FUTURE SPACE CITIES@UNIVERSE: *DIGI-CITY VISION*

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Abstract. A template for the future city has been carved into the heavens. Ever since the beginning of humankind, we have looked to the sky for the opportunity to make a new start in our imperfect world. Between the stars and the darkness we have imagined utopias beyond the reach of our travel technologies, colonizing space with our fantasies.

Now we are in the first stages of an electronic revolution, but in the future 50 years later we will be in a mega-digital era which we have to predict, work and search for the reality of that future. Our planet is recently over loaded with different problems, such as pollution, population, nature disasters.

Our vast speed of technology and the curiosity of discovering the invisible, leads to study and find out the nearest Future Space Architecture. With the vast acceleration of technology and digital life, we should start to predict the future architecture on, into or behind the Earth. This paper is one of many perceptions of life and architecture behind the Earth in the digital era, Digi-City Vision.

1. Introduction

Until the 20th century, leaving the Earth's surface remained a fantasy. But with the advent of the space race and the first ventures into orbit in the middle of this era, this changed forever. Yet, despite the initial success and the resulting enthusiasm for space projects, few people are aware that space travel for ordinary people is imminent, and even when presented with the arguments, many seem unable to accept the idea. This reluctance to believe in extra-terrestrial living can be seen as a significant failing in modern society. It suggests disillusionment and lack of conviction about the successful future of humankind.

Yet it is important for a society to have ambitions for the future. The conquering of space is unique challenge that can help to unify the world and encourage us to collaborate as a species. In the emerging global society, this collective project is essential not just as a symbol of human unity, but for future economic progress. After all, the story of the human race through exploration and expansion into new territories and environments, and the eventual establishment of cities, is the essence of civilization.

Every age has produced a particular way of dwelling as a reflection of its specific conditions -social, economic and cultural- and technological developments In our own time, the new technologies of information and communications are transforming the home into a micro-city, a genuinely multifunctional environment (work, shopping, leisure, rest) from which to inhabit the global village. Within a few years the passive physical world defined by purely functional structures which give people shelter, and in which we consume products and interact with the world by way of screens, will be rendered obsolete by intelligent environments in which everyone and everything (people, objects, and spaces) will both generate and consume information and (ideally) transform it into knowledge.

Architecture, which organizes human activity by means of the construction of space, has the potential to play a key role in this new situation if we can transform it into the best interface for interacting in the new hybrid situation we will find ourselves inhabiting. This being so, the design of both physical space and digital space are going to have to take place at the same time, in a process of constant feed-back in which both worlds learn from their own and each other's potentialities and limitations. Matter and information will intersect in human activities. The knowledge society will develop a home geared towards knowledge, a place primed for the creation and representation of knowledge, in which the individual, the citizen, in relation with other citizens around the world, can live a life of quality (Metapolis, 2001).

This paper is trying to answer some questions such as:

- If the Earth is the place of life? How do we design buildings to live in a way from Earth? How do the natural, artificial and digital spaces interact?
- How can a building be designed to ensure a total flexibility of uses under new conditions?
- Does the space architecture have virtual environment in the form of natural or artificial landscapes?
- How is information ergonomics integrated as physical ergonomics?
- Can all of the components be connected to one another, without a hierarchy?

- Through which interfaces do we relate to "intelligent space cites"? How do we control the flows of information between the physical world and the digital world in these new cities?
- How does information reach objects and spaces? What new wiring does the house incorporate?
- How can this architecture be smart enough to updates new conditions such as gravity, air, and space attacks, etc?

2. Vision to the future: Beyond the Horizon

Norman Cousins wrote "What was most significant about the lunar voyage was not that men set foot on the Moon but that they set eye on the Earth. To be able, from a station in outer space, to see the relationship of the planet Earth to other planets; to be able to contemplate the billions of factors in precise and beautiful combination that makes human existence possible; to be able to meditate on journeying through an infinity of galaxies; to be able to dwell upon an encounter of the human brain and spirit with the universe—all this enlarges the human horizon. It also offers proof that technology is subordinate to human imagination; we can do this not just because of technology but because of our imagination" (NASA, 2003)

Space and Galaxies

The story of the human race through exploration and expansion into new territories and environments, and the eventual establishment of cities, is the essence of civilization (Armadillo, 2001).

