FROM THE ARCHITECT-PROGRAMMER TO THE ARCHITECT-GAMER: THE VIDEOGAME AS AN EMERGENT TOOL OF ARCHITECTURAL DESIGN

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Swarm Architecture II

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Space is a computation

Architects design constructs to structure the movements of information. This is true for the simplest house. Urban planners design strategies to structure the flow of information in the city. This is true for all cities, big or small. Instead of focusing on the material appearance of spaces that are built with regard to the movements of people, we must pay more attention to the membranes of those spaces in the design process. We must also pay attention to the openings in the membranes allowing for the flow of information, in whatever form that information may take.

In the membrane, a door is essentially an on-off switch; the movement of material and bodies is structured to flow through that door. Doors are open or closed (or half-open and half-closed), the spaces are switched on or off, or they resemble the action of being switched on or off. The membranes are semi-permeable envelopes around a certain quantized volume of space. The semi-permeable membranes let through people, light, heat, cold, small animals, air, radiation, information, food, water, gas, waste, molecules, wind, sun, moisture, materials, cars, shopping bags, television programs, waves, books, paper.

A wide range of materials comes in through the membranes; another wide range of materials leaves the space somewhat later. Some things come in through explicit holes; others come in by diffusion, by radiation, by transmission, or are carried by other messengers. Much of it is carried by people, coming in and going out. People are information carriers; they run into, about and out of the house. The information they carry out of the house is of different content than the information – in whatever disguise – they take out of their house. The information content and some material properties of incoming information are changed inside the space. This space can be considered as a content transformer, it digests the incoming material/information. Taken to the extreme, all material is a form of information; taken even further, all information is a form of computation. Thus space computes information. The question to be raised here is: does the space compute or do the people in the space

real time

swarm

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Gamesetandmatch

Delft University of Technology
Faculty of Architecture

proceedings of the conference GSM, 13 december, 2001
gamesetandmatch, real-time interactive architecture

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13 December 2001 ...hitecture conference at the

...ulty of Architecture

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Namen

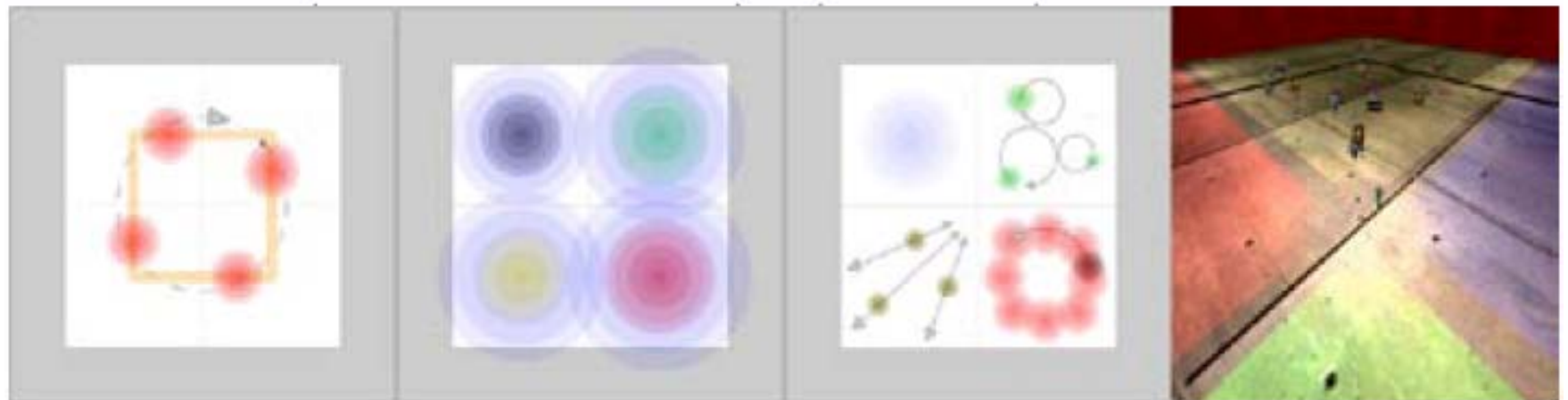*Students participating in projects of the Hyperbody Research Group,DUT*

Fatima El-bouyahyaoui
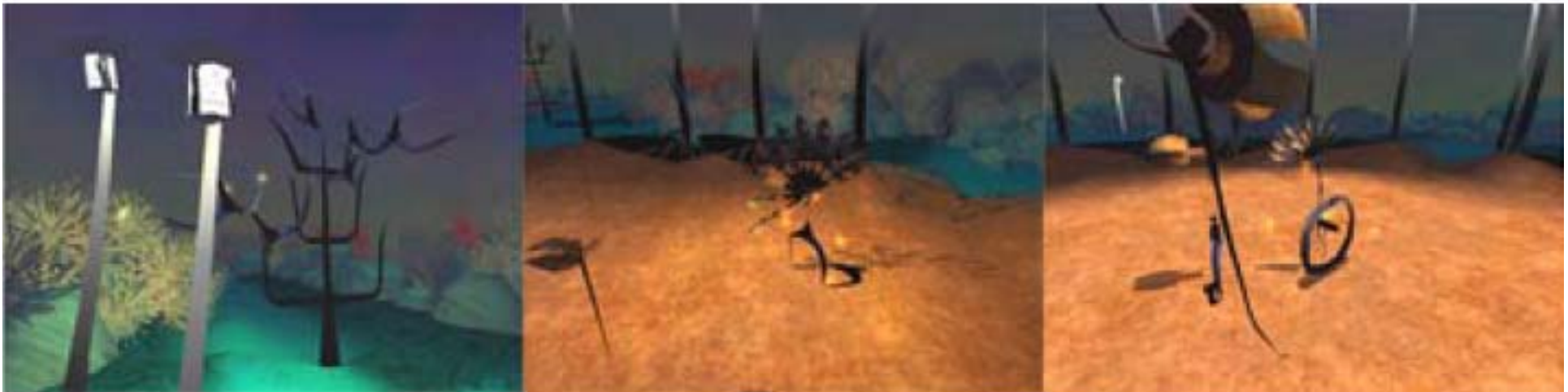
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-Intermezzo 3- Multiplayer Collaborative Design Internet Game

Ir. Hans Hubers

Building Engineer at Faculty of Architecture - TUD

Abstract: As an intermezzo Hans with his two sons show the state of the art of multiplayer internet games. This kind of technology can be used for simulations in architecture; not only for evaluation of the design by the future users, but also as a means of communication for the experts in a collaborative design team. Some problems and solutions of collaborative design are discussed.

On two projectors, my two sons, Jonathan (17) and Joris (15) show the state of the art of multiplayer games on the internet. They are no wiz kids. Their friends do the same. This generation will expect from our universities that education in architecture will be as interactive as this game.

The game is called Counter Strike. It uses the game engine of Half Life. It is a so called shoot-um-up game. Jonathan and Joris just logged in on the game server and joined the counter terrorist forces. With some key strokes they can switch cameras. The free look mode camera (Fig. 1) shows them both. Jonathan is standing in the back. With this camera you can move freely through the game when you are dead and learn from the others. It is also great to discover the architecture.

They first choose their weapons, depending on the money they earned. Killing a terrorist or diffusing a bomb make you earn money (Fig 4). Your budget is on the bottom right of the screen. Other information on the bottom shows how much life you still have, how bad your protection is damaged, how much time left and how many players. You can communicate with team members through standard messages like "Follow me" or "Cover me" by just typing a key combination. But you can also type in free text, which is shown over the camera view at the left (Fig. 2). Recently it became possible to even talk to each other using a head set, as Jonathan and Joris show. The green circle at the top left is a radar showing where your team mates are.

Of course it is not for fun that we show this game. At least not only. What strikes me is that we see here

this work? That is a big problem. But lets imagine an architect that is willing to invest in this, e.g. because in this way he build a relation with partners that can generate work. Then the next problem is to store all the information in a database in which every partner can read and write his information. But since there is no agreement about the classifications the database must handle synonyms. Of course there is no software that can take care of that. So some wiz-kid staff member will program a macro, which only he understands fully and maybe (not likely) the project will look like a bit collaborative design. Now project Y, a multipurpose building with some large meeting rooms and a theatre, must be set up. Maybe different partners? But even if the installation advisor is the same, now the heat loss of the walls are not relevant, because the building is underground or the heat loss is negligible compared to the isolation problem of air-conditioned large rooms, but acoustics are important and the advisor needs to know the kind and quantity of the materials inside the theatre. Again some wiz-kid has to go to work. I think my point is clear. The lay-out of the central database changes every time and every team is doing the same kind of poor database programming.

Still I think that both approaches are needed. Top-down by representing unions of the different professions and researchers and bottom-up by the professionals that know how things are done in practice. But since there is no money to make them cooperate there is still a long way to go.

So lets forget about collaborative design? No, we believe that in due time these problems will be solved. In our projects we experiment with multiplayer game development software and ways to work on the same project simultaneously. If we can do it in virtual reality it can be done in reality too.

GameSetandMatch II

The Architecture Co-Laboratory:

Game
Set
and
Match
II

On Computer Games,
Advanced Geometries,
and Digital Technologies

With new technical possibilities of worldwide electronic networking and the ubiquitous employment of new media and digital technology in various fields of research and practice, conventional disciplines gradually dissolve as new transdisciplines occur. Contemporary architecture too resides in a state of transgression that gives rise to new architectural conceptions benefiting from a multitude of influences.

This publication brings together the manifold, international and interdisciplinary contributions to the 'GameSetandMatch II Conference – The Architecture Co-Laboratory,' directed by Kas Oosterhuis, professor at the Faculty of Architecture of the Delft University of Technology, the Netherlands. It addresses contemporary and future changes within and across the boundaries of digitally driven architectural and design practices. The notion of architecture as a co-laboratory accentuates this strong devotion to experimentation and collaboration. In so doing it offers a kaleidoscopic view of, rather than a defined perspective on current developments in the digital design domain.

The authors of the essays and papers included in this book come from very diverse backgrounds ranging from architecture and design to technology and engineering as well as computer sciences and humanities. This collection of writings serves the generally interested reader as well as the scientific reader and provides a source of discussion to draw inspiration and motivation from.

GameSetandMatch II includes contributions from Robert Aish, Ole Bouman, Raoul Bunschoten, Bernard Cache, Jan Edler and Tim Edler, Georg Flachbart, John Frazer, Mark Goulthorpe, Branko Kolarevic, Anne Nigten, Marcos Novak, Kas Oosterhuis, Antonino Saggio, Katie Salen, Norbert Streitz, Tom Verebes, Peter Weibel and many more.

Kas Oosterhuis, Lukas Feireiss (eds.)

Kas Oosterhuis repositions the architect in society today as a well-trained hyperconscious idiot savant. Audacious intuition must be trained to decide in split seconds, like the Formula I driver. Today's architect is an information architect, able to act intuitively and to process rationally at the same time. He naturally investigates and practises architecture as a realtime transaction space, buildings are seen as processes running in real time. Building components communicate with other building components. All are members of the swarm, members of the hive. Swarm architecture implies that all building elements operate as intelligent agents, data-carriers and data-processing devices. Swarm architecture feeds on data generated by social transactions in the new transformation economy. In the process of collaborative design and engineering the participants work in the communication flow of the swarm. The collaborative work is based on parametric, generic and genetic design principles, on scripts and formulas with a multitude of variables. The modern informed architect is the designer of intelligent vehicles, executing a game of life and death. Architecture becomes the art of building prototypes for fluid dynamic structures and environments running in real time. Architecture no longer has the hidden agenda to resist external and internal forces. Buildings are pro-active hyperbodies displaying realtime behaviour. Buildings are familiar but unpredictable like the weather. Architecture goes wild and e-motive.

