The Cassandra Project_

White Paper

From Zero House to Zero City

Psycho-Biological Urbanism:

Physical and Mental Equilibrium in Urban Environments

A Network of Hybrid Cities from Scratch

32-page

Alfredo L. Peña, 2020

Abstract

The Cassandra Project is presented as a Model of Hybrid Cities Design, Self-Sufficient and Ultra-Efficient, whose Driving Force is the Security.

The model is presented from the empirical experience of The Zero House, a self-sufficient house, whose design began in 2012, being built in 2015 and having been monitored for five years, up to the present day.

From The Zero House experience the Principles of the Zero City have been defined and for this, a new urbanism model is configured denominated Psycho-Biological Urbanism, beyond biological urbanism: Physical and Mental Equilibrium in Urban Environments.

The Cassandra Projects (TCP) sets up the new design of Hybrid Cites as realities under three principles: Nature, Technology and Individual-Community.

In this way, environments will be created halfway between Nature and current Cities that nowadays are seen as virtual realities that show vulnerabilities due to the new paradigm we are facing: You are going to live for more than 100 years.

Index

- The Crisis of Cities
- A New Paradigm: You Will Live More Than 100 Years
- Biological Principles
- There are only Systems
- Everything is Energy
- The Empirical Exercise of The Zero Hero
- From Zero House to Zero City
- Psycho- Biological Urbanism
- Energy Exchange and Energy Storage in a Hybrid City
- A Network of Hybrid Cities
- Development Model: The Cassandra Project Foundation
- Integration of a Symmetric System in an Asymmetric World

The Crisis of Cities

The Cassandra Project is not presented as an urban exercise or a merely aesthetic transformation of urban environments.

The Project goes much further questioning the way people relate between each other in urban environments and reconsiders the driving force of the human being, reflecting on who he is and how he is organized in community.

Since the IV Millennium BC, human beings have been organizing in urban environments in order to modify their environment for their benefit and well-being, largely avoiding the predatory mode in which they operate in nature, thus creating virtual realities, the current cities.

Today we see how cities are going through a deep crisis which is mainly due to the disappearance of the middle class, homeless, increased population concentration, new megacities where different systems operate and clash between each other, the concentration carried out in recent decades of essential resources in a few hands, increasing the vulnerability of the resident in these environments.

In this way we observe the extreme financialization of the city's services and assets, the gentrification that expels the traditional resident, the high tourism that depersonalizes the city, turning it into a kind of theme park, in addition the space is commercialized, turning the Space Public as a mere place of transit, all of this has left the cities soulless, reducing quality relationships and social contact.

The generation of waste, pollution, C02 emissions from diesel heating, industry and the automotive industry have configured cities as inefficient environments.

Pollution, noise, visual pollution and lack of green spaces make cities unhealthy, where you only have to be a consumer.

Together with this, we see changes in people's habits and new trends such as teleworking, personal care, the need been more in contact with nature, the new generations' detachment from property, healthy nutrition and the greater mobility of people among others.

On the other hand, single-person households are increasing, which together with architectural barriers and the demand for services of dependent people make up an uncertain future.

This has been coupled with the Crisis of Politics, the Environment, the Crisis of Money, the Media and consequently a Crisis of the Individual.

Nature is a Predatory Eco System and Cities have become an equal or more predatory System if possible.

Welcome to PRISON-CITY.

A New Paradigm: You Will Live More Than 100 Years

Life Expectancy has almost doubled in the 20th century, going from 45 to more than 80 years in some countries. Scientific observations indicate that human beings can live between 120 and 135 years, an increasing centennial population is a fact and a woman who has lived 120 years is in the records.

Therefore, the individual should no longer be considered a factor of production but rather its main purpose is personal development, multidisciplinarity, its contribution to the community and health care mainly after the age of forty, social relations, safety and medical services become three essential pillars for the well-being of the individual.

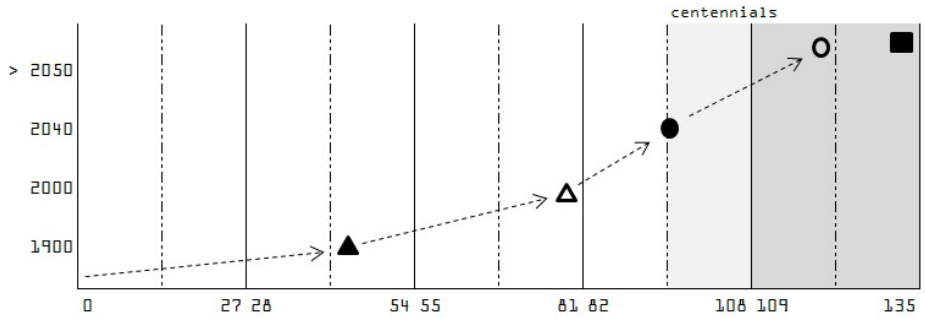

Figure 1: 5 Stages on Life Expectancy (each 27 years)

So if we consider that from the age of 40 the main activity should be personal care, we are talking about 60% of your life having you should be prepared for been self-sufficient and not dependent until the last day of your life.

In China in 2020 there will be 248 million older adults, and in 2040, more than 400 million, which means that 26% of the total population will be over 60 years old.

By 2050, the number of seniors in China is estimated to reach 487 million, which is equivalent to about a third of the total population.

For the same year, one in four people living in Europe and North America could be 65 years or older, this indicates about 250 million people.

In total, in those three geographic areas that make up a third of the world's population, we would be talking about 737 million people.

Biological Principles

Cell, Tissues and Organs

The smallest unit that makes up an organism, such as the human body, is the cell. This structure groups together with other cells to form the tissues that, in turn, form the organs. These organs interact with each other, carrying out functions together and forming the systems and apparatus of the human body.

Cells use glucose to generate energy and run their internal processes, exchanging energy with other cells and storing small amounts of energy in the form of ATP. Cells exchange information with very distant cells.

In order to coordinate efficiently and carry out their functions, organs receive nerve impulses from the brain and spinal cord, which make up the nervous system.

The sum of cells allows the formation of tissues, which can be understood as cities with their communication pathways (blood flow, nervous); with them specialized organs are formed.

The human body is integrated by about three trillion cells, which we can present as an analogy of all the households in the world.

Therefore, with a little imagination we can observe a similarity between the human body and all humanity as a great System of Systems.

Figure 2: Cell Tissue

The Human Body as a System of Systems

To define the principles of the Zero City, let's look at how the human body works, which has 12 systems to stay in balance and last as long as possible, defending itself from threats and continuous external attacks.

All those are managed by the nervous system which is in charge of communications between the 12 systems (circulatory, lymphatic, excretory, immune, integumentary, skeletal, muscular, reproductive, respiratory, digestive, endocrine), making decisions that affect the entire system in thousandths of a second.

