscopic environments, and real time user interaction.

The visitor can experience and interact with and within the physical and virtual environments through SOE-Qc | VRASI interface: the interactive device located in front of the installation.



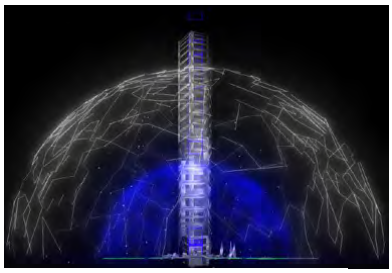


Figure 5: SOE-Qc|VRASI interface Figure 6: SOE- Star Clusters sound installation

Interacting and intersecting virtual reality imagery with real structure:

SOE-QC | VRASI is an augmented reality system; computer real-time generated images are overlaid on a real scene [SOE mock-up] to enhance the real scene. A tracking system integrated in the users interface provides the alignment of the superimposed computer generated images with the real scene.

Main objectives and goals:

To explore the power of intersections within architecture, design, art, science and technology;

To enhance new kinds of interfaces in architecture, design, art and technology, bringing these disciplines into relationship, allowing a more experimental approach to VR walkthroughs and immersive architectural fly-over interactions for the fruition of structures, buildings, interior designs, habitats, ambiances, and environments, real and/or virtual;

To conceive new ways of embedding and disembodying ubiquitous technology in architecture through multilevelled immersive audio-visual interfaces;

To expand the boundaries of understanding and perceiving new architectural proposals;

To develop a multilevelled, and augmented architectonic installation that integrates information from both: the virtual and the real aspects of SOE: the Space on Earth Project, enabling users to access interaction with information seamlessly integrated from their virtual and physical environments.

To design an architectonic installation mixing and overlapping bi-directionally the real (physical) and the artificial (virtual), expanding the boundaries of the realm of augmented reality and of the art of simulation implemented for architectonic, environmental and urban planning, concept, vision and solutions.