3. Human in Space

Most objects in space give off energy in the form of electromagnetic radiation. This radiation can be in many different forms and often travels millions of light years before it reaches Earth. However, most forms of radiation are absorbed by the Earth's atmosphere and so cannot be seen from the planet's surface. Because of this, these types of radiation are best studied

about space. There are many different satellites orbiting the Earth, allowing us to study radiation before it reaches Earth's atmosphere.

3.1 INTO SPACE

Of all the marvels and achievements of human race, the most incredible may well be our ability to leave our planet and travel into space. The drive for this came from two of the world's major superpowers, but it was not so much a desire for technological advancement as a battle for political supremacy. Nevertheless, sputnik's bold voyage into space in 1957 remains one of the most important milestones of science.

3.2 LIFE IN SPACE

We have put men on the Moon. Can people live in space? Can permanent communities be built and inhabited off the Earth? Not long ago these questions would have been dismissed as science fiction, as fantasy or, at best as the wishful thinking of men ahead of their times Now they are asked seriously not only out of human curiosity, but also because circumstances of the times stimulate the thought that space colonization offers large potential benefits and hopes to an increasingly enclosed and circumscribed humanity (Toroidal Colony, 2002).

The concept of human habitation in space is, of course, a very old one; in some form, it can be traced back to the early days of science and even earlier, to mysticism. It has been a theme of fiction and speculation. This century has brought the first real access to extraterrestrial space and, with it the architectural community is faced with the prospect of thinking the unthinkable about where we will live and the way in which we can best accomplish this.

In just 40 years, humanity has moved from dreaming of the moon and planets to landing on our satellite and sending spacecraft to all but one of our neighbouring worlds. Unless some economic collapse or popular backlash against space exploration cuts funding for the world's space programs, the coming century will certainly bring even more dramatic achievement and discoveries. Within several decades, engineers could be launching spacecraft toward the nearest stars.

To live in space humans must be protected from the fierce intensity and penetrating wavelengths of unattenuated sunlight, but this same energy is one of the primary resources of space. If this steady, ceaseless flux of solar energy is tapped its value may be very large. If the Sun's energy is converted with 10 percent efficiency to electrical power which is sold at a rate of $.012/kW-hr, a square kilometre of space would return more than

$14,000,000 each year. It is important for the colonization of space that an effective way be found to use this solar energy.

Space is extraordinarily empty of matter. The vacuum of space is better than any obtainable with the most refined laboratory equipment on Earth. This vacuum may be a resource in its own right, permitting industrial processes impossible on Earth. Nevertheless, there is matter in space and it is of great interest to space colonization (Toroidal Colony, 2002).

3.3 HUMAN NEEDS IN SPACE

Elementary essentials such as air, water, food, and even the sensation of weight all should be provided to the space colony. Engineering criteria to assure physiological safety and comfort are essential, but equally important is to provide for psychological and aesthetic needs of the colonists. The structure, mass, and shape of the habitat are sensitive to the choice of design criteria. Rather substantial savings in structural mass, and hence in cost and construction time, can be obtained by deviating from Earthlike conditions. Because the physiological effects of appreciable deviations from some of the terrestrial conditions are unknown, the living conditions in space are designed to be similar to those on Earth despite additional costs. The treatment of weightlessness is an example of this conservative approach.

Antigravity space – space center

3.4 FOOD AND WATER

Humans living in space must have an adequate diet; and food must be nutritious, sufficiently abundant, and attractive. There must be enough water to sustain life and to maintain sanitation. A diet adequate for a reasonable environmental stress and a heavy workload requires about 3000 Cal/day. It should consist of 2000 g of water, 470 g dry weight of various carbohydrates

and fats, 60 to 70 g dry weight of proteins, and adequate quantities of various minerals and vitamins. The importance of the psychological aspects of food should not be neglected. The variety and types of food should reflect the cultural background and preferences of the colonists (Toroidal Colony, 2002).