Thus, there are homes, cities, specialized organizations (hospitals, industrial cities, universities) and everything managed by systems (transport, health, food, security, ...) with a goal of maintaining the system formed by all the cells of the body and organized by the nervous system (political organizations).

Aerobic or Anaerobic Mode

Cells can function in an oxygenated (aerobic) or oxygen-free (anaerobic) environment.

Cells that work in aerobic mode do so in energy balance, only as we have said by storing small amounts in the form of ATP, there being no cells, tissues or organs in the body that accumulate large amounts of energy.

Only cancer cells that function in anaerobic mode are great consumers of energy, stealing this from healthy cells, these ones are in aerobic mode and when they do not have enough energy, they commit suicide.

Cancer cells, living with no oxygen, destroy healthy cells acquiring their energy and finally destroying the whole system.

Homeostasis: System in Balance

The human body is kept in energy balance through homeostasis.

Homeostasis is the ability of organisms to maintain a stable internal situation balancing changes in their environment through the exchange of energy and stuff with the outside.

In this way, an environmental disturbance forces us to launch compensatory actions in such a way that an attempt is made to keep the internal environment as stable as possible, for which a positive or negative feedback loop is created, for example the homeostasis of glycemia in such a way that in the event of increases blood glucose is activated by a regulatory system that returns the level to the range considered healthy.

Thus we see that there is a variable that is the characteristic of the internal environment to be controlled, a sensor that analyzes changes in the variable and sends the data to the control center, this receives the information from the sensor interpreting the changes produced, analyzing historical data to correct the error to return to the normal value of the variable.

Subsequently, the effector influences the variable, which produces its response, continuously monitoring the changes in a feedback system that can be positive, when it goes in the same direction as the deviation, or negative if the direction of the change in the deviation is reversed.

This term, initially applied to biology, has also been adopted by other sciences and techniques.

Once the basic biological principles have been observed, it can be understood that all are systems that interact with each other according to some principles, from which rules of interrelation are established, exchanging energy and information in order to ensure the greater survival of each system.

There are only Systems

The approach of The Cassandra Project is based on the fact that language is an element of manipulation that hides, behind emotional aspects in many cases, more complex issues, therefore any type of human organization is considered as a system.

Thus, the individual is better to be considered as a system as well, therefore, it is complex and has its own objectives for survival and personal development, in the other hand, political organizations are other systems with their objectives independently of individuals.

Companies, non-profit organizations, associations and social groups are systems in themselves formed by other systems and subsystems.

Following the analogy of the human body, the Individual-system interacts with other individual-systems within what are called social relationships, a key factor in the physical and mental well-being of the person.

In these interactions between individuals-systems, each one uses or interacts with 10 systems in order to cover its needs:

1) Means and Transport Networks
2) Security
3) Medicine
4) Shelter & Hospitality
5) Trade
6) Food & Nutrition
7) Information Media
8) Housing (Shelter)
9) Telecommunications
10) Culture, Sports, Leisure, Social Activities & Altruism

To interact between these systems and individuals there is an exchange of energy, and for so, should be needed to use:

- Energy Exchange Systems and
- Energy Storage Systems

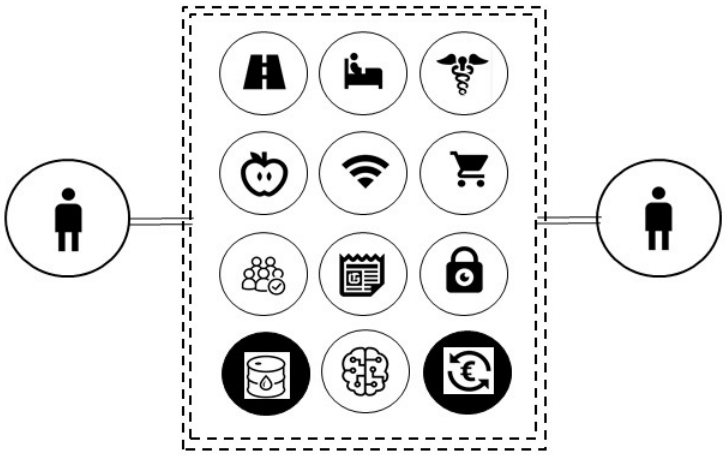

Figure 3: Interconnection between systems

Energy is spent in all of above two processes mentioned.

These ten large systems in turn have subsystems, for example, Security contains Police, Civil Protection, Firefighters, Justice, Food Safety, Road Safety, etc…

All Systems are coordinated by the Nervous System who can operate in two modes:

A) Master-Slave System (overlaying system):

It is an Asymmetric system, based on relationships between unequal ones, that is, the Master acts in its own interest and not in the interest of all the individual-systems that operate within, the Master relating is in an asymmetric manner with the individuals-system who are mainly, not all but majority, Slave-Systems of two types:

- Predators: if they receive energy from the Master asymmetrically in respect to the other Slave Systems, taking advantage of the energy of others
- Predated: If they contribute with energy to the Master in an asymmetric manner, discharging energy and giving it to others in its own detriment.

The Master System tends to its own survival, generating entropy, chaos and with time the corruption of the System.

The Master System operates only in First Level Cybernetics, where there is no observer, secretly hiding the principles and decision-making processes in the configuration of social relations systems.

This system is always overlaying, monitoring and distrusting the Individual-System and limiting access to information to it.

The Master System concentrates energy, that is, resources, eliminating System-Individuals when threatened by them.

B) Source-Replica System or parent-son (underlaying-system):

This a Symmetric system, based on ethics, consuetude, which is acquired naturally over the centuries and based on the traditional experience of social relationships in community, defining consuetude as the best way of life.

The Source or Father system, tends to ethics, actively working in the continuous supervision and improvement of the system, acting proactively in the forecast of entropy, typical of a closed system, avoiding the corruption of the system and chaos, causing the system itself to anticipate free will.

The Parent System must operate according to the principles of First and Second Level Cybernetics where the observer has great importance so that the observed knows that he is being observed and in this way

modifies his behaviour in the configuration of the systems of social relations.

This system is always underlay, supervising and interfering as little as possible, trusting the Individual-System, providing it with all the necessary information so that it can make decisions, assuming its responsibility and commitment to the Parent-System.

The Source System decentralizes the energy and provides information in a transparent way, establishing a self-regulatory framework of the Individuals-system for the improvement of the relationships between them and rising to a higher level of encounter and creativity.

