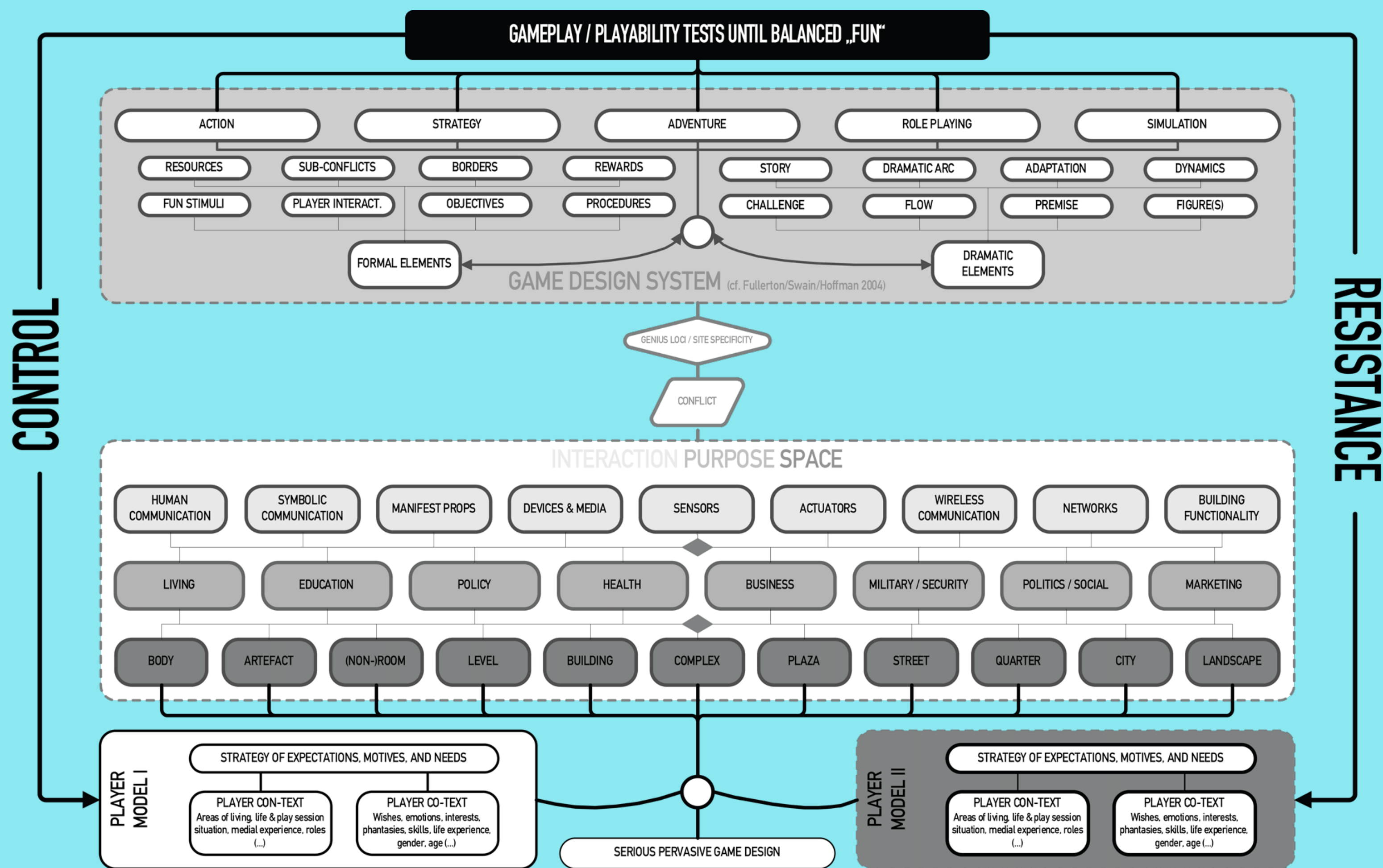lightFight: Wearable biofeedback game which allows player control to lights-over-IP by blowing.


ETHGame: Massively multiplayer WLAN geo-location learning game for ETHZ students.

GAMEPLAY / PLAYABILITY TESTS UNTIL BALANCED „FUN"

CONTROL

RESISTANCE

ACTION	STRATEGY	ADVENTURE	ROLE PLAYING	SIMULATION
RESOURCES	SUB-CONFLICTS	BORDERS	REWARDS	STORY	DRAMATIC ARC	ADAPTATION	DYNAMICS
FUN STIMULI	PLAYER INTERACT.	OBJECTIVES	PROCEDURES	CHALLENGE	FLOW	PREMISE	FIGURE(S)

FORMAL ELEMENTS — GAME DESIGN SYSTEM (cf. Fullerton/Swain/Hoffman 2004) — DRAMATIC ELEMENTS

