THE REAL-TIME CITY

A FULLY ADAPTABLE LIVING ENVIRONMENT

Loes Thijssen
CREATE YOUR OWN PERSONAL ARCHITECTURE IN REAL-TIME
WOW!!
WHAT DID WE JUST SEE?
LET’S START AT THE BEGINNING...
TABLE OF CONTENT

1. THE CHALLENGE
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I. THE CHALLENGE
Let’s introduce Brad...
He falls in love with the beautiful Doutzen...
They move in together...
And expect a baby...
And another one..
The children grow up...
And want more privacy as teenagers...
They both go to college...
And start their own families... Doutzen and Brad get retired...
Brad needs some extra care and moves in with his daughter...
CONCLUSION:
WE HAVE DIFFERENT DESIRES OVER TIME
WHAT ABOUT OUR ENVIRONMENT?
The typical Dutch rowhouse...
The typical Dutch rowhouse

More than 60% of Dutch citizens live in rowhouses

(CBS, 2014)
With a standard floorplan...

Source: bestaandewoningbouw.nl
But is there a standard household?
CONCLUSION:
OUR BUILT ENVIRONMENT IS TOO MUCH BASED ON STANDARDIZATION AND FIXATION
WHAT WE NEED:
A TAILOR-MADE ENVIRONMENT ADAPTING OVER TIME
LET’S HAVE A LOOK AT SOME EXAMPLES
Radical visionaries

Analysis adaptive environments

New Babylon, Constant
Plug-in City, Archigram
Fun Palace, Cedric Price
No-stop City, Archizoom Associati
Continuous Monument, Superstudio
The pop-up movement

Could everything pop-up?

The pop-up kitchen

The pop-up cinema

The pop-up club

The pop-up store

The pop-up office
PARAMETERS OF REAL-TIME

- PERSONAL
  - Standardized spaces
  - Personalized spaces

- FREEDOM
  - Grid
  - Freeform

- FREQUENCY
  - Static
  - Adaptive

- COMFORT
  - Manual
  - Automatic
LET’S MAXIMIZE!

- Personalized spaces vs. Standardized spaces
- Freeform vs. Grid
- Adaptive vs. Static
- Automatic vs. Manual
II.

THE PROPOSAL
MANIFESTO OF REAL-TIME

REAL-TIME =

1. PERSONALIZED
   ANYTHING YOU WANT

2. FREEFORM
   ANYWHERE YOU WANT

3. ADAPTIVE
   WHenever YOU WANT

4. AUTOMATED
   AUTOMATIC, SELF ORGANIZATION, INTELLIGENT
1. REAL-TIME = PERSONALIZED
Anything you want, on demand

A SERVICE ON DEMAND
1. REAL-TIME = PERSONALIZED
Anything you want, on demand

A TAILOR-MADE ENVIRONMENT
2. REAL-TIME = FREEFORM
Anywhere you want

BASED ON BOTTOM-UP, NON-LINEAR PATTERNS TO CREATE EVOLUTIONARY RESULTS IN EMERGENT ORGANIZATIONS.
2. REAL-TIME = FREEFORM

Anywhere you want

INNOVATIVE FABRICATION METHODES CREATE NEW DESIGN POSSIBILITIES
2. REAL-TIME = FREEFORM
Anywhere you want

ARCHITECTURE IN EXTREME CONDITIONS
3. REAL-TIME = ADAPTIVE

Whenever you want

ARCHITECTURE WILL ‘BLOOM’ AND ‘WITHER’
3. REAL-TIME = ADAPTIVE

Whenever you want

Make

Use

Return
3. REAL-TIME = ADAPTIVE
Whenever you want
Wait... what about emotional value?
Robert hasn’t changed his interior over the last 20 years. He is very attached to every object in the house. Some of the furniture has been passed from generation to generation. The antique chandelier is his show piece.
4. REAL-TIME = AUTOMATED

Automatic, self organization, intelligent

ANALYZING DATA TO OPTIMIZE NETWORK FLOWS
BASED ON SELF-ORGANIZATION, BOTTOM-UP
THE APPLICATION
I want to order a living room from 1pm until 5pm

What can I help you with?

Design your space
Real-time app

**Volume**
- 1m³
- 35m³
- 1000m³

**Transparency**
- 0 - 30%
- 100

**Solar energy**
- 0 - 100

**Activity**
- Sleeping

**How many people?**
- 1

**When?**
- Today: 23:00 - Tomorrow: 07:30

**Where**
- Current location

**Size**
- Medium

**Neighbors**
- 3

**Level**
- Groundfloor
Creating tailor-made spaces with integrated furniture and features
Human scale
Activities and shape
INHABITING REAL-TIME
Inhabiting Real-time

The Real-time City
Let’s share our desires!

*Sharing creates spatial and economic benefits*
28 people want to use the workshop space today

Want to dance tonight?

28 people have already joined this gym

Want to see the football match?

29692 people bought already a ticket

Watch a movie at 20.30h!