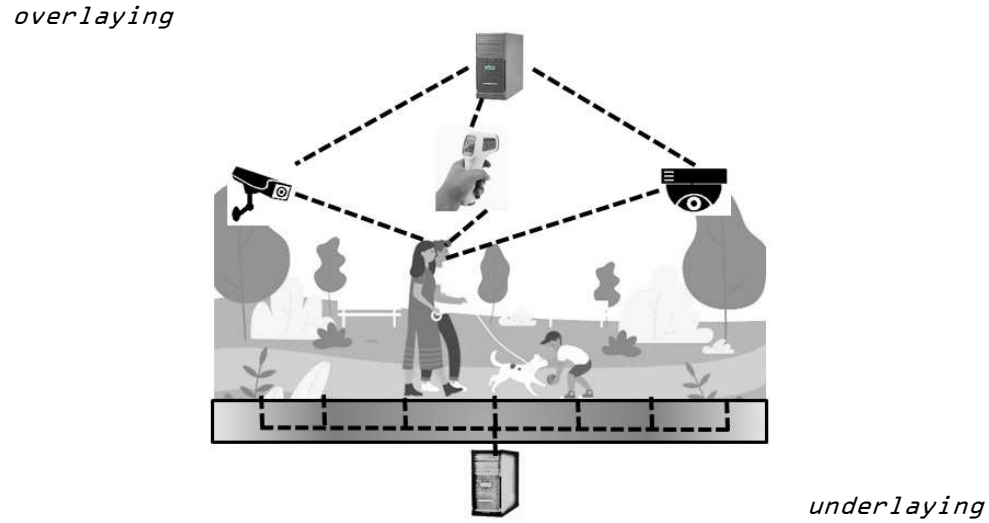

Figure 4: Underlaying versus Overlaying Systems

Finally, In Source-Replica mode, the systems act under the quality of trust, which is never imposed as a principle, it should be acquired on the basis of experience.

What is an Asymmetric System?

An Asymmetric System is a System that has not been certified as Symmetric (Ethichs) or that at least its level of ethicality has not been assessed, understanding that the systems must tend to be ethical.

An Individual-System cannot be forced to operate with Cybernetic Systems against its will only Systems can operate with Systems.

The Individual-System must be able to have access to the knowledge of the levels of ethicality of the systems with which it interacts voluntarily through the ethical certification seals.

The Individual-System will rely on Virtual Personal Assistants to interact with Systems in Symmetric Mode, under System-System relation.

The Virtual Assistant must be in Symmetric Mode, rejecting interaction with Asymmetric Systems or being aware that it is interacting with an Asymmetric System when it forces the Individual-System to interact with it.

Interconnection

Each Hybrid City is a System as a Local Community.

The Individual-System operates in 7 levels of organization of cybernetic systems:

1) Individual-System

2) Household-System

3) Neighbourhood-Local Social Network

4) Local Community (Hybrid City)

5) Regional Supra-local Structure

6) Supra-Regional Structure: Block

7) Supra-Block Structure: Global

The Hybrid Cities will interconnect with the 10 systems described, which must be coordinated between them through the nervous system, under Principles and Rules of interrelation and objectives, based on the Driving Force: the Safety of Individuals, system, resources and resolution of needs.

For this, it is understood that, in addition, starting from the Hybrid City as a System that integrates cells (homes), individuals-systems and specialized systems, as organs (culture, sports, medicine, security, etc...), and from here the City must interconnect with supralocal systems at three levels, according to the distances and frequency of geographical and social relationships, distances, and social and commercial relationships.

Each Individual-System operates with the 10 systems and subsystems in three modes:

A. Origin

B. Transit

C. Destination

Considering Mobility as the most important factor for an Individual-System, it will always be found in one of the three modes described, origin being its most habitual residence, transit in the process of moving from one hybrid city to another and destination the time it takes in the city of visit.

In the transit mode, the individual-system will be able to interact with the 10 systems described in supralocal mode if the transit does

not occur in direct way from A-Hybrid City (origin) to B-Hybrid City (destination).

Supralocal modes are not in the influence of a Hybrid City.

In transit mode and through the Resident's App, the resident will be in the sphere of influence of one of the two cities, origin or destination, for any assistance on the journey.

The Individual-System will interconnect with other people or Systems, and for this, in the case of people, these interconnections as part of the social relations (monetary or non) and for so, the individual uses its own Network of relationships and contacts of all kinds (family, friendship, professionals, care, etc...) on the other hand in the interconnection with systems will try to do it with symmetric systems and certified as ethical under different geographical area of influence:

- **Local**

It is understood as areas with a radius of influence of less than 30-60 mn. And as the most often geographical area of influence and in the case of hybrid cities, it is considered local interconnection bet Hybrid Cities even if distances are greater.

- **Regional**

We talk about geographic areas with continuous relationship between social groups, regardless of national, state or language identities. These are areas that maintain historical, social, cultural and commercial relationships in a scope of about one and four hours of radio.

- **Block**

It means large historical, social, economic and cultural pluri-communities that coordinate rules, principles and consuetudes, and exchange and storage of energy.

- ***Global***

Maintain relations between blocks worldwide, exchange of energy, knowledge and information.

The Supra-block organizations should try, as long as they can, be certified by 2nd and 3rd Level of Cybernetics.

The Cassandra project scope reaches only its own network of cities, the 10 supralocal systems decision processes at Regional, Block and Global depend on other decision making structures, the Hybrid Cities under TCP model will only try to interconnect under as much Symmetric relation and Security possible.

Must be accepted that any Individual-System may decide to have as its main priority its own survival, security and maintenance as system in any of both modes of interaction: Symmetrical or Asymmetrical.

Everything is Energy

Once we have observed which systems interact with each other and which principles that should govern their relationships, we must be clear that everything is energy.

Processed products, food, energy resources as themselves, assets constructed, everything is energy, including people.

Energy cannot be accumulated in large amounts, it is in motion, it can materialize in knowledge and productive intelligent capital, in safe class A assets and in ensuring supplies with long-term strategic partners as well as the design of redundant networks as well as physical storage.

Following the biological principles, we pursue the energy balance and the minimum energy consumption: Zero is Infinite.

The Individual is Physical, Mental, Emotional Energy, as well as Spiritual, in this way the first 3 indicated energies interact in the individual-system with other energy systems in the physical world: nature, animals, people, computer systems, machines and robots, community and supralocal systems carrying out monetary and non-monetary transactions, having to do so in the most ethical and symmetric way possible for the security of all the systems involved.

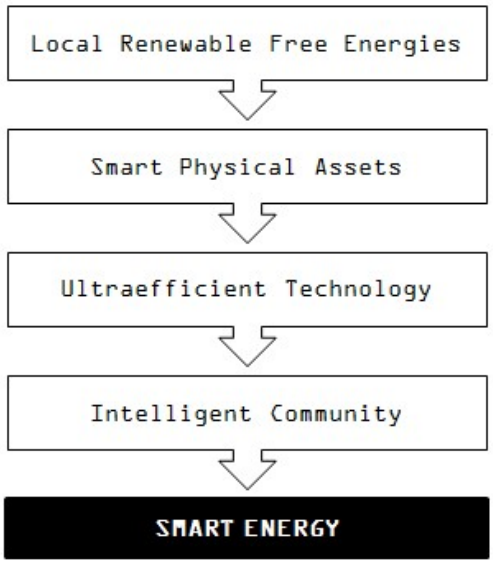

Figure 5: Smart Energy

For all the above, all the renewable and local natural resources must be taken advantage of, the formation of intelligent physical capital, the reduction of energy expenditure and the Intelligent Community that avoid wasting energy, balancing monetary and non-monetary exchanges, having to release the energy when it cannot be used to avoid entropy.