GENIUS LOCI / SITE SPECIFICITY

CONFLICT

INTERACTION PURPOSE SPACE

HUMAN COMMUNICATION	SYMBOLIC COMMUNICATION	MANIFEST PROPS	DEVICES & MEDIA	SENSORS	ACTUATORS	WIRELESS COMMUNICATION	NETWORKS	BUILDING FUNCTIONALITY
LIVING	EDUCATION	POLICY	HEALTH	BUSINESS	MILITARY / SECURITY	POLITICS / SOCIAL	MARKETING	
BODY	ARTEFACT	(NON-)ROOM	LEVEL	BUILDING	COMPLEX	PLAZA	STREET	QUARTER	CITY	LANDSCAPE

PLAYER MODEL I
STRATEGY OF EXPECTATIONS, MOTIVES, AND NEEDS
PLAYER CON-TEXT: Areas of living, life & play session situation, medial experience, roles (...)
PLAYER CO-TEXT: Wishes, emotions, interests, phantasies, skills, life experience, gender, age (...)

SERIOUS PERVASIVE GAME DESIGN

PLAYER MODEL II
STRATEGY OF EXPECTATIONS, MOTIVES, AND NEEDS
PLAYER CON-TEXT: Areas of living, life & play session situation, medial experience, roles (...)
PLAYER CO-TEXT: Wishes, emotions, interests, phantasies, skills, life experience, gender, age (...)

Serious pervasive game design taxonomy under construction.

ETHZ Foundation Fundraising Game (concept):
Large scale LED manipulation fundraising game
with cell phone and web interaction.
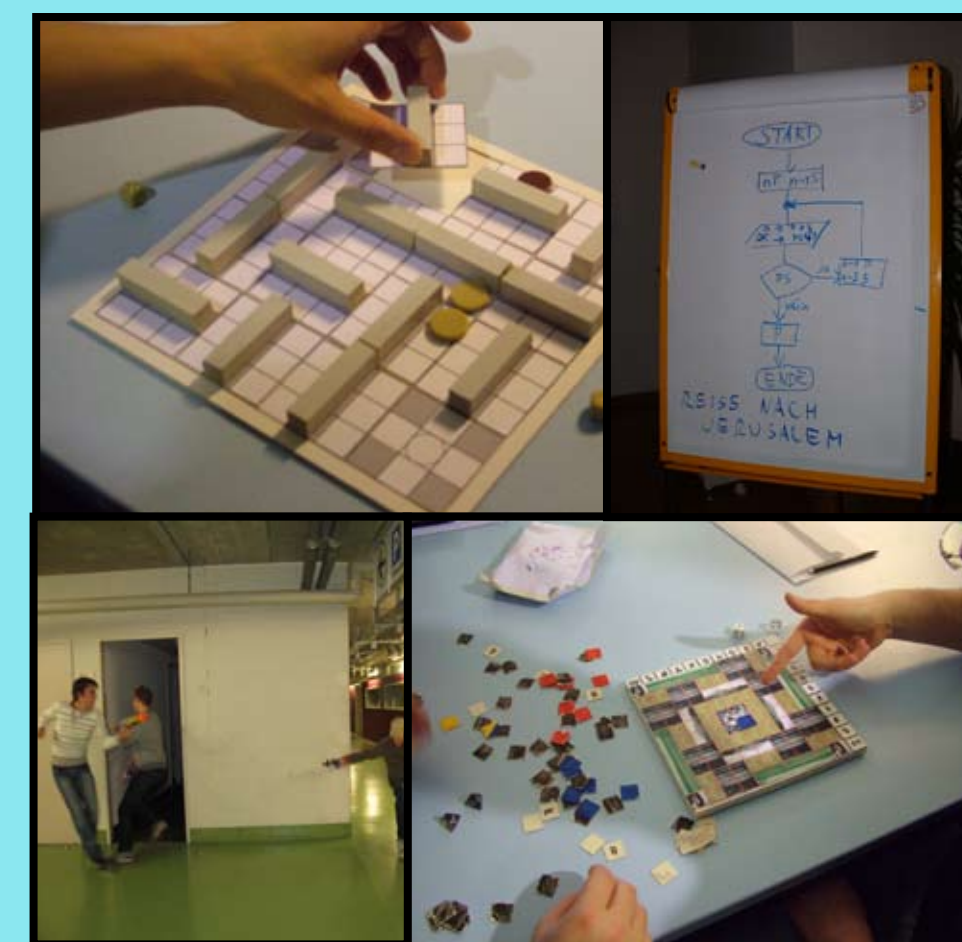
Applied game design prototyping methods.

SERIOUS PERVASIVE GAME DESIGN
FOR SENTIENT ARCHITECTURES

ABSTRACT
At the ETH Zurich's chair for Computer Aided Architectural Design (CAAD), we are currently developing a series of serious pervasive game prototypes (SPGs) which shape the main author's Ph.D. thesis. The goal of the following statement is twofold: a) Engage a discussion about the dialectics of (S)PG designs; and b) briefly introduce a SPG taxonomy the author has come up with, as well as point out SPG research and teaching examples.

