Mixed Reality design at FoAM is motivated by the conviction that living spaces (including materials, clothing, built or grown artifacts, and architectures) should not be designed as static or predefined structures. Rather, we approach them as malleable, alive entities able to be influenced and shaped by the activities occurring within and around them. Through a continuous, spontaneous interaction with human participants, the surroundings are becoming active agents affecting our social relationships in everyday life. On one hand, the solid matter which constitutes our realworld, is ripe for infusion with responsive media; on the other, digital worlds are being designed with more tangible, immersive properties. Both trajectories have been followed in FoAM's laboratory, shaping two of our largest projects: txOom and groWorld. The first, using the surface of the human body as a point of departure, extended its reactive membrane into several layers of a responsive environment. The second, cross-fertilizing the virtual and the real, stretches through a networked ecology of involuntary gardens and urban jungles.

"grow your own worlds"

compiled by FoAM >> http://fo.am

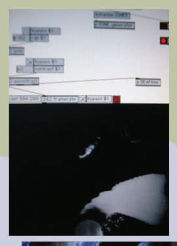
txOom [*]

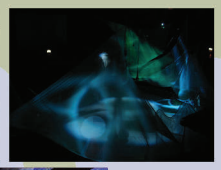
http://fo.am/txoom

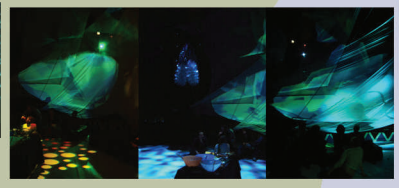
booklet/DVD > foam et al. (2003), txOom [tks'u.m], Kibla, Maribor. ISBN 961-6304-06-2

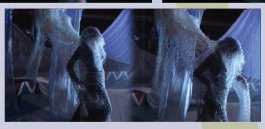
The project began in 2001 - its name an amalgam of 'texture' and 'bloom' - a mixed reality environment as flexible and interconnected as a texture; as layered and evolving as a bloom. Within a consortium of European partners (Time's Up, KIBLA, Interactive Institute and Future Physical), FoAM has developed a series of prototype spaces, responsive to the movement and actions of their temporary human inhabitants - the 'players'.

All events within the txOom spaces originated from the physical movement of the players, encapsulated in costumes responsive to touch, light, sound and motion. To provide a comfortable setting where players could forget the technology they wore in their costumes, we embedded the electronics, ensuring aesthetic and functional integration with the structure of the garments. The costumes worn by the players were truly a 'wearable architecture', clothing that extended into projection-screens and massive flexible walls, in which the electronic devices functioned as agents of communication between the physical and the virtual, translating human action into digital signal. These signals were wirelessly transmitted to a network of computers; analysed, interpreted then translated back into generative audiovisual media, experienced as a realtime feedback loop within the 'playSpace'.









To ensure the consistency of the experience, the modelling of media, materials, garments and architecture were guided by the principles of Biomimetics - design inspired by biological forms and processes, particularly emergent phenomena. From generative computer graphics programmed using Artificial Life [*] applications, to the knitting of a 15 metre long electroluminescent wearable wall; the environment was directly responsive to the torque and torsion of its playful inhabitants. txOom became an irreal ecology fertilized by the kinetic energy of the participants; smearing realworld motion across the membranes of the virtual, emerging in the physical as a strangely familiar but artificial life-form.

In 2004, txOom becomes TRG [Transient Reality Generator], a mixed reality universe exploring the possibilities within virtual worlds to mutate and re-assign the laws of physics and evolution, by intelligently perceiving and adapting the actions of realworld players... [*]

MIXED REALITY (MR) in soundbites and links

PLAY

PLACE
how is 'place' [the cultural activation of space through the activity of humans] constructed through, with and between virtual and real worlds?

AUGMENTED REALITY
the realworld is simultaneously experienced with an overlay of virtual data eg: using HMD's [head-mounted displays]

SPACE
what is 'space' in realworld and virtual environments?

REALTIME

PUBLIC SPACE
augmenting and re-activating realworld spaces with virtual data sheaths to extend & re-define public space - online & embodied

ENGINEERING
eg: 3D 'holographic' models that both clients and engineers can collaboratively interact with in the design process

MOBILE GAMING / LIVE-ACTION ROLEPLAYING
play 3D games like Quake in the realworld
http://www.tinmith.net/tinmith.htm
or; use the real world as a primary user interface for deep mobile games
http://www.gamesconference.org/2003/index.php?Abstracts/Ericsson

AUGMENTED VIRTUALITY
systems which are mostly synthetic with some real world imagery added such as texture mapping video onto virtual objects

BODY
what is the role of the body as an interface in MR environments?

COLLECTIVE INTELLIGENCE
becoming a permanent continuous part of a human knowledge network

WEARABLE COMPUTING
heads-up displays, body sensors, personal wireless local area networks... the wearable computer can act as an intelligent assistant

INTELLIGENCE
digitally augmented cognitive prostheses

BIOMIMETICS
design inspired by biological forms and processes, particularly emergent phenomena

http://c2.com/cgi/wiki?ArtificialLife

REMOTE COLLABORATIVE MR
computer supported collaborative work (CSCW) overlaying virtual objects on the real world
http://www.hitl.washington.edu/publications/ r-98-36/r-98-36.pdf

IMMERSION
what constitutes 'immersion' in these environments? does a user have to be 'immersed' to participate in a 'world' or 'reality'? how much of immersion is 'in the head' and how much in the body?

groWorld [*]

http://fo.am/groworld

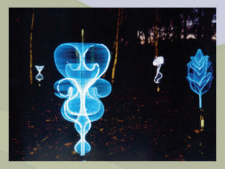
One of the most utilised forms of primitive mixed reality in everyday life are the global communication technologies. It is common practice that geographically distant communities can easily come in contact with each other and form distinctive intercultural spaces online. Diverse, emergent realities, leaking into the realworld through the fingertips of the millions of users worldwide. Through the use of ubiquitous global computing technologies, these realities can become mobile, generated ad-hoc, as required by the community. Existing as temporary autonomous worlds, engaged in an economy of appearance and disappearance. This aspect of globalisation has become one of the major driving forces behind social and cultural changes around the world.