Kas Oosterhuis (1951) is professor at the Technical University of Delft where he directs the Hyperbody Research Group. Together with visual artist Ilona Lénárd he runs their office ONL in Rotterdam. Kas Oosterhuis received a number of international awards for realized projects [Garbagetransferstation Elhorst-Vloedbelt, *Saltwaterpavilion*]. He launched the paradigm shift towards fully programmable architecture with the presentation of the *Trans-ports* project proposal at the first Archilab Conference in 1999.
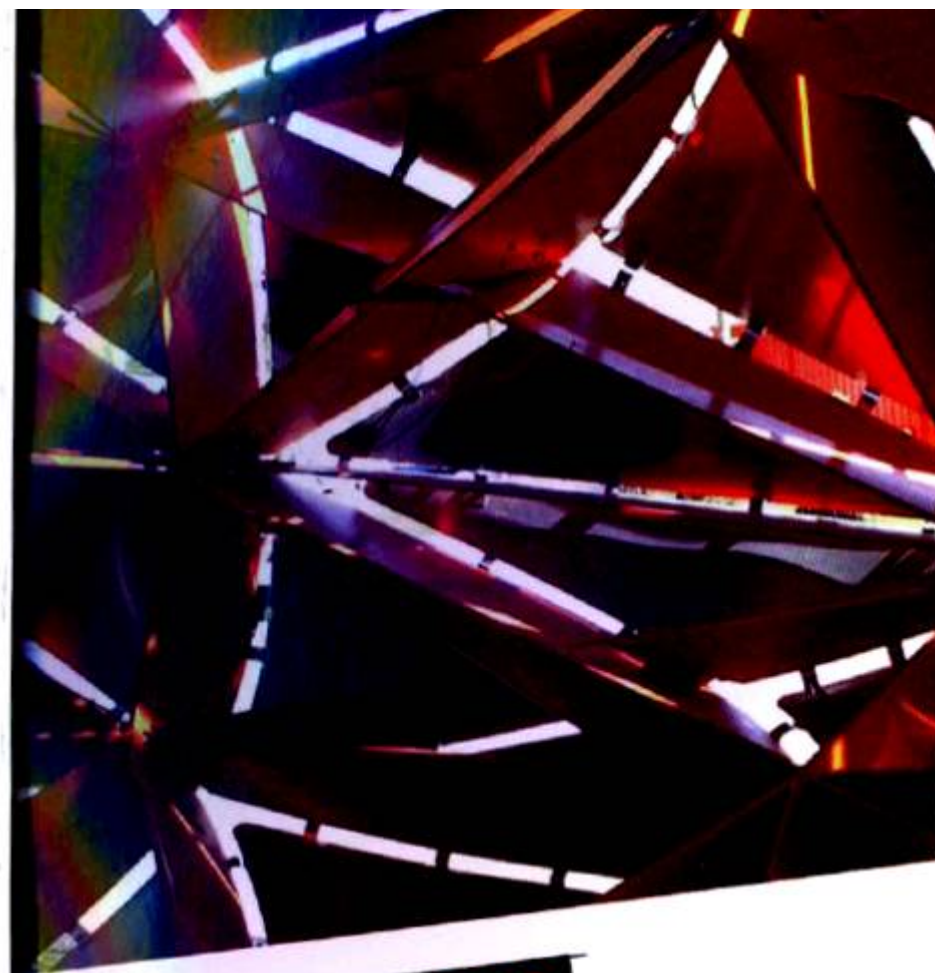
HYPER BODIES

Kas Oosterhuis | Towards an E-motive architecture

29. The Nature of the Game

The concept of collaborative design and engineering is facilitated by building a game, which opens up the design process of architecture and building in real time. It is extremely relevant that the designers don't just talk about the process, but that they actually make it work. *You must run the process, and work in the process.* First you must see and feel how beautifully complex the procedures are, and how precisely and intuitively you must think and act to make it work for you. You must think like a program writing code. You must become as innocent and tricky as a child playing a game. The designers must deal with the simultaneous development of the design and communicate with the other stakeholders in the transactive design process. Game development software (Virtools, Blender, Quest 3D) offers the tools for the design of architecture in real time. Resolution and render time aren't issues anymore, *it is all about frame rate.* Animals like to play. Humans like to play. *Playing is an evolutionary tool to learn how to act and react in new situations.* The game, whatever it might be, is not the point (Huizinga, Homo Ludens, 1938). *A game is highly structured information in a state of flow.* If the game has been supralogical in the evolution of animals and humans, why shouldn't it be beneficial to the evolution of intelligent buildings? Why wouldn't an embodied game structure be essential for the next step in the evolution of smart buildings? Buildings must become playful. While

processing the information flow the e-motive vehicle builds its playful state of mind. Playfulness is acted out in real time. The playful buildings will develop a whimsical will of their own. They will develop real time behavior. Buildings start to behave as unexpectedly as the weather. They will fool us, encourage us to react to their actions, and then act again. *Only when both users and their environments are active, can there be true interaction.* As we have seen before, these buildings will be more than responsive, they will become pro-active. Casa ludens. What a thrill.

DRIP PAINTING (JACKSON POLLOCK 1950): PROCEDURAL ACTION

When people walk, they execute a script of staying upright, of not falling, of balancing on two feet. When people paint, they follow a set of personal rules, and validate their own paintbrush movements during the act of painting. For the Drip Painting *series, a strict procedure was invented for dripping the paint on the canvases, which are placed horizontally on the floor. While painting, Pollock physically executed a simple script existing of only a few lines of code. Put the brush in the pot, take a step aside, bend over the canvas and make a pre-programmed movement with the arm holding the brush. Then repeat the same script but one step to the right. For each new layer in the painting Jack The Dripper he applied slightly different parameters for slightly shifting rules. In the background of the painter in action, Pollock's wife, Lee Krasner (a painter herself), controlled the scene. In 1943, she came up with the initial concept for working according to a similarly strict procedure. The result of the transactive procedure is a rich, multi-layered action painting, fractally pleasing by virtue of the endless selfsimilar variations caused by the in-real time-produced parameters in the execution of the drip program.*

30. The Rules of the Game

According to Huizinga, the game creates order, the game is order. The game unfolds within the limits of its own playroom. The game is played according to its own set of rules. The challenging issue here is: who sets the rules for the playful building? What are the boundaries of the playground? Who decides what formulas are used? Who writes the procedures? Who creates the scripts, who writes the genetic code? *And who is authorized to change the rules of the game?* MIT research associate Michael Schrage (Serious Play, 2000) urges us to look at promising prototypes. He persuades us to position the time-lapse camera inside the prototype to capture its environment. And then track all the conversations, collaborations, consultations, arguments, negotiations, debates, budget fights, and brainstorms that go on as the prototype evolves into an innovative product. Schrage asks himself: which point of view best captures the nature and value of serious play? *Developing the prototype is a serious game.* The prototype is a complex set of rules and choices. A complex set of formulas and parameters. The process of interaction, communication and collaborative design is a parametric game.

Glossary of terms

Hyperbody is a data-driven construct changing in real time and connected to environments changing in real time.

E-motive architecture runs and develops real time behavior.

Hyperarchitecture links through networks to other connected environments.

Idiot savant is a narrow-band genius.

Transformation economy deals with changing the client.

Architecture Goes Wild is the title of the book of manifest writings by Kas Oosterhuis.

Dataflow is the flux of streaming packages of data.

Stakeholder is a person or an object pursuing individual goals.

Parametric design formulates the relationships between objects.

Direct democracy is based on a continuous voting system to involve non-experts in political choices.

Unibody is the constructive shell protecting a weaker substance.

Automotive styling gives shape and character to unibodies.

E-motive styling gives style to data-driven constructs.

Information theory hypothesizes that matter and ideas are disguises of informative waves.

Information coefficient validates the most compact form of formulating the project code.

Second law of thermodynamics indicates how humans perceive passing time.

Collaborative design operates as a swarm in a shared information space.

Collaborative engineering is engineering in the hive mind of the shared information space.

Swarm is a group of relatively dumb members forming emergent intelligence.

Hive is the transaction space of the swarm.

Real time is the ability of the operating system to provide required service in a bounded response time.

Intelligent agent is a semi-autonomous unit that seeks to maximize its fitness by evolving over time.

Flocking behavior is grouping together in the swarm according to a limited number of relatively simple rules.

Multiplayer is the presence of several players in the same game in real time.

Algorithm is a recursive procedure whereby an infinite sequence of terms can be generated.

Programmable pertains to a device that can accept instructions that alter its basic functions.

Voxel is a unit of graphic information that defines a point in three-dimensional space.

Interaction is the tension field between at least 2 active parties.

Boid is one of a multitude of semi-autonomous agents constituting the flock.

Body building is the art of putting loose parts together to form an integrity.

Building body is a selfbearing construct distributing forces through itself.

Transarchitecture delaminates the physical borders of an object in space and time.

Liquid architecture is static architecture becoming supple under high data pressure.

Open source architecture reveals its source code freely.

Emersion is the recreation of reality through the ephemeral.

Immersion is the free floating of the physical body in the ephemeral.

Sensor is a detection device that requires input energy from a source other than that which is being sensed.

Actuator is a device that converts energy into robot motion.

Pro-active is taking the initiative and the responsibility for making things happen.

Responsive is answering or replying in a timely fashion.

Behavior is conduct in a shared environment in real time.

Feedback is the return of a (processed) portion of the output, of an active device to the input.

Virtual reality is hyperreal byte-by-byte quantifiable and qualifiable constructed reality.

Schema is the most compressed form to describe a complex system.

Project model is the project database viewed through a 3d viewer.

Flowchart is a graphical and symbolic representation of a running process.

Building block is a self-contained body of code or graph in the overall script.

Graph is a symbolic abstraction of the reality of a network.

Interface is the shared boundary between two operational units defined by specific characteristics.

Group design room is the shared transaction space for collaborative design.

Group decision room is the shared transaction space for open decision systems.

Information index validates the information level of the project.

Link is the logical connection between discrete units of data.

Hub is a device that accepts a signal from one point and redistributes it to one or more points.

Backbone is the high-traffic-density connectivity portion of any communications network.

Synthetic means fusing discrete elements together to form a new whole.

Formula is a standard procedure for solving a class of mathematical problems.

Database is an organized collection of information.

Bandwidth is the difference between the highest and lowest frequencies that may be transmitted.

Game is a set of rules within a restricted playing field.

Code is a set of unambiguous rules specifying the manner in which data is represented in a discrete form.

Script is a relatively short computer program that performs one specific task.

Autolisp routine automates a series of commands.

Language is a system of relatively arbitrary symbols and signals that change over time.

Scale-free network is characterized by an uneven distribution of connectedness.

Wireless network or terminal uses electromagnetic waves.

Prototype is a working 1:1 model of a projected series of products.

Intuitive refers to the perception of the internal and external world through the unconscious.

Counter-intuitive ideas or assumptions seem to be contrary to what would be considered normal.

Democracy is government by the people in which the supreme power is exercised directly by them.

Qualifier is a word added to a corporate body to distinguish the body from others with the same name or title.

Complex adaptive system evolves through emergent control and order by intelligent agents.

File to factory is direct machine to machine communication.

IGES means Initial Graphics Exchange Specification.

NURBS means Non-Uniform Rational B-Spline.

Web-based applications are accessible and operational via the Web.

Mass-production is the running process of linear production methods.

Mass-customization produces series of unique elements for specific clients.

Vertex is a corner, point or node in a mathematical construct.

Surface model is a surface tessellation using connected triangles.

Fold is an angular or rounded shape made by folding

Cities and landscapes change, continuously.
In size and character.