4. Problem Definition

Our planet is recently over loaded with different problems, such as pollution, population, nature disasters. Our vast speed of technology and the curiosity of discovering the invisible, leads to study and discover the space with many questions: Space exploration, an active pursuit for less than two decades, has already displayed an extraordinary power to alter our viewpoints and stretch our minds. The concept of spacecraft Earth, a sphere of finite resources and ominous pollution, became pervasive and powerful at the same time we first received good photographs of our planetary home Human-made objects have already travelled millions of kilometres into the depths of space. The Pioneer and Voyager space robes have flown beyond Pluto, heading for the edge of the Solar System. However, in the vast expanses of the Universe, this is hardly any distance at all! Scientists and engineers are already working on new technology that will take the human race to the nearest stars, to neighbouring galaxies, and beyond.

The question, "**What is feasible**?" can be finally answered only by future historians. If in the 14th and l5th Centuries when new technology first made transoceanic voyages possible, European rulers had inquired what they should do with this new capability, no man could have been long-headed enough to perceive all the possibilities, nor persuasive enough to communicate his vision to others. We now realize that technology is but a part of any broad stride taken by man. A perception of advantage to be gained, resolve, organization, and a continuity of effort - some of the elements that must combine with technology to effect a major human advance - is indeed vital (Mitchell, 1998).

5. Building in Space

Space travel provides the ultimate challenge for designers and architects wishing to create an environment that is self-contained and can grow with, and is seamlessly integrated with, the human beings it protects and nurtures. One of the major challenges will be to identify substances that will be cheap and easy to assemble in space. Spacecraft and space stations will be assembled like Lego. The basic units will be manufactured from all over the

world and will have standardized electrical circuitry, oxygen-carbon-dioxide-nitrogen-mixture carry capacities, internal pressure, etc, in order to prevent negative external forces ripping environments apart. The less human intervention and maintenance of space structure there is, the less costly habitation will be. Smart materials that are capable of self-repair will be needed, as the cost of sending up repair crews could prove prohibitive to future space stations. Not all materials will need to be artificial. Some organic materials that can grow, divide and mature in space, like bone, could be used to grow space stations from the culture of cellular 'seeds'.

To avoid disorientation, buildings able to maintain their own life cycles, mimicking the diurnal Earth patterns of sleeping and walking, and which can recycle water and organic products, will be necessary to pacify their inhabitants psychologically. The ideal architectural material to use in a vacuum is, of course, light. Laser highways, sculptures, artworks and advertising will be part of the information and architectural structure of colonized space. The concept of human habitation in space is, of course, a very old one; in some form, it can be traced back to the early days of science and even earlier, to mysticism. It has been a theme of fiction and speculation. This century has brought the first real access to extraterrestrial space and, with it, the architectural community is faced with the prospect of thinking the unthinkable about where we will live and the way in which we can best accomplish this (Raskar et al, 1998).

5.1 FASTER-THAN-LIGHT TRAVEL

Because the distance between stars are so enormous, we do not possess the technology today to be able to travel to another Solar System. Even the closest star to our Sun is too far away to reach in a single lifetime. To reach other stars, star-ships have to be able to travel faster than the speed of light-300,000 kilometers per second. But according to one of the fundamental laws of physics, Einstein's theory of relativity, faster-than-light travel is impossible. Even if scientists were to find a way to travel at the speed of light, it would still take over 300,000 years to get the centre of our galaxy (Armadillo, 2001).

5.2 INTERSTELLAR CITIES

One way of overcoming the need to travel faster than light is to build enormous star-ship that would act as portable space cities. Some scientists have suggested building colossal construction, several miles long, which would be able to carry thousands of people into space. These ships would not be able to travel as fast as speed of light, and the journey to find other plants would still take thousands of years. However, the number of people

on board would mean that future generation would be able to explore far-off galaxies and planets. None of the original astronauts would live to see the far reaches of space, but their great-great-great grandchildren could!