The Empirical Exercise of The Zero House

Considering the home as the base from which society is built, in 2012 a process of design and monitoring of an Eco-sustainable Home began under the principles of Self-Sufficiency and Ultra-efficiency to face the challenge of how to create environments in the face of the new paradigm that we are facing. we face, considering that the efficiency and the reduction of energy expenditure is essential for people with long life expectancy.

After experiencing with light construction systems and in a manufacturing timeframe of 3 months, in 2015 Casa Zero was built, under the Co-housing model, which has been monitored for 5 years, achieving the following achievements:

A) Eco-efficient housing, 80% recyclable
B) 99% consumption of Renewable Energies
C) 100% Water Cycle Management
D) ACS Solar
E) Solar Heating and Biomass
F) 0% Non-recyclable Wastewater
G) Generation of non-recyclable waste: 1.7 kilos / person month, 90% less than the annual average in cities
H) Energy Efficiency: Appliances + AAA, + AA
I) Zero Emissions Local Mobility: Electric Bicycle / Solar Car
J) Positive Balance in Co2 Emissions
K) Bio-pond: support for Local Biodiversity
L) Telecommunications: Local Provider (support local economy)
M) Food Self-sufficiency: Production of 1/3 of the needs
N) No use of Chemical Fertilizers
O) Financial self-sufficiency: low monetary dependence.

Daily Cost per Resident: 0.54 euros in Emergency mode.

Modes in which the House operates: Ultra-efficiency (Normal), Hibernation (There is a Threat and the Supply Networks are maintained) and Emergency (fall in the supply networks).

The home is provided with a high percentage of the resources it consumes locally, focused on the security and redundancy of its Supply Network and the reduction of Energy Consumption and with the design of energy exchange and storage systems both physically and virtual.

The House have access to 7 Renewable Energy Local Resources:

a. Solar
b. Wind
c. Biomass
d. Soil
e. Gravity
f. Bacteria
g. Physical and Mental Human Energy
h. Waste
i. Water

From Zero House to Zero City

The achievements obtained in the Zero House and the experience of Resident Zero, as well as the procedures implemented in the management of the home in the areas of construction system, energy, water, waste, devices, mobility, telecommunications, security, medical monitoring, food and maintenance, we transplanted them as principles of the Zero City.

It is essential to understand that the increase in Life Expectancy forces the creation of new environments that significantly reduce the energy expenditure of a person who is going to live twice or three times the life expectancy of the early twentieth century; For this, special emphasis should be placed on the elimination of architectural barriers so that a person by himself can move around the city with the help of assistants.

In this way, we set twelve principles, understanding Zero as a tendency to Zero, that is, the continued effort to reach that goal:

- ZERO C02 Emissions
- ZERO Waste
- ZERO Crime & Abuse
- ZERO Acoustic and Visual Pollution
- ZERO Chemical Fertilizers
- ZERO Accidents
- ZERO Unemployment
- ZERO Architectural Barriers
- ZERO Concentration of Power
- ZERO Maintenance
- ZERO Dependency
- ZERO Corruption and Inefficiencies
- ZERO Barriers to Access to Knowledge
- ZERO Misinformation

Based on the above, if we understand that everything is energy and information systems with principles, we can already configure new environments in harmony with nature, based on the physical and mental balance of the individual, calling the urban model established for its practical application as Psycho-biological Urbanism, beyond Biological Urbanism.

Psycho- Biological Urbanism

The Urban Model of the Hybrid City goes beyond the latest architectural trends in biological urbanism, focusing on the connection between Nature and the Individual-Community, taking advantage of the state-of-the-art technology at every moment and the design of the interconnection between systems, with the Objective of setting physical and mental equilibrium in urban environments.

To do this, urban environments are designed in several layers:

1) Geo-location (geopositioning)

2) Urban Design

3) Technology

4) Community

5) Urban Operating System

6) Interconnection

1) Geolocation

Locations should be chosen (geopositioning) guaranteeing access to:

a. Connection with Supralocal Systems (communication routes and water)

b. Access to sufficient local renewable energy resources:

- a. Solar
- b. Wind
- c. Biomass
- d. Soil
- e. Geothermal
- f. Gravity
- g. Hydroelectric (gravity + solar + water)
- h. Bacteria
- i. Biogas
- j. Water (underground & rain)

c. To select geographic areas with geological stability and low risk of natural disasters (earthquakes, floods, diseases, political risk…)

The climate and its tendency will be observed for the creation of microclimates, study of landscaping and maintenance and enhancement of local biodiversity.

2) Urban Design

The Urban Design of the Hybrid City is based on:

1) Circular design (Ring), in order to save energy and time,

2) Without Architectural Barriers

3) Integration with Nature,

4) Architectural design focused on

a. iconic community buildings

b. and the most functional in the residential area.

5) Autonomous Supply Networks: Energy, Roads, Water, telecommunications, etc... and an easy way of maintenance.

The Construction Systems will be light and the useful life of the building will be defined, being able to be completely renovated and recycled after that period by the new technologies of the moment.

The architecture takes on a secondary importance, except in the emblematic buildings, not using great heights and sacrificing the design with the functionality and the maintenance costs of the infrastructures that must be equal to zero or that generate profit, giving greater importance to the integration in the natural environment.

There are two big zones: One Public: Core Center: Zone of Social Relations, Restoration and Cultural Activities and another Private: Residential Zone, interspersing public areas of the different facilities that provide main services.

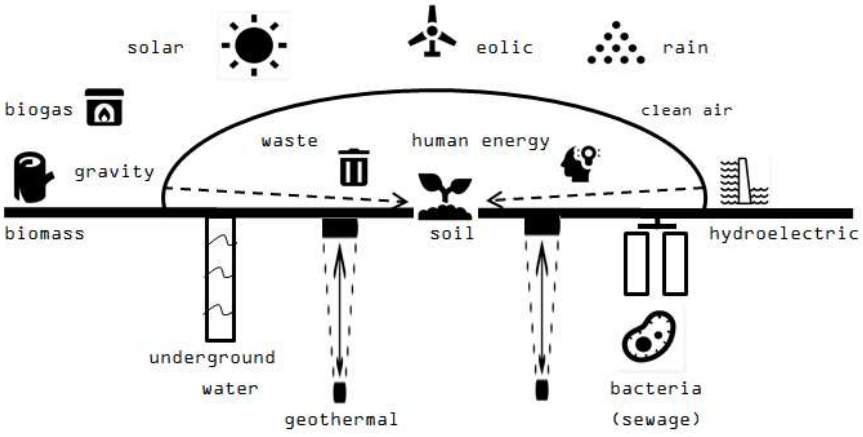

Figure 6: Renewable Local Energy Resources

Private cars are prohibited, local mobility should be organized through Collective Mobility systems (PRT & Community Transport Solutions or similar) Maximum Speed: 25 km. (less than 10 minutes to any point in the ring).