INTRODUCTION
Serious games are games that serve non-entertainment purposes such as health care, security, management, or learning. Pervasive games take advantage of interface, wireless, sensor, and positioning technologies for game experiences that feature virtual and physical game components. When combined, serious and pervasive game design together offer novel research opportunities. Examples of SPGs include a cooperative environmental learning game created by the MIT's Teacher Education Program – cf. http://education.mit.edu – and an atomic bomb countdown and conspiracy game investigating group trust, cf. http://www.madcount-down.com for a detailed documentation. The latter example has been been projected by the main author in 2001/2002, earning him his M.A. in social anthropology at the University of Tübingen, Germany.
In this design statement, the author very briefly considers SPGs as systems being both surveillant and fun, introduces a SPG taxonomy under construction, and points out SPG teaching and research examples.

THE DIALECTICS OF SERIOUS PERVASIVE GAMES
Within the field of CAAD, SPGs can help architects to conceptualize, simulate, and implement specific services in computer intergrated, "sentient" environments, for example for the fields of emergency logistics, ambience setting, energy saving, or remote supervision. Yet, and more generally, SPGs redefine the way users interact with each other, as well as with physical environments, because serious games usually set the game's main goal outside of the actual gameplay: "By the time you stop playing, you will have learned X". That is why the authors assume that SPGs in particular have an even stronger impact on players' everyday actions, as these games also transfer conflicts from outside the game into the (artificial) gameplay with the help of emerging technologies. From a planning standpoint, but also psychologically, these technological interventions can and should be compensated for to guarantee an immersive, yet intrinsically motivating experience during the SPGplay session.
Because SPGs tend to be intense experiences involving the whole physical and cultural body of a player next to the player's context, such an experience must also be balanced beyond the mere gameplay session. To guarantee this, the authors usually make use of extensive qualitative social sciences methods - ethnography, in situ observation, interviews - to plan a design first from the player's perspective, and then according to a location's architectural genius loci. Eventually, after implementation and testing, both gameplay and gameplay's social consequences are being analyzed.

As a SPG designer, it is important to bear in mind that SPGs as closed and, ideally, balanced systems represent both mighty surveillance tools and empowerment vehicles. On the one hand, SPGs posit players into exciting public playgrounds never seen before – the world itself becomes the game board. On the other hand (and in order to assure a seamless experience), SPGs need to bring upon the player a quasi surveillant IT infrastructure to ensure seamless gameplay and goal fulfillment. We can think of this dilemma as the dialectics of SPGs.

A DESIGN TAXONOMY UNDER CONSTRUCTION
The design taxonomy shown in the above should be read from bottom to top, looping back, but not in the fashion of a linear design process dictate. It visualizes how the author 'maps' SPG designs during the early prototyping and playtesting stage. In summary, the taxonomy asks a SPG designer to start the design process always player-centered, that is: by considering the prospective player's context, e.g. her medial experience or situational role outside of the game, as well the player's counterpart, e.g. other players or a computer. Then, the architectural space whereon the game takes place should be taken into account, as well as the overall purpose of the SPG, and appropriate human(-computer or sentient environment) communicative and strategic interactions. Specifically the latter will change once the game prototype will be playtested and iterated. Depending on the core SPG conflict, site specific design problems arise (e.g. site infrastructure, game element availability or orchestration) which should be solved with general as well as SPG specific game design techniques. Of course, these techniques define a SPG dramatically and formally as a system negotiating fun with the player during gameplay. A game mechanic sketch may kickstart a SPG design, too or an appropriate storyline – there is no hierarchy to good ideas.

SPG TEACHING
Based on this taxonomy, the author has been teaching a number of SPG and PG design studios, for example at the University of Stuttgart – see the extensive (German language only, unfortunately) class Wikis http://wiki.caad.hbt.arch.ethz.ch/twiki/bin/view/Gamearch or http://wiki.caad.hbt.arch.ethz.ch/twiki/bin/view/Game05. In 2004/05, the author has co-headed an English language SPG studio at the ETH entitled "ETH-Game", see the figure in the above. The course has resulted in a massively multiplayer locative learning game early prototype including a feasibility study and game media available for download at this location: http://wiki.caad.hbt.arch.ethz.ch/twiki/bin/view/Game0405/ETHGameSessionFinal.

SPG RESEARCH
Our more recent SPG prototype "lightFight" involves biofeedback interaction. lightFight connects a player with wearable biometric hardware, so that during a fitness type exercise, she manipulates computer integrated functionalities such as light control by changing her skin conductance through blowing hard or moving physically within a demo space, the ETH's so called "Red Hell" which features IP enabled building services. More research relevant to the main author's Ph.D. is being conducted currently, including cell phone control of IP-enabled services via text-to-speech, automatic voice recognition, and key interaction.