They appear and disappear; they become important
and less important. They flourish, they become ruins.

No, nothing is fixed, even if we try so hard sometimes.
Even with lots of Monuments Acts. Maybe it is not
permanence that is monumental but change itself.

Change seems one of the very few constants.
But how do concentrations and settlements 'move'?
How do they mutate and and/or adapt to this con-
tinuous change'? What is the struggle, the driving
force, behind this?

Maybe a process-oriented, 'Darwinist' or evolutionary
attitude can be followed towards change and creation,
one that models these 'battles', these acts of ascen-
ding survival mechanisms.

SpaceFighter wants to model these interactive
urban developments. It wants to reflect and compare
(in one second or one minute) imaginable interactive
urban processes.

SpaceFighter has been constructed by Winy Maas in
collaboration with the Delft School of Design (DSD),
the Berlage Institute in Rotterdam, cThrough in
Eindhoven and MIT, Department of Architecture
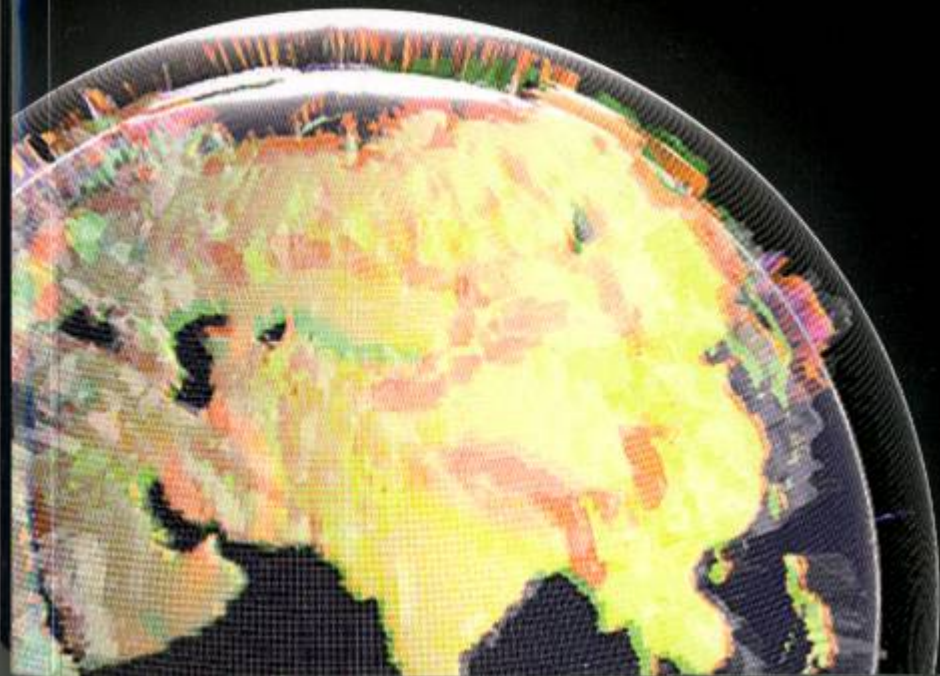in Cambridge (Mass.) in the years 2005–2006.

ACTAR
A

SPACE FIGHTER

THE EVOLUTIONARY CITY (GAME:)

MVRDV/DSD

In collaboration with
the Berlage Institute,
MIT and cThrough

Student: These are the layers we discussed about Student: We have a common vision of the city and we are working on different layers Student: Yes, what you were saying about the colours but you can switch off one of the games Winy: That's fine Student: But each game has his own unit type so it's difficult for me to imagine the same unit type. Winy: Why not? It's the same blocks of 100x100x100m, I still want to have the opposite. Arthur: In reality it's very diverse, things aren't the same, they're not cubes. Winy: Find smaller pixels. Arthur: How small should they be? Winy: 5x5x5m. Arthur: But that's enormous, I mean. Winy: I don't see it yet. Arjen: I see it, if you translate these games towards these collectively decided units and then you'll be forced to pick a scale and to translate these games to a city. And if you have this common unit then you can easily translate it, it doesn't matter the scale and location. That's beautiful. And eventually if that is connected if it is working on a common legend then you get what you were describing. Because certain machines work at the street level and then you zoom out and see as the result of what is happening with another machine at the global scale. Arthur: The problem in the global scale is that it's not possible to put one legend for all scales, it would be enormous. Winy: No that's not true Arthur: Otherwise it starts to become impossible to understand. Winy: Let's go to the different groups. Your group has to deepen it, it was too shallow according to every-

I think the closure is that you take lessons from the evolutionary city, it helps you to design. Student: Maybe the difficult part now is to let go of the individual differences in the games. Because we can superpose them in a way if we understand each one's position, maybe they will have links together and they will join. Then it will be difficult for each one of the groups to let go of what is not in the evolutionary city Arthur: Maybe it's possible to overlap them without letting go, without losing. Arjen: They're all contained right now, isolated. Winy: But what do we want to see in the sum. It might be a dream, I could tell you glimpses of it; There is the globe and you could see dots moving around earth... no don't laugh yet. Student: No but I'm seeing it. Winy: You zoom in and you see on a micro-level that there are certain things happening as well. It means that there is a time span of a thousand years. Arjen: And the scale is variable. Winy: Yes you could zoom in and see another type of pixels. That's clear, work on that. Then I'll have to be very strong to defend that for a moment and I don't want to see any circles anymore. You have to translate these circles into pixels. Is that possible? Is that a common dream? Student: I would really like a common dream as well, but I'll think about how to do it. Student: In a way that's something we all should talk about, what is it, that ties my game into your game? And that's a sort of argument. They are all working either at different scales but on the same sort of object.