5.3 LIVING OFF-WORLD

Space stations now allow humans to live in space for long periods of time. However, living in Earth's orbit is just the beginning of a new age of space habitation. Scientists all over the world are thinking of new ways to allow people to live in space and other planets-not just for years but permanently!

NASA deigns trials for space cities 2003

Space stations could become enormous homes in space as the population of Earth becomes too great for planet to contain. These giant homes could also be used for cruises through the Earth's atmosphere for those who would like a holiday in space! (Armadillo, 2001).

5.4 FOOD AND WATER NEEDED IN SPACE

Humans living in space must have an adequate diet; and food must be nutritious, sufficiently abundant, and attractive. There must be enough water to sustain life and to maintain sanitation. A diet adequate for a reasonable environmental stress and a heavy workload requires about 3000 Cal/day. It should consist of 2000 g of water, 470 g dry weight of various carbohydrates and fats, 60 to 70 g dry weight of proteins, and adequate quantities of various minerals and vitamins. The importance of the psychological aspects of food should not be neglected. The variety and types of food should reflect the cultural background and preferences of the colonists (Armadillo, 2001).

5.5 CITIES IN SPACE

Current space stations are usually quite small and cramped. They cannot hold more than a few people. Even the International space Station (ISS) is restricted to a staff of seven. Some scientists have suggested building much larger homes in Earth's orbit. These space cities would not just be laboratories for space science but homes for thousands of people. Although there is no gravity in space, this could be overcome by making the space city spin at a constant speed. This would create a false gravitational force that would push everything to the outer wall (Armadillo, 2001).

5.6 NEW HOMES

My personal vision to the future is a vision to the orbit Space city, it is possible in the electronic life we are going through, day by day we used to use the technology in every field of our life, so what will be tomorrow and next? This is the future vision. Our homes will be fully connected to an intelligent system which assist household doing and controlling every thing ….all furniture will act as intelligent objects work to make us feel comfortable in all our different modes, it's a new horizon, new lifestyle. How about our future space homes? Homes will be automatically recycled intelligent homes.

Every age has produced a particular way of dwelling as a reflection of its specific conditions -social, economic and cultural- and technological developments: The piping of water into the home led to the appearance of the kitchen and the bathroom; artificial light and electricity resulted in new forms of organization at home; domestic appliances allowed people to conserve food for longer periods and to do more in less time, and TV turned the traditional living room into a window on a world dominated by the mass media. In our own time, the new technologies of information and communications are transforming the home into a micro-city, a genuinely multifunctional environment (work, shopping, leisure, rest) from which we can inhabit the global village. Within a few years the passive physical world defined by purely functional structures which give people shelter, and in which we consume products and interact with the world by way of screens, will be rendered obsolete by intelligent environments in which everyone and everything (people, objects, spaces) will both generate and consume information and (ideally) transform it into knowledge (NASA, 2003).

"Space colonization is likely to have a large favourable effect on communication and other Earth-sensing satellites. Already communication satellites play an important role in handling telex, telephone, computer, and TV channels. They provide data-links and track airplanes and ships as well as rebroadcast TV to remote areas. In the future even more of these data-link

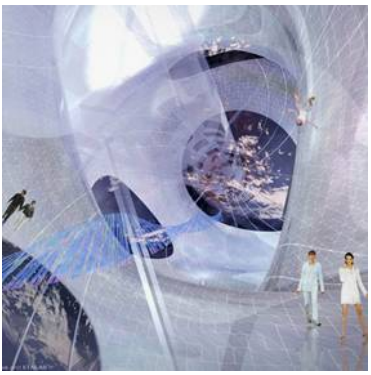
applications can be expected. Not only will planes and ships be tracked and communicated with by using satellites, but trains, trucks, buses, cars, and even people could be tracked and linked with the rest of the world continuously. Currently, the main obstacle blocking direct broadcasting of radio and TV to Earth from orbit is the lack of low-cost power in space. SSPS's would produce such power. In addition, their platforms could be used to provide stability. Currently, up to 40 percent of the in-orbit mass of communication satellites consists of equipment used to provide power and maintain stability. Finally, colonists could carry out servicing and ultimately build some of the components for such satellites" (NASA, 2003).