Each Ring may have a population, workers and residents, between 12,000 and 60,000 people, being able to build 1,2,3,4 or 5 rings together.

Areas of Urban Development:

1) Geo-positioning
2) Urban Design: Focus on Self-sufficiency and Ultra-efficiency.
3) Construction Systems
4) Own Renewable Energy Production Network
5) Waste Management
6) Water Cycle Management
7) Security
8) Telecommunications Network
9) Community Local Mobility System
10) Fleet of Vehicles & Drones for Supra-local Mobility
11) Food Self-sufficiency (code of ethics)
12) Financial Health
13) No Architectural Barriers
14) Governance System
15) Logistics & Urban Airspace
16) Urban Operating System
17) Personal Mobile Application
18) Interconnection with other Systems

Facilities and Services:

19) Different types of Accommodation
20) Center for Innovation and Knowledge
21) Community Center
22) Medical Complex
23) Sports Center
24) Care Center
25) Cultural & Educational Center
26) Social, Restoration and Leisure Area
27) Community Agri-food Center (Ethical Food)
28) Trade
29) Business Center
30) Waste Management Center
31) Warehouses & E-Industry (Assembly & 3D Printers)

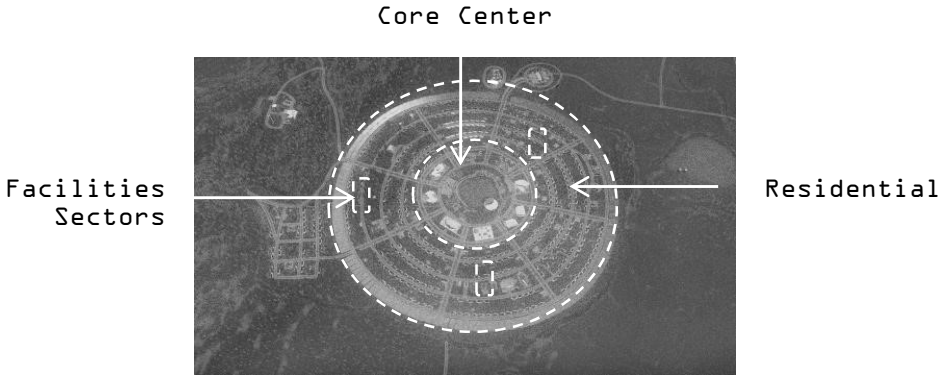

Figure 7: Ring Main Sectors

3) Technology

The Hybrid City will incorporate the state-of-the-art technology that exists in every moment in order to achieve the purposes of Self-sufficiency and Ultra-efficiency.

To do this, TCP develops the **Business & Technology Partners Program.**

The Hybrid City will integrate the latest technology, making alliances with companies and global corporations in order to provide the latest innovation in products and services in the following areas:

a. Collective Mobility and Car Fleet

b. Community Agri-Food Center

c. Medical, Hospital and Pharmaceutical

d. Hotels, Residences, Real Estate

e. Maintenance

f. Energy production

g. Water cycle

h. Telecommunications Networks

i. Waste management

j. Security

k. Logistics & Last Mile Deliveries

l. Commerce

m. Knowledge

n. information

o. Culture, Sports & Leisure

p. Restoration

q. Construction Systems

r. Infrastructures

All Basic Networks are property of the Hybrid City.

In this way, each Partner will become a strategic partner of the Community on its product or service under the mark: **Powered by……**

Alliances will be made with two leading companies in each sector in such a way that they will compete and in turn share the progress made, in a competition-collaboration model (C&C Model).

In this way, the city guarantees redundancy in access to services.

Adaptive Behaviour based on Targets (AB)

Under no circumstances will the partners use the term Artificial Intelligence (AI) in their systems for designing solutions and systems for the services to be offered in the city or by the U0S, this term may not be used in a Hybrid City or in any of the systems that manages it, it will be replaced whenever it is intended to be used by the term: Adaptive Behaviour based on Targets (AB) that covers the procedures carried out by machines or robots for data processing, solve problems, analysis and present proposals, which always must approve humans.

4) Community

Governance System

The Model that governs the community relations, which means, the Governance System configured in a Hybrid City is identified with the electronic direct democracy that resembles the concept of liquid democracy or revocable delegative democracy, which is a form of direct democracy that includes the possibility of immediate revocable vote delegation.

It is a system in which any resident can vote online for each decision that affects the local Community.

The Urban 0perating System will allow each resident to vote, make proposals or delegate their vote to the representatives they choose.

The vote is verified through its Smart Contract, which incorporates secure cryptographic codes that guarantee the identity of the resident.

In this system of liquid democracy, representatives can be elected for each decision area (mobility, telecommunications, knowledge, etc...) through what is called transitive delegation.

Transitive delegation

The transitive delegation allows residents to delegate to other representatives, thus establishing secure networks of trust that channel votes optimally, citizens can change representatives whenever they want.

In this delegation each decision the voter does not vote directly and gives its vote to an expert or residents chain of confidence who represents him for the specific decision area.

Residence Rights

Residence rights are reflected in a Smart Contract, differentiating between ownership and usufruct. The Hybrid City may terminate the contract in the event of continued non-compliance by the resident, maintaining its property rights if it has.

Residents sign the residence contract where the rights and obligations of the resident are established, identifying with the principles of coexistence and community management (Friendly Community) and respecting the commitments to protect nature, respect animals (Pet Friendly), Ethical Food , Reduction of Co2 emissions, Responsible Generation of Waste, etc ...

The resident opens an account with the City maintaining a sufficient balance for a minimum of three year period. The resident may withdraw its balance of the funds when the resident wishes to terminate the contract.

Types of User of the Hybrid City:

a. Resident (more than 6 months a year).

b. Semi-resident (between 3 and 6 months a year).

c. Visitor (less than 3 months a year)

d. Staff (resident or not)

e. Service Providers (Freelancers, SMEs, Corps.)

Types of Accommodation:

a. Hotelier

b. Independent Residence

c. Assisted Residence

d. 24 hour Residence Assistance

e. Hospital and other Assistance services

5) Urban Operating System (Urban Operating System-U.O.S.)

The U.O.S. is the management system of the entire city and operates based on the experience acquired in its programming, according to the version available at every time, and feeding on the contributions of each community, configuring an Ethical-Symmetric model of relationships between residents of the Hybrid City.