DETROIT – Past

DETROIT – Present
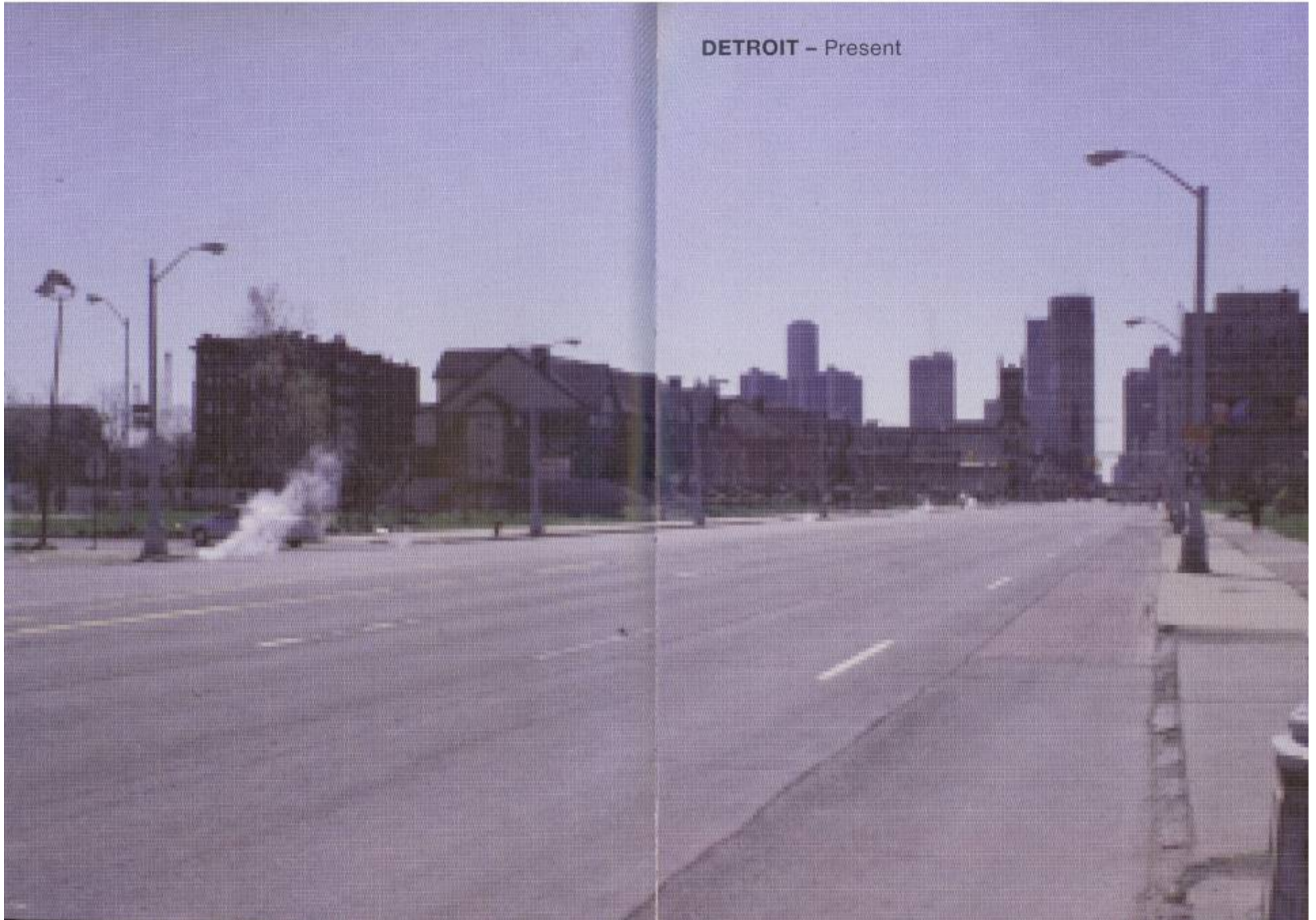
DUBAI – Past

DUBAI – Present
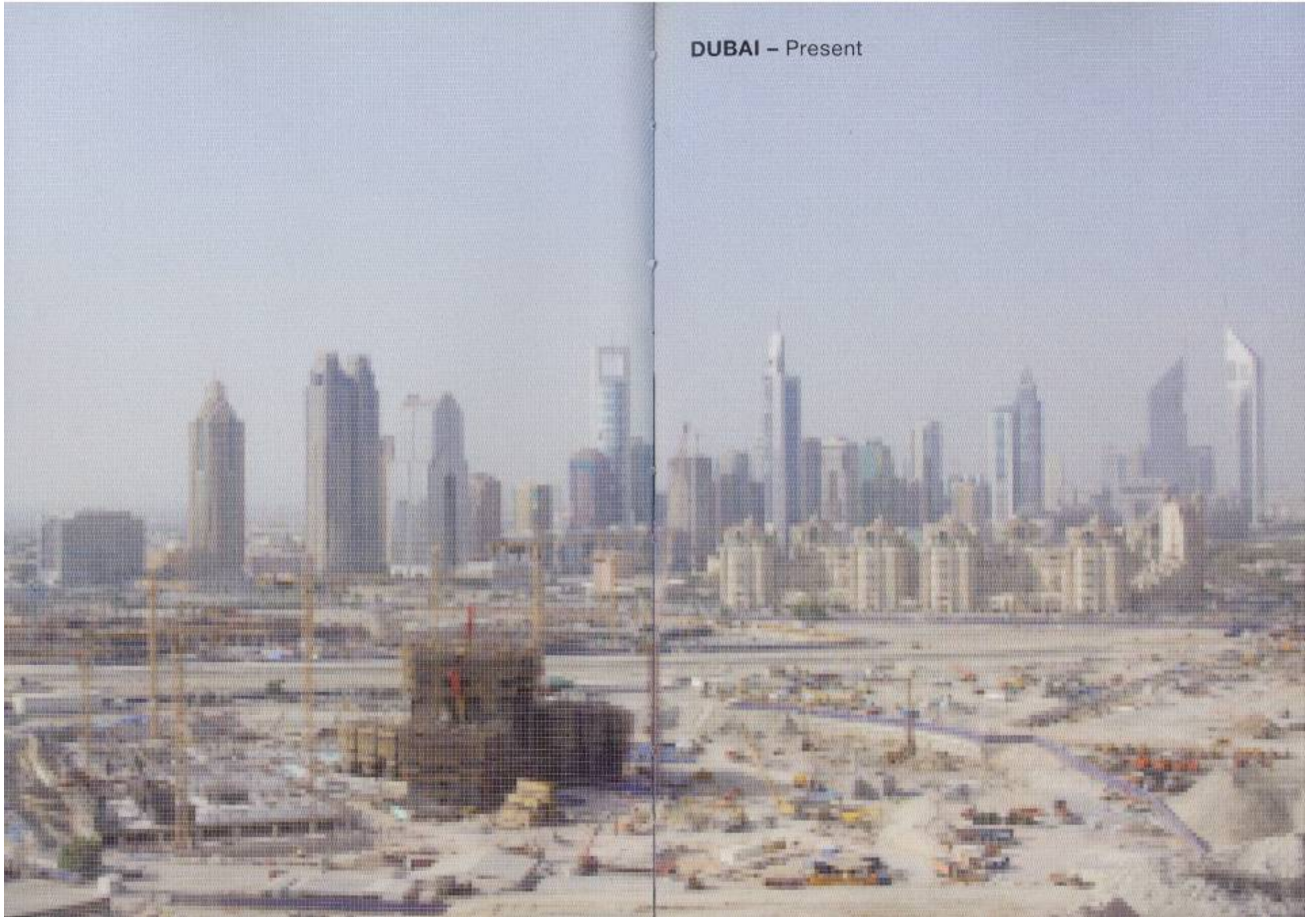
ROMAN EMPIRE — Past

ROMAN EMPIRE – Present

Rise and fall of cities over time. In this book the relation between evolution on the long term and architectural and planning strategies on the short term is clarified, through a conceptual framework called Entropia, and a gaming platform called SpaceFighter.

Africa
Asia and the Middle East
Europe
Central and South America
North America

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SPACEFIGHTER PLATFORM

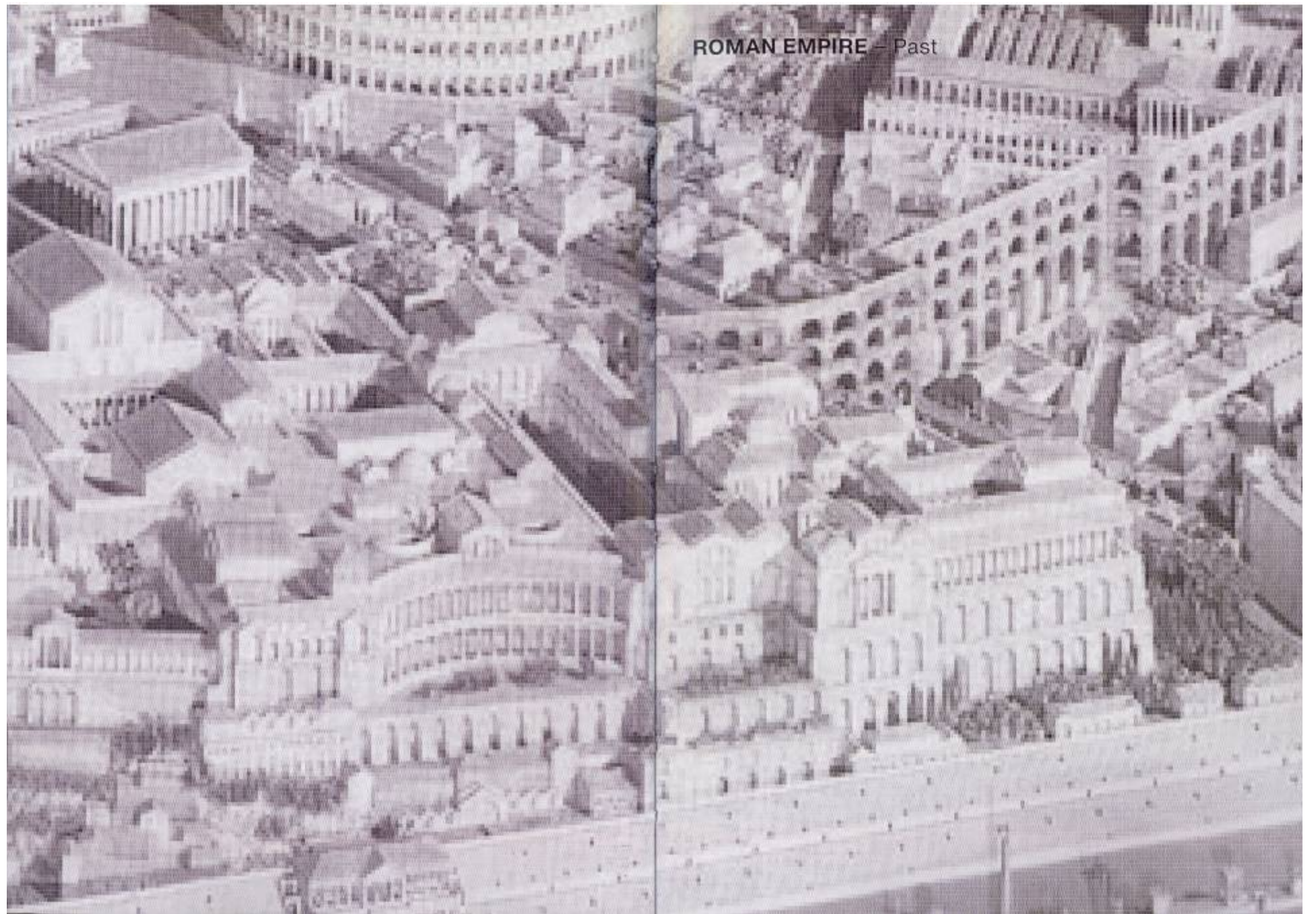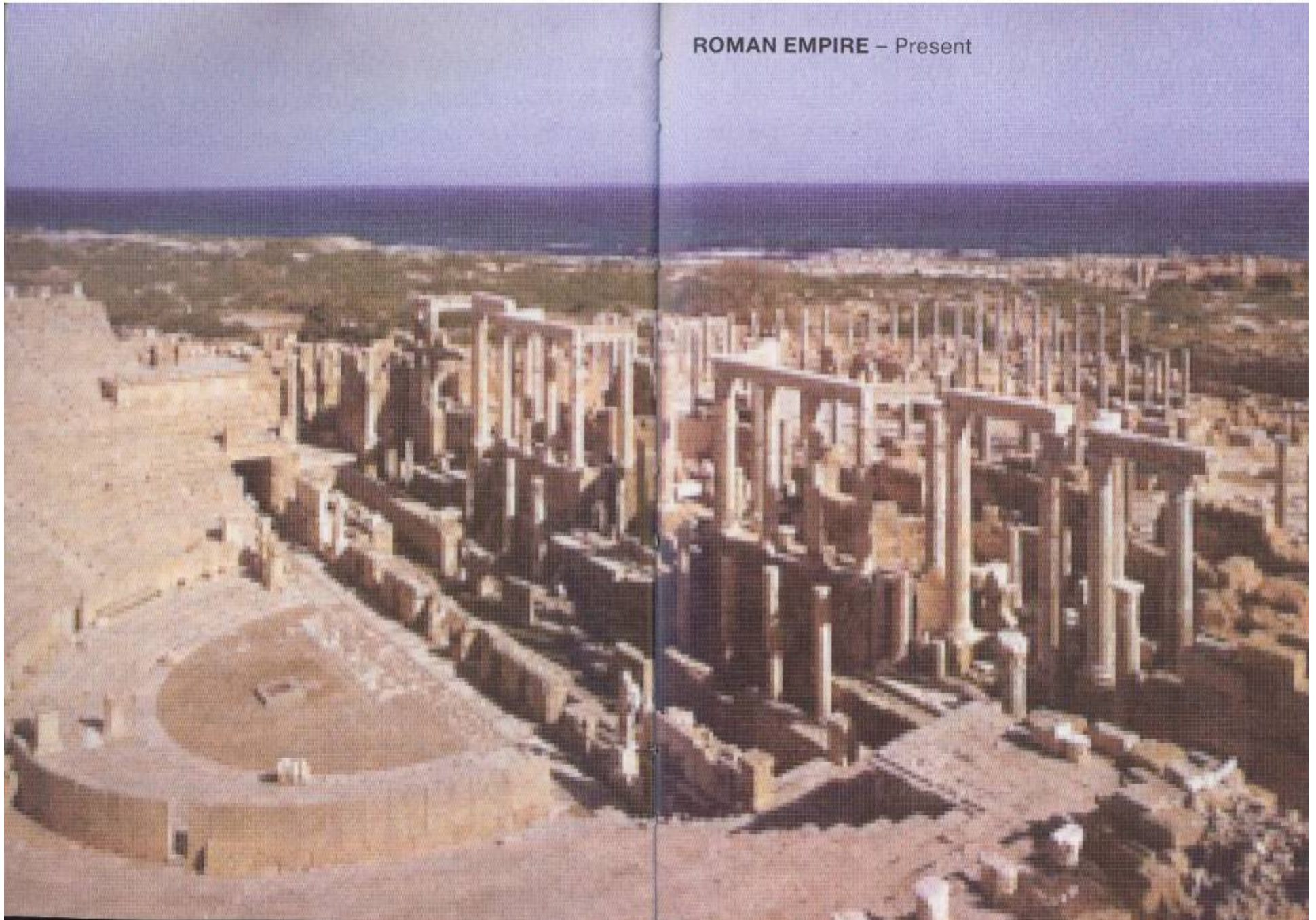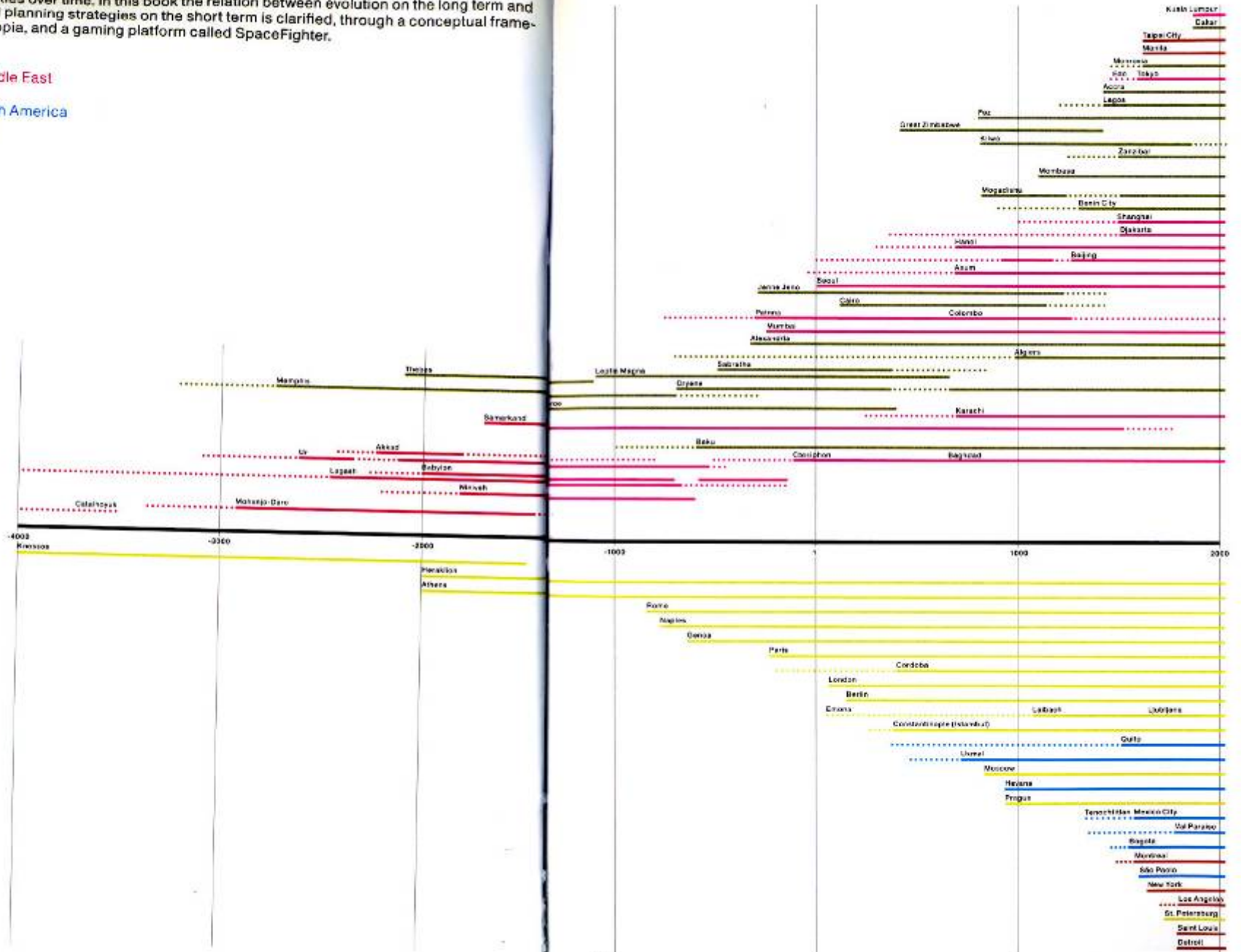The inner organisation of SpaceFighter, called the Platform, is introduced and explained in this contribution. The platform plays a central role in assembling the individual games, the players and their common environment. It shows the diagram of the inner structure as well as the design of the Platform from the game designer's perspective and it shows how the player is plugged into the structure of the Platform. This section explains how the player has access to the Platform, what he encounters in entering and playing the game, and what he is able to do and access from the perspective of the inner structure of the game.