Create a new event

Organisation by event

Public life
INFRASTRUCTURE
Infrastructure

Three types of infrastructure

Primary infrastructure
External infrastructure

Secondary infrastructure
Internal infrastructure

Tertiary infrastructure
Ducts
Primary infrastructure

Hyperloop tubes

- Hyperloop tube
- Transportation vehicle
- Batteries
- Magnetic levitation (magnetic particles)
- Seating
- Motor and generators
Infrastructure

Types of infrastructure
Climate design

**Summer**

- **Rainwater tank**: A filter and pump are connected to the tank to pump drinking water to every space.
- **HVAC system (district heating/cooling)**: Heat exchanger connected to heatpump.
- **Rainwater collection**: Filtered water for grey water purposes.
- **Structural ribs**: Integrated gallium selenide particles in the facade areas with direct sunlight.
- **Photovoltaic**: Integrated gallium selenide particles in the facade areas with direct sunlight in order to collect energy for the households.
- **HVAC system (district heating/cooling)**: Heat exchanger.
- **Air exhaust**: Mechanical ventilated.
- **Air supply**: Mechanical ventilated 100% outside air intake.
Climate design

Winter

- **Rainwater collection**
  Filtered water for grey water purposes

- **Structural ribs**
  Integrated gallium selenide particles in the facade areas with direct sunlight

- **Photovoltaic**
  Integrated gallium selenide particles in the facade areas with direct sunlight in order to collect energy for the households.

- **HVAC system (district heating/cooling)**
  Heat exchanger

- **Air exhaust**
  Mechanical ventilated

- **Air supply**
  Mechanical ventilated
  100% outside air intake

- **Rainwater tank**
  A filter and pump are connected to the tank to pump drinking water to every space.

- **HVAC system (district heating/cooling)**
  Heat exchanger connected to heatpump
Climate design

Summer

- Skylight
  - Biopolymer with electrochrome particles to control daylight access
- Solar energy collection
  - Biopolymer with gallium selenide particles
- Ventilation raster
  - (see reference image)
- Ducts
  - Water drainage, ventilation supply and return, electricity and network
- Air supply
  - Mechanical ventilated
- Air exhaust
  - Mechanical ventilated
- Floor cooling
  - Chilled hydronic radiant cooling
Climate design

Winter

- Skylight
  Biopolymer with electrochrome particles to control daylight access

- Solar energy collection
  Biopolymer with gallium selenide particles

- Ventilation raster
  (see reference image)

- Ducts
  Water drainage, ventilation supply and return, electricity and network

- Air supply
  Mechanical ventilated

- Air exhaust
  Mechanical ventilated

- Floor cooling
  Chilled hydronic radiant cooling
Climate design

Activate only the necessary

- Skylight
  Biopolymer with electrochrome particles to control daylight access

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  Biopolymer with gallium selenide particles

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  Water drainage, ventilation supply and return, electricity and network

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Climate design
Activate only the necessary

- Skylight
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  Chilled hydronic radiant cooling
MATERIALISATION
Real-time building process
Automatic fabrication

Immediate
- Inflatable

Phase
- Drone assembling
- 3D/4D printing
- Additive manufacturing

Nanoparticles
- Phase changing particles
Real-time building process
Additive manufacturing

Prototype MIT, Mediated Matter
Biopolymers
Prototype MIT, Mediated Matter
3D printing drone
Prototype Architectural Association, London
Real-time Resources

Catalogue

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Fig. 44

Fig. 45

Fig. 46

Fig. 47
Biopolymers

Neri Oxman, Materialecology
Interior
Build-in furniture
Real-time living space

Section
Real-time living space

Section
Detail Rib

Integrated transparency

- Transparent biopolymer electrochromic particles 100mm
- Biopolymer opaque particles 100mm
- Water
- Heating/Cooling
- Electricity
- Drainage
- Cavity
- Transparent biopolymer electrochromic particles 100mm
Real-time living space

Section
Detail floor

Materialisation

- Biopolymer finish 50mm
- Biopolymer heating center to center 300mm
- Biopolymer 170mm
- Biopolymer insulation particles 130mm
- Biopolymer finish 50mm
Real-time living space

Section

5800 mm

4150 mm
Detail Seat

*Integrated softness*

- Biopolymer finish 50mm
- Biopolymer heating center to center 300mm
- Biopolymer 170mm
- Biopolymer insulation particles 130mm
- Biopolymer finish 50 mm
- Biopolymer soft 50 mm
Real-time living space

Section
Details

Integrated photovoltaics (gallium selenide particles)
Facade
Customized patterns and functions
Details
Integrated features - Air purifier / Green
Real-time living space

Section
Details

Ventilation raster
Real-time living space

Section
Details

*Integrated features - Shape changing material*
Details

Loose furniture - shape memory material
Real-time living space

Section

5800 mm

4150 mm
Torsion

Elastic Iris
Detail

Entrance open / close
Detail

Horizontal section opening

Insulation layer
Air insulation

Rotor
Connected to sensor

Structural layer 25mm with 30% insulating particles
Hardener

Structural layer 20mm with 10% insulating particles
Hardener

Structural layer >25mm
Hardener

Finishing layer 10 mm
Hardener, water and windproof
Glossy white

Proximity sensor
Tracks the proximity of inhabitants. Whenever the inhabitants are close, the sensor sends a signal to the rotor.

Gear wheel R400
Hardener

Gear wheel R1200
Hardener - elastic, wind and water proof
Glossy white

Elastic
Wind and water proof, Glossy white

-97 / 110-
Entrance

Sensor to open / close

Closed

Open
Torsion

Connection cells

Elastic biopomer, wind and water proof
Gear wheel
Sensor
Torsion
Connection cells

Elastic biopomer, wind and water proof
Gear wheel
Sensor
Creating personalized architecture

Different styles fit in the same city
Creating personalized architecture

Different styles fit in the same city
Integration in existing Parasite
III.

REFLECTION
REAL-TIME VISION AS DREAMT REALITY

-Real-time City
IMPACT ON SOCIETY

-Real-time City-
THE CITY AS A SELF ORGANIZING MECHANISM

-Real-time City
ABLE TO PERMANENTLY ACT, CHANGE AND ADAPT THROUGH TIME AND SPACE

-Real-time City
MAKE REALITY OF OUR IMAGINATION!

-Real-time City