The UOS operates by interconnecting and coordinating other levels:

a. Personal Assistant (Mobile App),

b. Home Assistant (Household) and

c. Facilities.

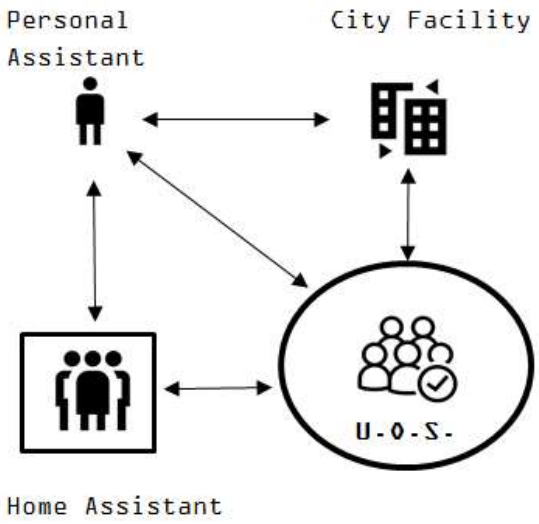

Figure 8: Systems Interconnection

In order to operate as an Ethical-Symmetrical System, the Cybernetics norms must be applied:

First Level of Cybernetics:

This level is made up of the UOS itself with the learning acquired, in addition to the contributions of the Community for its enrichment and the support and collaboration of external professionals and technological partners that collaborate in the construction and management of the city:

1) U.O.S. (Software with acquired know-how)
2) Community
3) Professionals &
4) Technology Partners

Second Level of Cybernetics:

It is made up of the observer mode in such a way that the first level actors know that they are observed, thus affecting their behaviour.

This second level is made up of ethical certification seals on the one hand, and behind them there must be entities that supervise the protocols of each certification seal, as the supervisor of the supervisor.

It is necessary to use at least two certification seals to verify the symmetry of the first level decisions.

Third Level of Cybernetics:

The META-Observer

The Contribution made by The Cassandra Project is that adds a third level in cybernetics, although there is the first level, the design of the systems and the second level that is the observer, cybernetics secures the symmetrical relations adding a third level.

The META-Observer consumes very little energy, therefore that consumption does not significantly affect or influence the system, in addition, The META only communicates asymmetric relationships, being above all levels, it observes without being observed.

Can the meta-observer be corrupted? Extremely difficult, because corruption implies obtaining power or energy control and the meta observer consumes little energy, therefore, it does not have the capacity or control of all the systems, whose manage a lot of energy.

Furthermore, the META-Observer does not have bidirectional communication, it only acts in one direction without feedback, the feedback is carried out at the first and second levels of cybernetics.

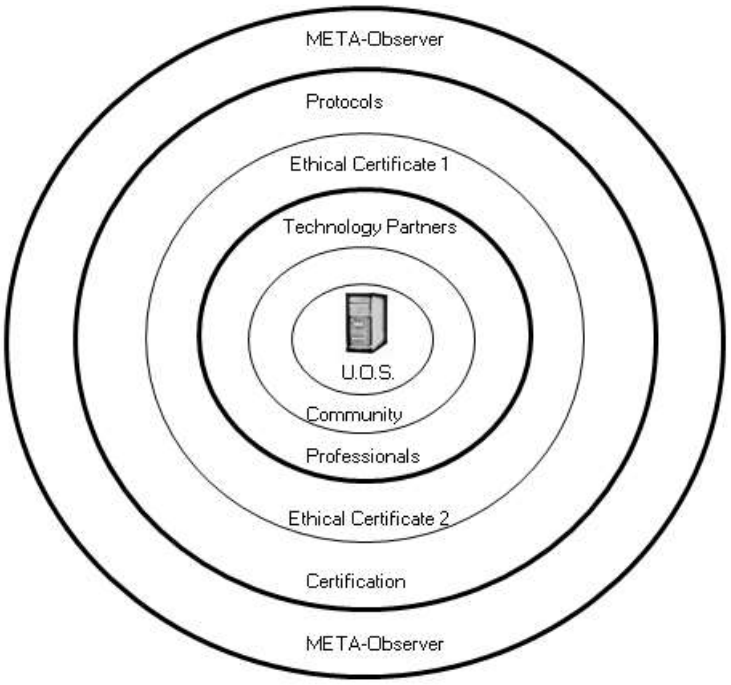

Figure 9: Cybernetics of First, Second & Third Level

The UOS operates according to the Source-Replica model, setting the principles of operation and subsequently enriching itself continuously based on the following properties:

1. Homeostasis

2. Self-regulation

3. Self-organization

4. Self-learning

Cybernetic Homeostasis

Returning to the biological principles previously exposed, biological homeostasis has been used in other environments, including cybernetics.

In Cybernetics, homeostasis is the ability of self-regulating systems to maintain certain variables in a steady or equilibrium state within certain limits or range.

In this way, an attempt is made to maintain an ultra-stable behaviour in the face of the alteration of basic parameters.

Psychological Homeostasis

Psychological homeostasis is understood as the tendency that every organism has to maintain an internal balance when it is altered, these imbalances can be psychological or physiological.

In this way, the organism, in its life, constantly seeks the balance between its needs and its level of satisfaction, in such a way that it establishes itself as the behaviour of the organism in that permanent search for the satisfaction-need balance.

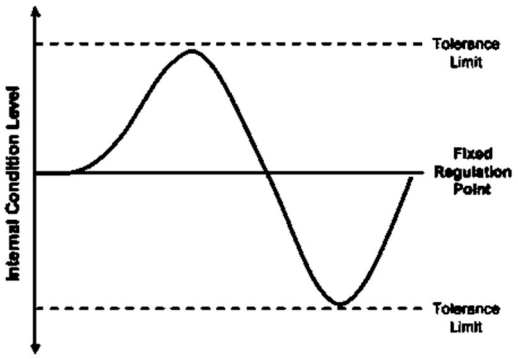

Figure 10: Homeostasis

Self-organization

Self-organization occurs in a wide variety of physical, chemical, biological, social, and cognitive systems.

Self-organization is a process in which some global form of order or coordination arises from local interactions between the components of an initially disordered system.

The laws and principles followed in the process and their initial conditions can be set as starting point for the self-organization process, which in TCP model are set by the UOS in its version.

Once the bases have been established, the self-organization process begins according to the 3 levels indicated above with the established actors: community, professionals, business partners, certification systems, supervisors of the certification protocols and meta-observers.

The process is generally triggered by random fluctuations that are amplified by positive feedback. The resulting organization is completely decentralized or distributed over all the components of the system; This organization is typically very robust, capable of surviving and self-repairing substantial damage or disturbance, including all improvements in the next version of the UOS.