The other side of the globalisation coin, the rampant force of global capitalism, although promising a sustainable economic system, has some of its more prominent powers forcefully introducing a global monoculture. Two examples of this extremely damaging, but fragile species are the policies of proprietary communication technologies and the transnational 'life-industries'. While doomed to fail in the long term, unable to sustain themselves in an economically, environmentally and socially fluctuating ecosystem, in the short term these industries are causing a rapid decrease of diversity in the world's ecological, biological and cultural habitats. [*]

MEDICAL
eg: image guided surgery and remote surgery.

"**Biodiversity**" edited by E.O.Wilson (et. al.)
vol. I http://www.nap.edu/books/0309037395/html/
vol. II http://www.nap.edu/books/0309052270/html/

http://fo.am/publications/2000_diac/

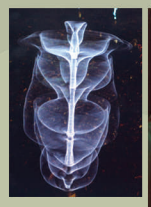


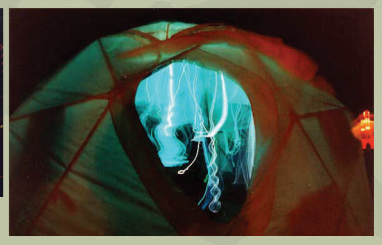
avantgardening. edited by Peter Lamborn Wilson and Bill Weinberg, Autonomedia, ISBN 1-57027-092-9

GroWorld initiative emerged as a counter-reaction to the decrease in biodiversity, from a wish to intensify the growth of new worlds, by developing a human-plant-interface (HPI), as an addition to the otherwise well known human-computer-interface (HCI), in which the edges between the animal, plant and machine kingdoms would be maximised, and their borders minimised.[*] In order to generate hybrid realities, abandoned or otherwise 'de-activated' sites in the realworld can be virtually augmented and re-activated as thriving new edge-habitats: planted, cultivated and harvested. GroWorld, in its many forms and instantiations aims to merge diverse local, realworld sites with globally accessible digital media, and build translocal events that encourage a symbiosis between the biological, the urban and the virtual.

DIGITAL ARCHITECTURE
the application of evolutionary & interactive MR strategies to design dynamic, realtime architectural solutions.

INTERFACE MODELS [HCI / HPI / HCHI]
MR creates opportunities for advanced interface modelling: human-computer-interface / human-plant-interface / human-computer-human-interface





SYNAESTHESIA
when one type of sensory stimulation evokes the sensation of another sense. eg: hearing a colour

The first prototype of groWorld was seeded at the Burning Man festival in the desert of Nevada, USA [*]. A mixed reality environment was designed to give the appearance of a virtual forest, of light becoming tangible, 3-dimensional, solid plant tissue growing from the barren, cracked silt bottom of a dehydrated sea. By infusing this dead matter with responsive light and sound the environment became magically animated, merging virtual with realworld through the sensory organs of the participants: the saturated chill of a sandstorm was amplified by the swishing sound of buried speakers, the arid soil as it fractured underfoot being sensed and translated into a luminescent flash overhead. And it tasted like more... we needed more of these places around the world - communicating with each other, growing and spawning a new hybridised reality in which nature and culture become interwoven. We found a solitary roof garden in Belgium, a network of abandoned Austrian military fortresses in Croatia, the disappearing mouth of the Murray-Darling river system in South Australia, the Chernobyl "involuntary wildlife park"[*], and many others.

MULTIPLE DIMENSIONS
simultaneously straddling multiple world-dimensions. one approach is to divide dimensions between the senses eg: a virtual world accessed only by touch, the realworld by sight. how does this form one 'reality'?

MILITARY
eg: in wartime, the display of the real battlefield scene could be augmented with annotation information or highlighting to emphasize hidden enemy units.

Viridian Note 00166

similar to technology currently used in MMORPGs (Massive Multiplayer Online Role Playing Games) [*]

Augmented Reality is experienced by users as a composite overlay of virtual data onto a realworld scene eg: a user wearing AR goggles can see the realworld landscape in front of her, but she can also see a virtual creature which appears to be roaming that landscape. [*]

The future of groWorld lies in creating a network of such hybrid gardens, in which the physical sites (pocket-ecologies) are connected to each other through a persistent 3D virtual, online groWorld (data-ecology) [*]. This distributed data-ecology can be experienced as a virtual media layer draped across the physical sites, through an Augmented Reality [*] system, appearing to 'grow' from cracks, holes and openings between the physical and the virtual. Events and conditions within the physical sites can directly influence the evolution of the online world, making it grow and decay, shrink and expand, mutate or homogenise - becoming an increasingly autonomous, distributed wilderness or a tamed, cultivated work of art.

HYBRID MULTIAGENT ENVIRONMENTS
in which MR environments are defined as one 'hybrid' reality experience with human agent-artificial agent interaction
http://jasss.soc.surrey.ac.uk/5/1/6.html

[*] for further reading see http://libarynth.fo.am/