Furthermore it shows how new games can be inserted, rules of conversion between games are established and how rules between games (and within games) will change due to computations the platform makes on the basis of user data that is delivered by the players of the game itself.
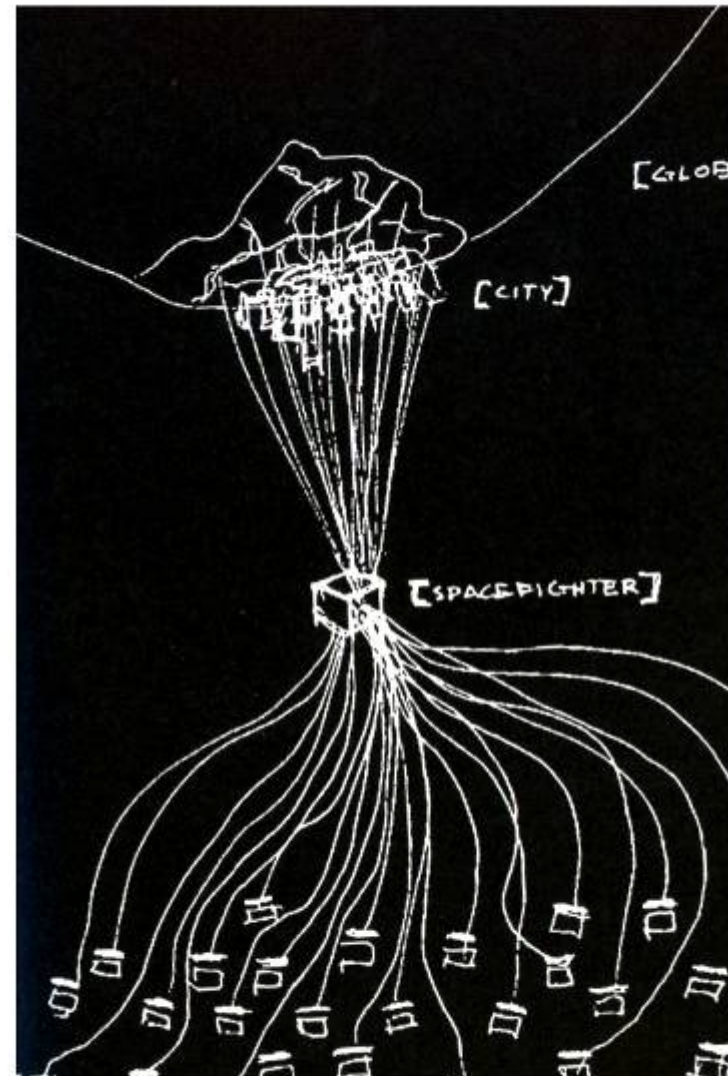
ID SEEKER

Yvette Vasourkova

The player compiles the identity of an entity through discovering its rules. The rules are fixed but unknown at the start. Everyone is unique, everyone creates a specific identity.

INSPIRATION Growth is a process of experimentation, of trial and error. You can learn as much from a 'failed' experiment as you can from the experiment that ultimately 'works'. Learning and growing means moving from 'here' to 'there'. Your last 'there' becomes your new 'here'. Everyone is taking different paths, to find himself and the rules of life.

GAME CONCEPT

Aim To fill up and create a viable platform.

The player discovers the rules through trial and error. He tries different combinations of three elements. 'Good' trials will be accepted and 'bad' trials (errors) will disappear. The player has a limited time to fill up a viable platform with given elements. If he does not discover the rules in time his platform will 'die'. In the meantime the player is learning from wrong strategies. After creating a viable platform in the first phase, the player can apply his strategies and learn new ones in the next phases. Each player is using different strategies, leading to his own specific pattern, the identity of the viable platform. As the game is being played the platform is constantly growing and new rules are gradually discovered. It is a self-learning process. The player that is able to discover the rules (i.e. adapt) will survive. The learning process never ends. The game could be played indefinitely.

1. Game field A constantly growing platform. Each player has a limited amount of time to fill up a viable platform.
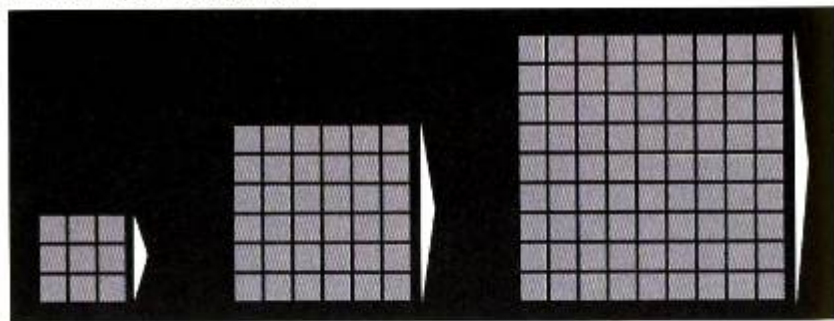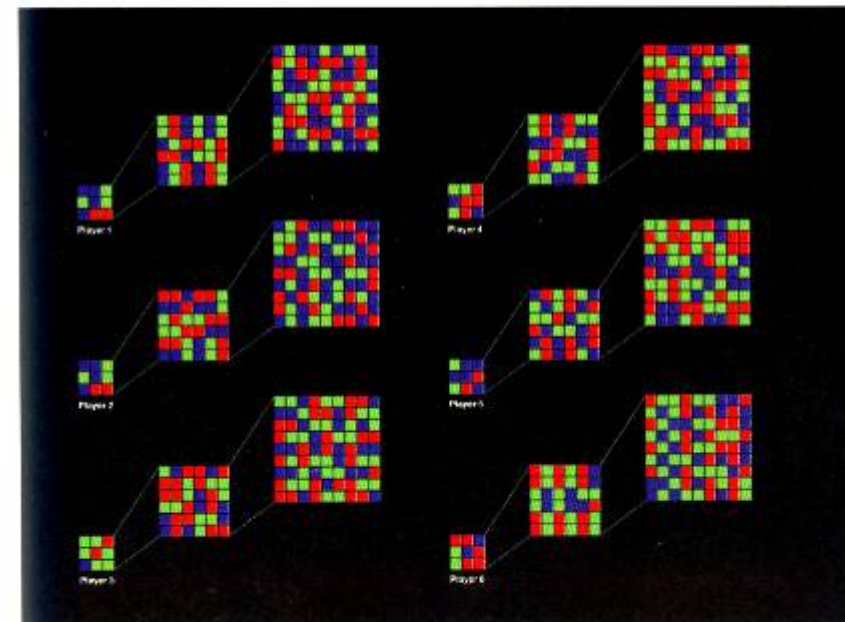

2. Hidden rules Constantly accumulating with the growth of a viable platform. The player has to react adequately to the changes.
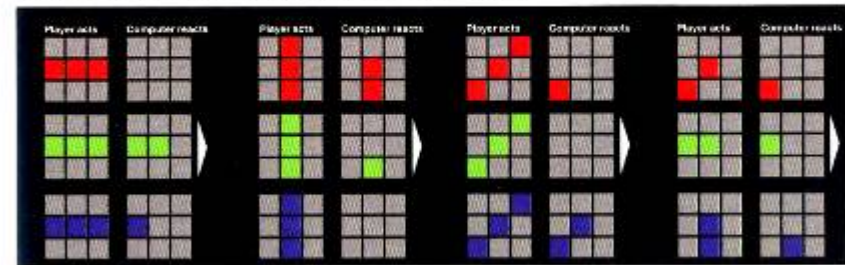
**3. Each player uses different strategies for discovering the rules.**

4. Each successful strategy of an organism has a unique form: Every player creates a viable platform with a specific pattern and identity with the hidden rules.

VARIATION

Two-player Each player makes the rules for his competitor.
Aim To fill up the platform by discovering the hidden rules of your competitor. The fastest player wins. The game can also be played with more elements.
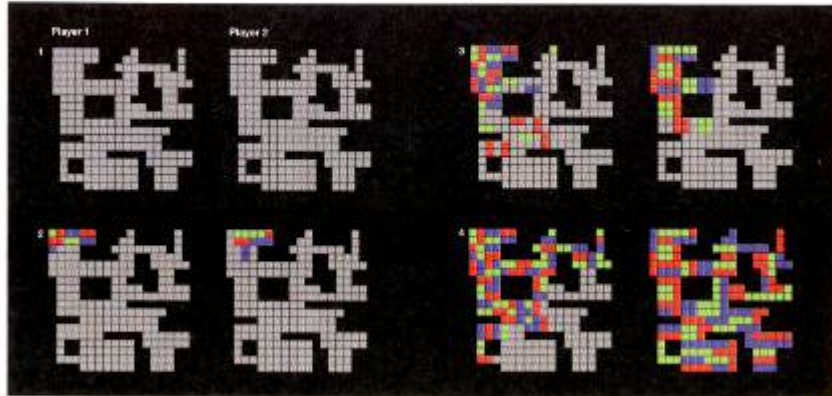
WALK THROUGH

Start The primary game field. The player is using three elements for filling up the platform. His time is limited and not all combinations are possible! When the player makes a wrong combination, the computer automatically erases the filled elements according to the hidden rules. The player learns and discovers the rules through trial and error.