Self-regulation

Self-regulation is recognized as a multidimensional construction in which the social and personal evolution of man forces him to organize himself to manifest his knowledge, in a theoretical or practical way.

As the initiative of competition and cooperation are part of the human being, he must make an internal and organized analysis of his ideas, his way of acting and behaviour, leaving, over the years, the mark of experience to correct accordingly. individually and collectively the mistakes of the past causing the need to innovate in problem solving methods, to make things easy even easier, learning is a fundamental part of life so it has been involuntarily mechanized and regulated by internal processes that we no longer notice.

So, UOS is a self-regulating and self-directed psychological process.

Self-learning

Both in order to self-organize and self-regulate, it is necessary that the OUS and the different actors involved are aware of the permanent learning that must be autonomous.

Key Variables in UOS Management: Everything managed by the UOS is based on the four key variables as the basic framework that have been reflected in this document:

1. Principles
2. Rules
3. Information
4. Energy

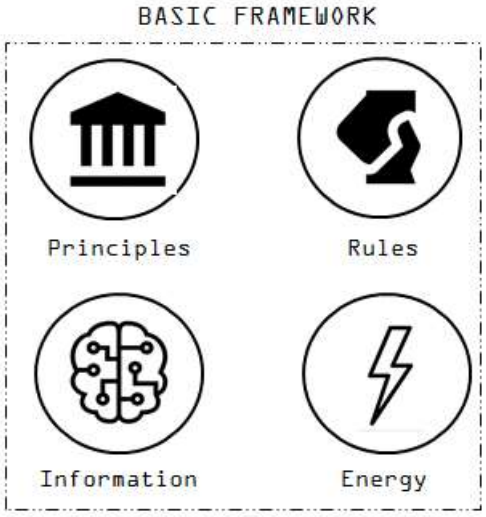

Figure 11: Framework

So, we have principles and rules based on ethical codes, which is, in the search for the best way of life, and energy exchange and storage systems (physical, partners, cash, class A assets and multi-currencies) having access to just in time information.

Entropy and Systems Corruption

The U.O.S. will have a team to avoid or minimize entropy, chaos and potential corruption of the system by anticipating entropic processes, provoking and solving them proactively, similar to the war games carried out by armies.

Threats Management

In addition, External Threats will under constant analysis and monitoring, indicating the level of each threat:

A) Bio Attack
B) Natural Disaster
C) Protection from Climate Change
D) Bio War
E) Chemical War
F) Internet Attacks
G) Financial Wars, Attacks & Crashes
H) Nuclear War
I) Info & Mind War
J) Terrorism
K) Other type of Attacks of Supra-local Systems

Supra-local Information

The U.O.S. Through the Community Center, special attention will be hired to process and analyse the information in such a way that the resident will have a team of people who will filter worldwide and will be able to provide a community point of view on how to face the Info War in collaboration with others cities and Specialized Systems (Medical, Security, ...)

All in your Mobile App.

In this model, people cannot be forced to interact with systems. As has been said, if they are not certified as ethical, only systems can interact with systems.

The UOS will provide access to all information and services in the app, or on your computer or mobile, through a unique UX and UI experience.

In the App the resident will have complete information on: energy generation, storage and autonomy, mode of operation of the city at all times: ultra-efficiency, hibernation or emergency, waste management, water consumption and reserves, efficiency in consumption by residence, access to city services: called internal community network vehicle, Car Fleet reservation, restaurant reservation, food order, interconnection with the medical, sports, Care Center, cultural, knowledge, guests, transit to other cities, balance available, access

to the Community Center, Smart Contract, Information System, Telecare, Financial Health of the City, Management and Level of Threats, etc...

It will be possible to operate in the City also without having a mobile phone.

6) Interconnection

The Hybrid City will interconnect with other systems locally and supra-locally.

- Local: Hybrid City,

The Hybrid City therefore interconnects locally with residents, visitors, workers, homes, business partners and facilities.

It will also interconnect with other supra-local systems, both Symmetric and Asymmetric systems, trying to avoid the latter.

- Supra-local Systems:
  - Other Hybrid Cities, interconnecting in a symmetrical way, exchanging information, energy, knowledge, resources and facilities through the U.O.S.
  - With 10 other systems and subsystems described above (networks and means of transport, telecommunications, food, medicine, security, etc...
  - Interconnection is considered at 3 levels: Regional, Block, Global

The Supra-local Systems to which it is interconnected will be: Energy Exchange, such as tax and social security systems, and Storage (banking), Information Systems and Regulatory Systems (Principles and Rules).

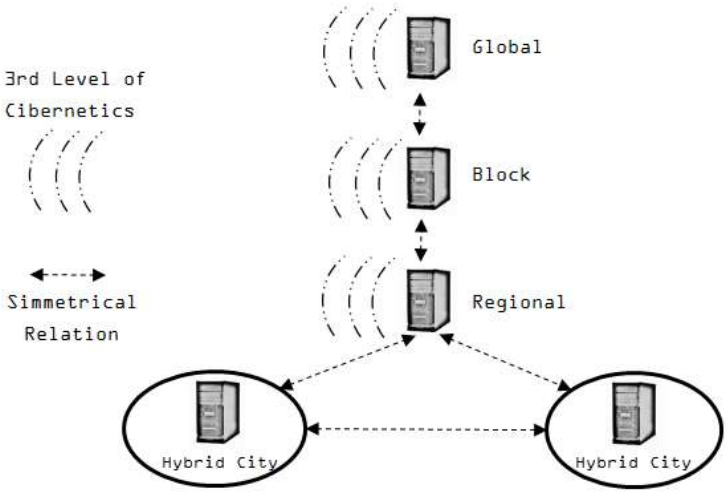

Figure 12: Supra-local Interconnection

The interconnection with supra-local organizations or institutions of the 10 systems will be tried to be totally symmetrical according to the principles of First, Second and Third Level Cybernetics.

Energy Exchange and Energy Storage in a Hybrid City

The Hybrid City, which its Driving Force is Safety has the financial Health as a priority, considering in its model both monetary and non-monetary exchanges as part of the balance of the individual in the City.

In such a way that it works on three concepts:

- Energy Consumption: reduction to the minimum necessary according to the principle of Ultra-efficiency.
- Energy Exchange: Redundant Systems and facilitate Monetary and Non-Monetary exchanges.
- Energy Storage: both in physical capital, in relationships with suppliers and partners, storage of resources, cash, and virtual systems (e-banking) always using symmetric systems in the latter case.

Energy exchanges vary depending on the way the City is operating:

1. Ultra Efficiency (Normal Mode)
2. Hibernation (There is a threat but the systems are maintained, it reduces energy consumption and as well the relationships between systems until the threat is vanished)
3. Emergency (a failure in the systems, the energy consumption is reduced with respect to hybridization until the emergency ends).

Money as Energy

In the Hybrid City in money, it is understood as a way of accounting for energy exchanges, but not using a single accounting system.

In this way we find monetary and non-monetary interactions or exchange relations between people, nature and systems, having to facilitate both monetary and non-monetary relations.

Physical Capital

Energy (capital) is stored in four modes: physical, storage of resources to meet needs for 3.5 and 7 years, accounting account with corporations and companies, traditional and alternative e-banking systems.

Multicurrency

The optimal way to operate a Hybrid City is with the following capitalization systems:

1. Smart Contract (which can be traded)
2. Global Currency
3. Block Currency
4. Local Currency
5. Class A assets

This multi-currency model facilitates the redundancy of systems in the face of corruption or asymmetry in which a virtual energy storage and exchange system (e-banking) can enter.

Networks (Networking)

The Hybrid City must ensure the supply networks, redundancy, storage and contingency plans both to ensure supplies, logistics chains and exchange systems (e-banking) in the modes of operations: Untra-Efficiency, Hibernation and Emergency.

A Network of Hybrid Cities

According to UN forecasts, 55% of the world's population lives in cities or urban areas, and this proportion will grow to 68% by 2050.

This means that within three decades, about 6.6 billion people will live in cities, with the total population of the world today being approximately 7.4 billion.

The Cassandra Project foresees that this trend will be reversed and because of the change in the Driving Force of many people, especially in the strip, 35 to 65 years old, it will cause a migration of part of the population of current cities to other types of environments.

This will implicate an exodus from the Cities of between 5% and 10% of the current population, which means between 150 and 300 million people from the most developed societies.

The Cassandra Project as a collaborative model aims to solve a part of the potential Exodus in several phases:

1) Phase 1: Construction of 3 Hybrid Cities and Interconnect them.

2) 100 Cities Project: ONLY FOR GLOBAL CITIZENS.

The objective after phase 1 is to build a city every 400 km. Around the world, in such a way that a resident can go around the world with its mobile app exchanging residence and through clean mean of transport, making each 400 km journey between cities in 4 sustainable ways:

A) 2 weeks walking
B) 3-4 days by E-bike or Solar Vehicle
C) 4 hours in hybrid vehicle
D) Between 1 and 2 hours by drone

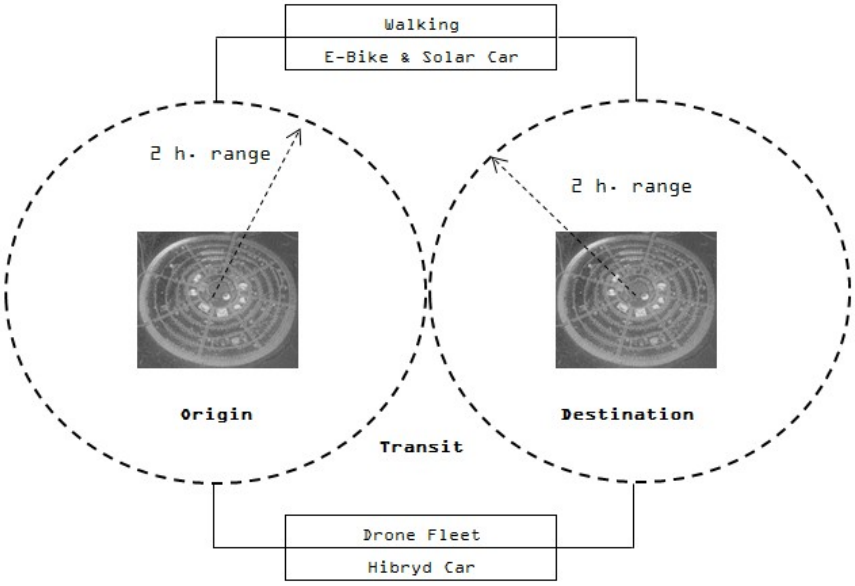

Figure 13: Travelling between Hybrid Cities

The Mobile App will assist the travelling, been always in the range of one of the two cities: origin or destination.

3) Expansion of the Model: in about 20 years, the Hybrid City model will have been implemented in the world, causing an exponential development of this type of environment.

Development Model: The Cassandra Project Foundation

The Cassandra Project will be developed as follows:

A) Cassandra Project Foundation: will develop the U.O.S. and it will assign the rights of use to the promoters of a Hybrid City anywhere in the world and will facilitate the interconnection between cities.

B) Promoters of the Hybrid City: they can be from Public Institutions, Supra-Local entities, Private Promoters or the future residents of the City themselves in cooperative mode.

C) Technology Partners: world-class companies within the Business & Technology Partners Program will supply state-of-the-art products and services to all cities.

All hybrid cities are autonomous, sharing the same U.O.S. and connecting to the network through: The Cassandra Project Network.

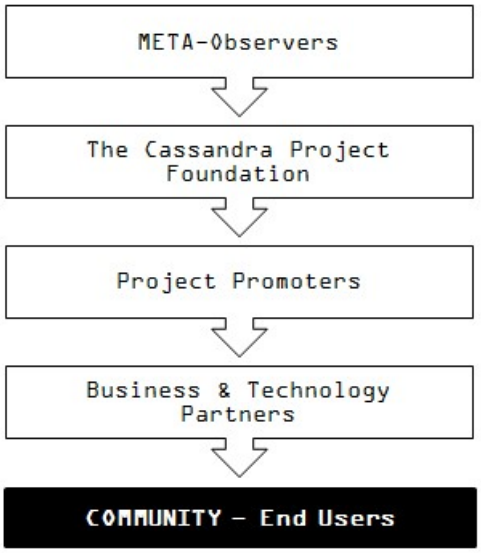

Figure 14: Development Model

Integration of a Symmetrical System in an Asymmetrical World

The main challenge for Hybrid Cities will be how to interconnect with other Local and Supra-local Systems in an Asymmetric World.

This integration may be in two ways, initiating a trend from asymmetric to symmetric systems and/or accepting asymmetric systems the integration of symmetric systems in symmetry with the asymmetric one.

The interconnection is at four levels: principles, rules, information, and energy, creating a great network between all systems related.

We live in times of change and evolution of the human condition, the Driving Force to generate money and spend it, consumerism and waste of resources must be changed by the Security of Systems, starting from the individual, the household as the nucleus of society, rebuild Strong Local Communities to secure basic needs and provide the necessary resources for personal development.

From this starting point, local communities must be integrated with regional, block and global systems certified as ethical based on transparency and symmetric interconnection between all systems, raising the cybernetics of systems to the third level.

The Hybrid City is presented as a Stop and Go and a Back to Basics in a world in frenzy of development and innovation, artificial growth, pretending TCP stop to ensure reviewing everything that has been achieved and create environments to ensure the security of communities.

In this way, a global environment of safety can be created just like the human body, operating in homeostatic balance in an aerobic mode.

Welcome to a New Generation: GENERATI0N ZER0.