Accelerated game process

End: If the player manages to fill up the platform in the given time, he goes on to a larger game field. The game field platform grows and the player starts again from scratch.
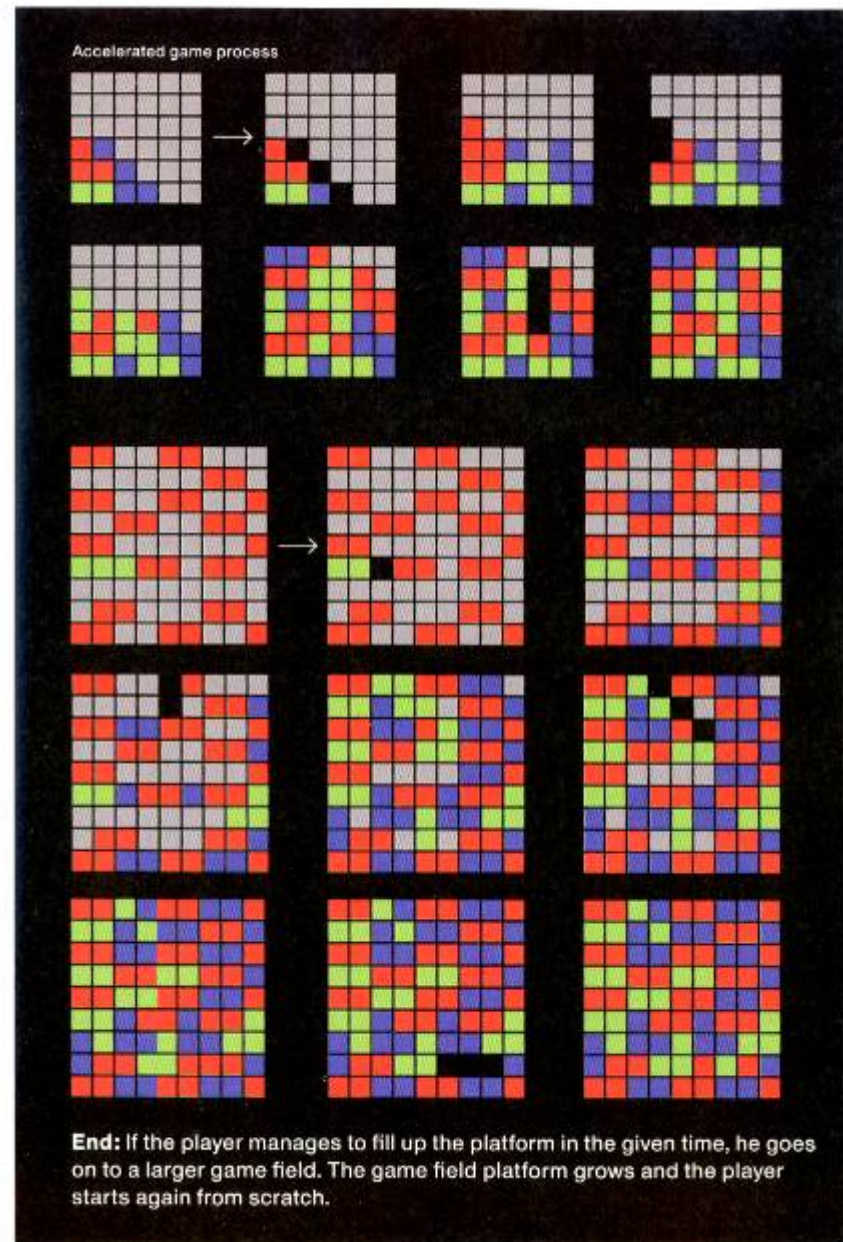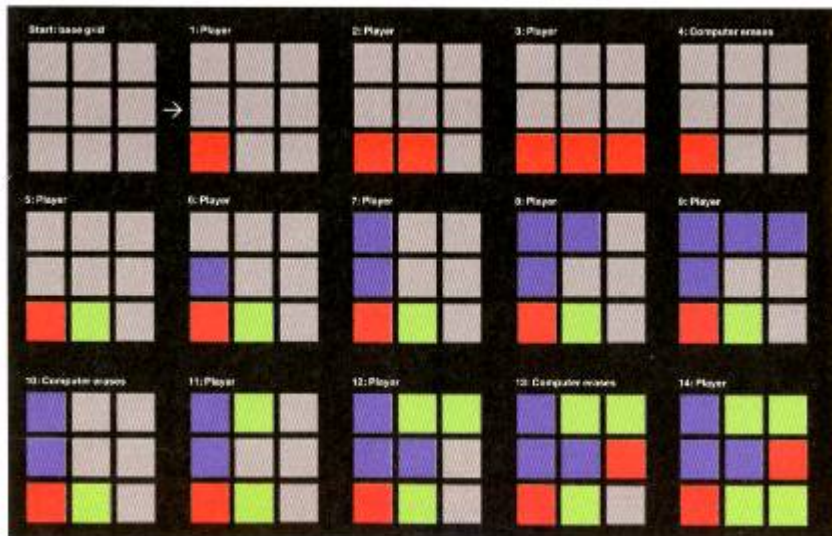
SYNERGISER

Vid Mozina

Welcome to the world of land-use planning! Apart from conducting a responsible job of distribution, organisation and categorization of lands to different functions according to type, planners and municipalities are also confronted with temptations of misuse, abuse, corruption and other negative aspects, usually related to positions where important decisions are being made.
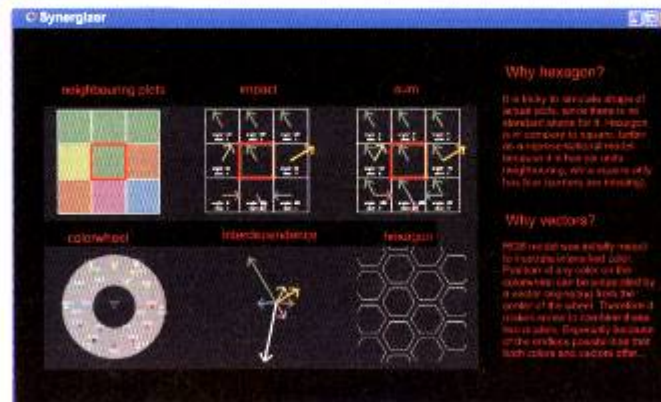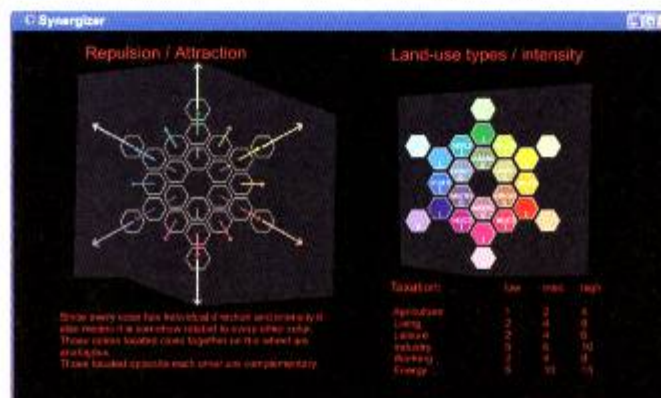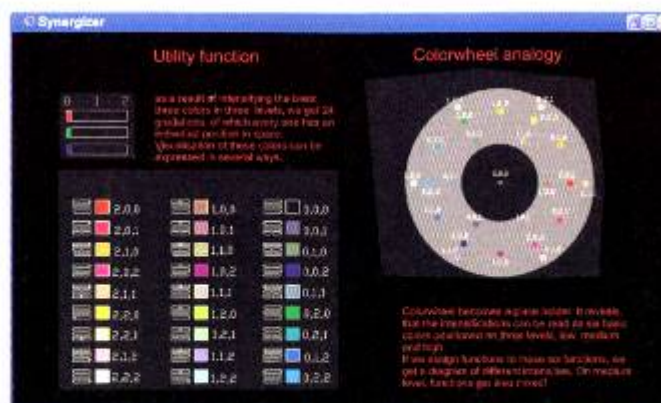
The aim of this game is to familiarize the gamer with a land-use management process, particularly with the possible negative side effects it induces, by portraying the land-use process in relation to a taxation system.

INSPIRATION Manipulations and misuses are unfortunately very common in the world of land-use management, due to the very speculative aspect of human nature, particularly when dealing with important decisions involving large amounts of money. Relationships in such situations are mutual: you influence your neighbours, and your neighbours influence you. Therefore the game attempts to portray situations where combinations of tactics and strategies are needed.

GAME CONCEPT Six different land use types are defined either as repellent or attractive in a mathematical model. Diversity is introduced in terms of three different categories: basic, mixed and intensified.
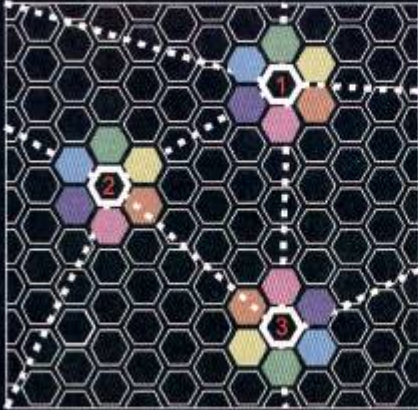
A property tax system is applied according to the intensity of use and proximity to the network lines (infrastructure). The game is played on a network: nodes imposed on a grid are municipalities, represented by players, who compete/cooperate with one another by judging each other's development moves.

The intention of the game is also to explore spots within the city where resistance is lowest, since sprawl will be likely to emerge there first. The evaluation of cooperation is expressed in a payoff matrix. Hence the name Synergiser.

PLAYERS COMMUNITY AND THEIR ACCESSIBILITY TO SPACEFIGHTER

OBSERVATION
LISTING
SEARCH

Common rights Anyone entering SpaceFighter has the possibility to browse through all information. Particular data about cities and regions can be downloaded for research purposes.

OBSERVATION
LISTING
SEARCH

Visitor

Visitors Observers of the unfolding of games without affecting their outcome.

OBSERVATION
LISTING
SEARCH

Player

Players Active visitors causing changes in the particular game they are playing and therefore in the overall behaviour of SpaceFighter.

OBSERVATION
LISTING
SEARCH

Senior Player

Senior players Experimented players in the sub-games or at the level of SpaceFighter as a whole, who acquire special rights after the game identifies their playing history and ability. They are allowed to formulate new games or alter some of the rules in their particular sub-games.

THE SPACEFIGHTER PLATFORM

❶ SpaceFighter is a game consisting of multiple games. This makes the **SPACEFIGHTER PLATFORM** a medium where the language from all different games is processed and translated into a common one. The platform consists of an Index and a Fingerprint Database. There, all information regarding the players' activities is transformed into spatial data.

❷ **THE INDEX DATABASE** contains information about the games' interactions with variables. In object-oriented programming, inheritance is a mechanism for creating subclasses that add or change data methods of the super-class. Each class is characterized by relations, references and abstraction (the ability of a program to ignore the details of an object and work on a more generic level).

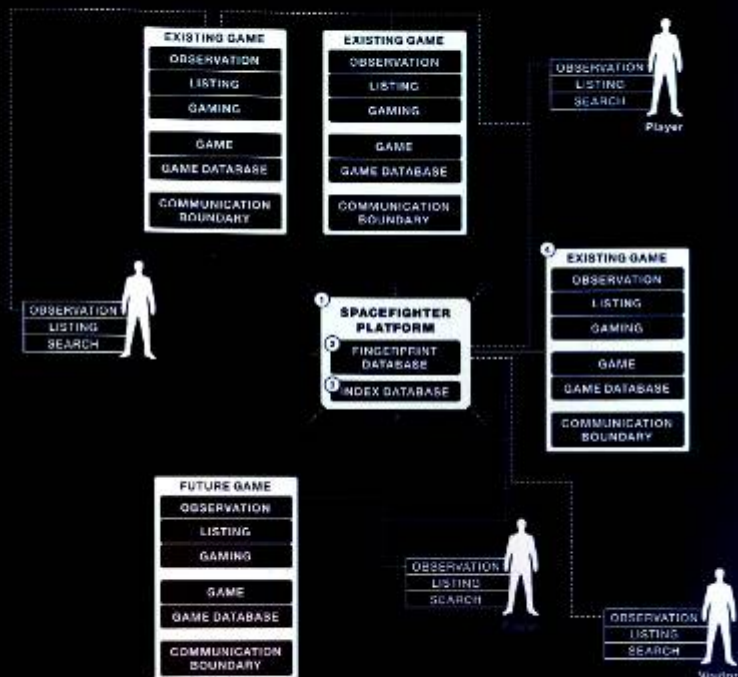❸ **THE FINGERPRINT DATABASE** includes all contents of the SpaceFighter platform, such as the world's urbanisation past, current and future situation; specific conditions of some regions, cities or metropolitan areas; and also other relevant data such as trends, analyses or reports.

❹ In the platform, **GAMES** are perceived as objects sending and receiving information while carrying their own set of rules in their individual databases. For this reason, communication channels between the games and the core of the platform is needed. Hence, to play one of the games, users are allowed to enter the system by plugging their actions in at any time. The emerging patterns of the games are stored in this database, representing SpaceFighter's historical memory.

PLAN OF THE SPACEFIGHTER

Color Code
■ Existing Network
□ Future/Possible additions of the infinitely expansive game

USERS HAVE DIFFERENT RIGHTS WHEN ENTERING THE SPACEFIGHTER

SPACEFIGHTER PLATFORM

ACCESS STATUS	USER	INDEX DATABASE	GAMES	FINGERPRINT DATABASE	RESULTS
Control	Game Designers Senior Players	Access Edit	Access Edit New Games	Access Edit	Navigate Save
Action	Players	Navigate	Play Add New Games	Navigate Add Info	Navigate
Passive	Visitors			Navigate	Navigate

APPLICATIONS

DUBAI
Berlage Institute

What possible events will come to pass during a session of SpaceFighter? Different players' decisions and interactions with different games in the system can generate entirely different outcomes. Who will win and who will lose? Let's zoom into Dubai and start playing!

At the beginning, players look for the information concerning the city they want to play with.

SPACEFIGHTER PLATFORM

FINGERPRINT DATABASE

INDEX DATABASE

OBSERVATION
LISTING
SEARCH

Observation: Player browses play scenerio options prior to logging on.

Location

Domain
▶ Demography
▼ Economy
  ▶ Exchange
  ▶ Exploition laws
  ▶ Finance & Business
  ▶ Government funds
  ▶ Inflation
  ▶ Labor wages
  ▶ Land price
  ▶ Tax
  ▶ Tourism
  ▶ Trade
▶ Environment
▶ Technology

To enhance accessibility, all available data is split into categories such as: demographics, economic and environmental conditions and technological progress.
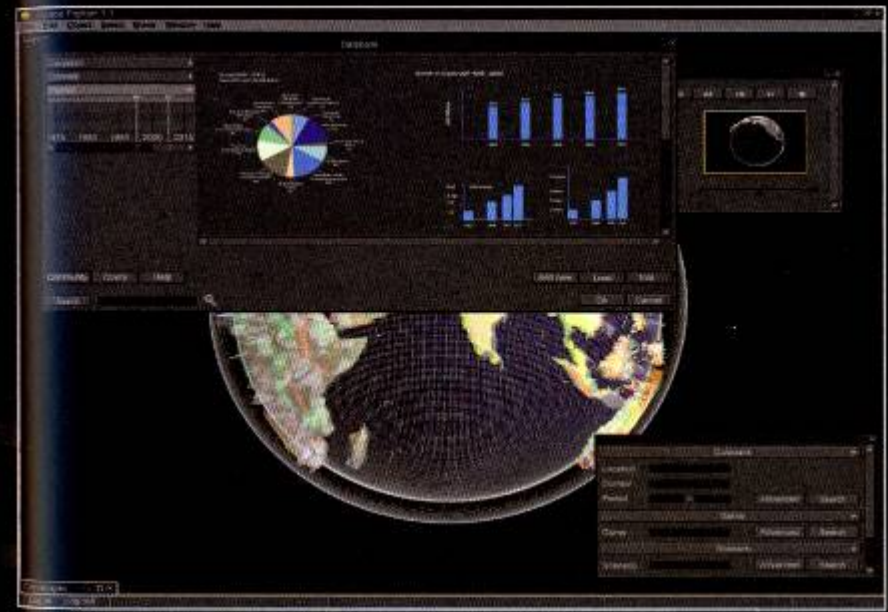
Browsing the various categories and sub-categories, the user can find actual time-based data. This is presented visually as graphs or bar diagrams.

By clicking the help wizard, players can access detailed rules and strategies for any particular mini-game.

Rule

1. Buy the land and apply basic strategies.

p=2, p'=0   p=0, p'=3   p=0, p=3   p=0, p=4   p=0, p'=5

2. Can not buil more than 3 different function in one building.

3. Landprice = initial + p - m   (m = p²-5)

4. Cost = 1 + n(p'G) + n(p'R) + n(p'O) + n(p'C) + n(p'L)

5. Score = np(L²·L¹)

These are the land prices for this section of the gamefield.

Developer : Help Wizard

About Developer | How to Play | Specific Feature | Plug - in

▸ Rule
▾ Field

Begin with field with an initial landprice.

Once at the desired scale, the player can maximize the 'Developer' game to start play.

| Rule | Analyse | Statistics | Help |

| | | | Green | Residential | Office | Commercial | Leisure |

Location
Traffic
Use Density
Green Area

Invest   5000
Income   2450   Cost   355
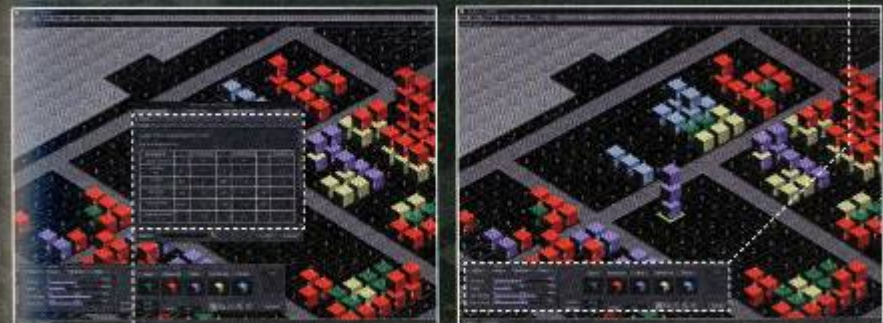
▸ Rule
▾ Field

LAND PRICE ADJUSTMENT TABLE

Per dwelling unit site

VARIABLE	=	STANDARD	>	SUPERIOR	<	INFERIOR
Base Value $		10		10		10
Location Km	10	0	5	+ 1	12	- 1
Traffic m	400	0	200	+ 2	700	- 2
Density %	60	0	30	+ 1	80	- 1
Green area m	400	0	200	+ 1	600	- 1
Adjusted value $		10		15		5

The rules of the game help players to choose a strategy.

The introduction of a new function (program) makes the entire area richer.
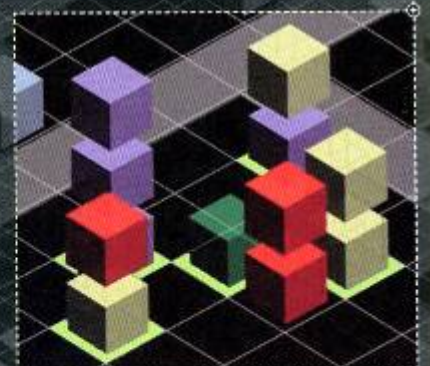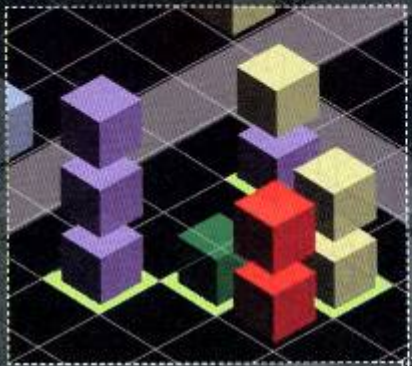
Next, the inclusion of a mixed-use building seems appropriate.
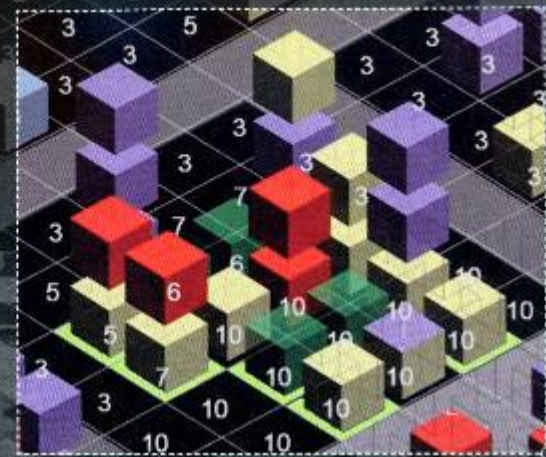
The game progresses postively for our gamer. But suddenly, a new road appears: What has happened?
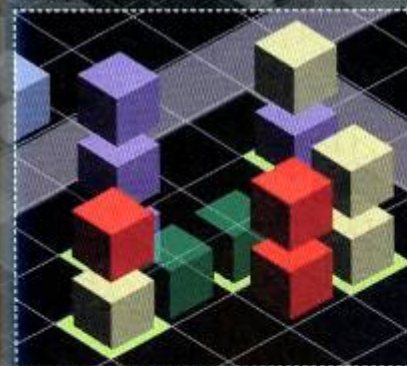
Adding green areas increases the value of existing buildings.

TURNING WORLD
Berlage Institute
FILM FRAGMENT

Players in this game constantly receive real-time information about the global market trends. This information suggests that Dubai is a hot spot for investment.

Thus, many flows come are redirected and enter the Dubai Region. The overall level of investments increases.
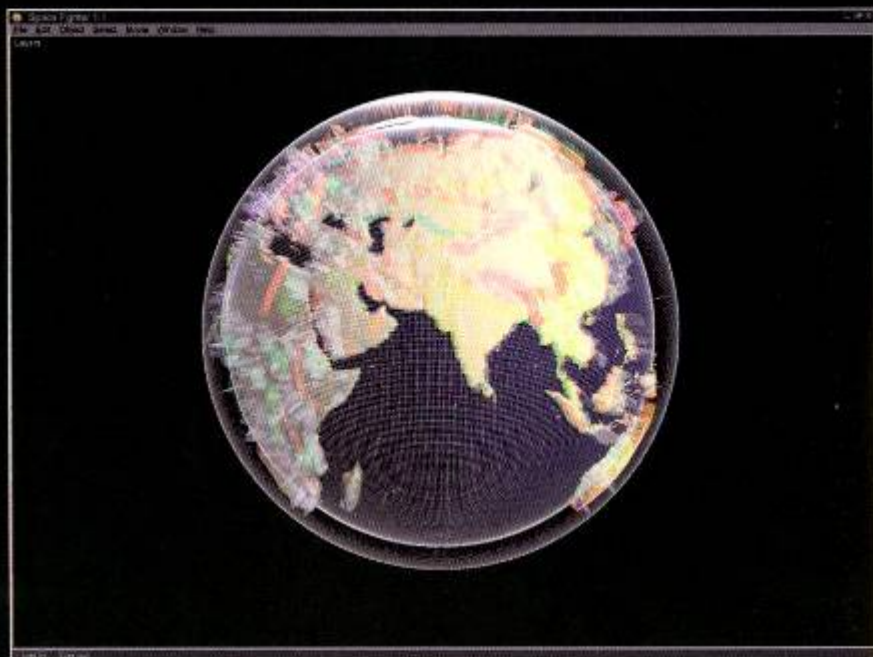
Senior players can shift from the local scale to a global view. A senior player updates a scenario happening on a global scale. But first, he must submit the proper login information and password for authentication by the SpaceFighter platform.

Here, the senior player tests the nature-based scenario of global warming. Just as nature affects all regions in the world, SpaceFighter regions are also affected by such scenarios.

Back in 'Developer', players are advised, via a pop-up window, of the introduction of a new factor (global warming) that will affect their gaming scenerio.

Land values shift again in reponse to this new scenario. Now, the Dubai player can choose from several different possible strategies.

As global warming is integrated into the Dubai 'Developer', the threat of rising sea levels causes the decay of coastal areas, Development stops.

Eventually, Dubai becomes a city of floating Islands.

PS: SPACEFIGHTER 2.0 by MIT/Winy Maas
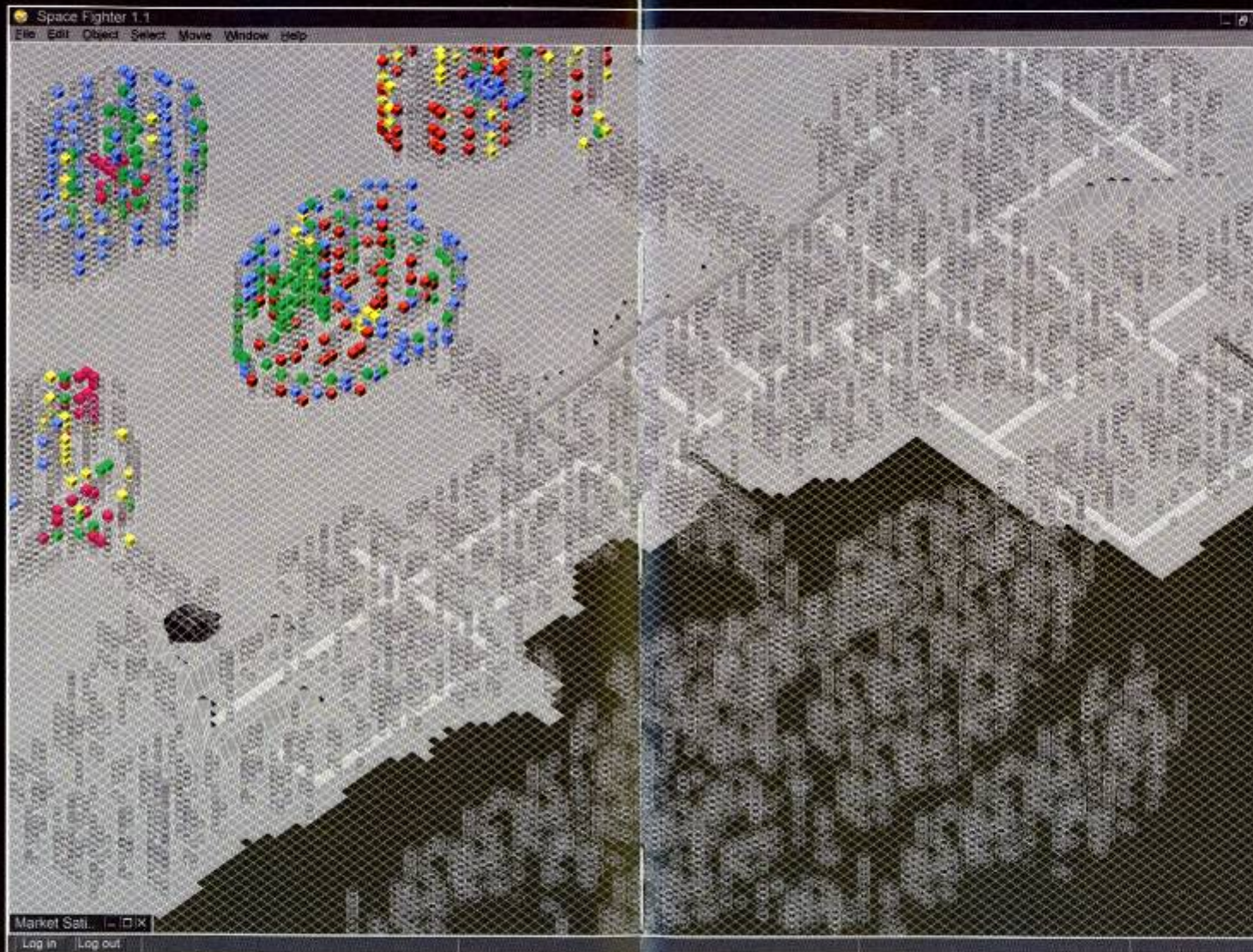
In the first 'real' tests at MIT in the fall of 2006 and the spring of 2007, a multi-player game has been developed, where there is an initial terrain where intelligent agents move around to react to the players. The players use paint to project their intentions of the future on the terrain: they occupy and feed plots. This paint attracts and repels agents, often converting them into urban forms. If the paint has 'dried out', the buildings decay, the agents disappear. It is a multi-player environment and there is substantial interference between the players (competition and collaboration) just like in the real world. This interference leads to emergent patterns of urban form. This game will appear at the end of December 2007.
Check out www.mvrdv.nl

Open flap for an entire overview of the SpaceFighter Platform.

The CORPORATE wants to make TALL cities

The ECOLOGIST wants to make DENSE cities

The TECHNOCRAT wants to make CONNECTED cities

Agent state change cycle

free agent → agent senses paint elements in neighborhood

if activated, change state (park on top)

not happy? convert to free state

The Agents

Besides the three players, there are a finite number of mobile agents initially distributed uniformly in the city. They are set to a default condition, randomly moving in the world until the players begin painting. All the agents have a happiness index linked to themselves, which is influenced by the paint of the players. If their happiness index is greater than a threshold condition a state transition of the agent is triggered i.e. the mobile agents park themselves as part of a certain development. There are three possible developments – tall (blue), connected (red) or dense (green) developments. It is these developments that appear as city form. Both the static and mobile agents constantly sense their neighbourhood as well, updating their happiness index. If the index falls below a certain threshold value the parked agents become free and mobile again.

SpaceFighter
The evolutionary city game

SpaceFighter is an attempt to explore and model chains of interactive planning processes through a game. It is based on the emerging 'Evolutionary City'.

"The inevitable and total surrender towards a process-oriented approach radically changes urban planning and its architectural products. It will lead to another 'city': a city that can reformulate itself, a city that is conscious of its gained knowledge. It is a city that can compare, analyze, optimize, adapt and create alternatives: The Evolutionary City. In this city, where planning is based upon huge databanks activated by software (selectors, evolutionary devices, zoomers, comparison devices, communicators, and visualisers), planning is no longer described through books. It is developed through interactive participation in addition to separate planning institutes. Here, cohesion (when it occurs) and hierarchy are realised through democracy. Here, monitoring (if it is needed) takes place in literal and virtual war rooms. Planning is not only done by specialists, but due to the endless and easy networks and connections, everyone will be a 'citymaker'." (MVRDV 2005, p.1256)

This city is meant to be communicative, interactive, self-critical and ultimately self-forming or self-scaping. It is a city that changes in time. Continuously. A city that engages with individuals as a possible collective. A city that wants to manoeuvre between these possibilities.

Democratic city
SpaceFighter is a multiplayer game that captures the dynamic growth of a city over time, by allowing the players to continuously superimpose their intensions via a simple painting act. The painting act works as an interface for players to project their intensions on the screen. The game models urban developments as an interactive evolutionary process, creating a democratic city. This is a leap from the conventional scenario making in urban planning.

Real Time
The players in this game are playing in real time; the screen reflects the changes immediately and represents the entire urban development.

The Players
The players interact in this city by strategically painting the screen with a colour specific to its role using a remote controller (wii-remote). There are three possible roles -Corporate (they desire tall high-rise development), Technocrats (they desire different parts of the city to be connected) and Ecologists (they desire density). Players simultaneously paint the board with their assigned colour to trigger their desired developments. In such a collaborative and conflicting environment players end up developing a city. For example in an instance of collaboration, connected developments can become a part of dense developments. And for example tall developments are in conflict with dense developments because of limited resources.

Player paint elements

Corporate	Technocrat	Ecologist
tall	connected	dense

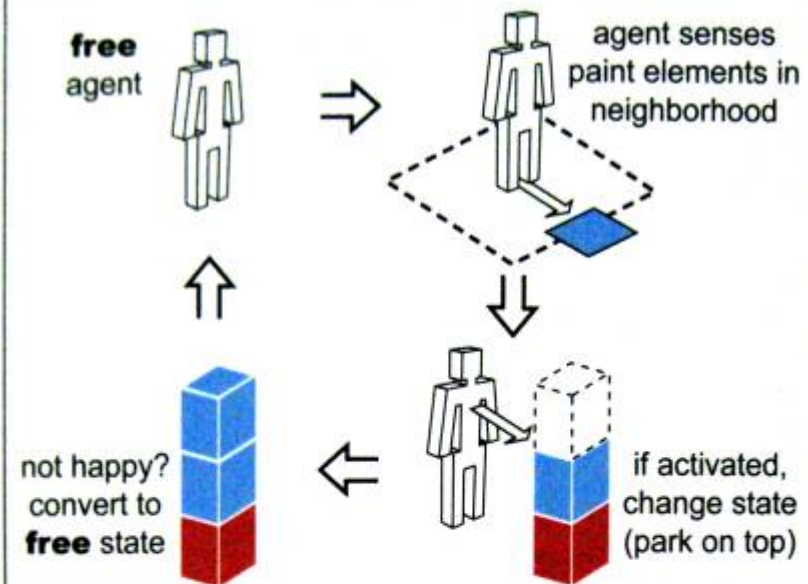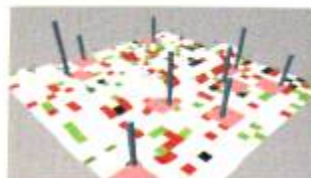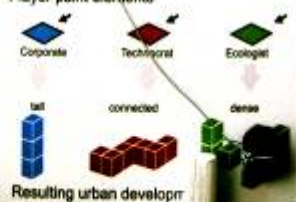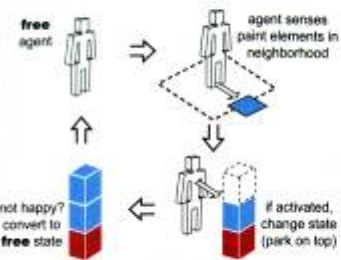Resulting urban developm...

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How to win
Guided by the paint of the players, the agents start forming stacks or 'towers'. So also mixed-type towers (made up of mixed blocks) can appear. These towers will be evaluated by the overall distribution, so for example if the majority of blocks are blue (Corporate), the entire tower is said to be captured by the Corporate. The winning player will have accumulated the most points with the number of developments he captures.

The city is constantly analysed for role specific metrics such as average height, connectedness and density to evaluate and characterize the current city. After a certain point of time when all the resources (paint) are used up the entire development results into a city with dominating characteristics displaying the greatest influence of the winner. Lets SpaceFight!

September, 2008

MVRDV in collaboration with MIT

GOAL: capture maximum numbers of blocks!

INSTRUCTIONS
1. Enter the SpaceFighter arena
2. Choose a role by selecting a wii-mote
3. Point at a strategic location on terrain
4. Press button A (middle) to paint on screen
5. Paint to capture and maintain developments
6. SpaceFight!

IFIP WG 9.5 International Workshop on Virtuality and Society
Images of Virtuality: Conceptualizations and Applications in Everyday Life
April 23- 24, 2009
Athens University of Economics and Business, Greece

Thank you for your attention!
Comments and questions are most welcome: giama_wins@hotmail.com

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