Architecture, which organizes human activity by means of the construction of space, has the potential to play a key role in this new situation if we can transform it into the best interface for interacting in the new hybrid situation we will find ourselves inhabiting. This being so, the design of both physical space and digital space are going to have to take place at the same time, in a process of constant feed-back in which both worlds learn from their own and each other's potentialities and limitations. Matter and information will intersect in human activities (Clark, WWW).

The knowledge society will develop a home geared towards knowledge, a place primed for the creation and representation of knowledge, in which the individual, the citizen, in relation with other citizens around the world, can live a life of quality. Now this technology leads us to land on Moon and Mars, it also can lead us to live in the space, building space cities with new life style, healthy environment. After this conclusion of NASA researches, how could we imagine our future space city? This is my dream which can be real one day, it’s a dream of the melting and mixing different environments using meta-technologies to gain new ways, new meanings and new quality of life in the future (NASA, 2003).

6. Building Virtual Worlds to Explore Signs of Real Life in Space

"Somewhere between reality and the unknown, science fiction has always flourished. The best sci-fi authors rigidly adhere to one principle: Make it as real as possible, given what's known. Now, as if lifting a chapter from an Isaac Asimov novel, NASA plans to create hundreds of "synthetic planets" that might represent real worlds orbiting faraway stars" (NASA, 2003). Discussions of the relationship of the actual to the virtual tend to polarize even more rapidly than discussions of morality, politics, or gender. Remnant of our predator/prey days, an exclusionary either/or mentality makes more detailed considerations difficult. In considering the urban implications of a transmissible architecture, we will have to set aside binary oppositions and establish continua between extremes that may well wrap around to meet at their most distant ends.



Interactions between virtual and real world

The **DIGI-City** will be suffused with intelligence. Sensors and effectors will be ubiquitous and will be linked everywhere with information utilities as common as running water. How can we begin to envision such a city? The problem of the design of "intelligent environments" can be instructive. Each term, and their relationships, can be replaced by "tuples". "Intelligence" can be replaced by Howard Gardner's seven types of intelligence: Visual, Verbal, Mathematical, Bodily, Musical, Interpersonal and Intrapersonal. "Environments" can be seen to be of at least three types: Actual, Virtual, and Hybrid. The loci of application of intelligence to environments can also be listed: in, on, of, and by. If we map these tuples onto a coordinate system, we create a space of possibility for:

- What intelligent environments might mean?
- What projects might be undertaken?
- What directions explored?
- What is the bodily intelligence of a virtual environment?
- How is intrapersonal intelligence exhibited by a hybrid environment?
- How can technologically augmented intrapersonal "intelligence" enhance an actual environment?

Once we have understood some of the features of this space, we can add dimensions. What is the range of urbanism? (Toroidal Colony, 2002). There is no question that urbanism as we know it will be altered, that our cities will become our interfaces to the net, that we will really be able to "reach out and touch someone" across the planet and as far as our transmissions will allow. As important as the understanding of those changes will be, we must not forget to see the larger change: a new, non-local urbanism is in the making.

This new urbanism, trans-urbanism, freed from a fixed geometry, will have to draw upon set theory and the physics of a quantum universe.

As distant as this may appear from the city as we know it, the trans-physical city or as I call it DIGI-City will not be the post-physical city. As the prefix *trans-* implies, it will be at once a transmutation and a transgression of the known, but it will also stand alongside and be interwoven into that very matrix. In order to develop **"the DIGI-House"**, which will include both; the design of spaces and objects and also the development of software, 20 different layers have been defined; the people responsible for supervising these layers will set out to define specific areas of development with the potential to take on a life of their own beyond the "DIGI- House". If remote control can change our understanding of TV watching behaviour – a form of activity that is relatively simple – imagine how extreme the effects which digitally enhancing a desk or work surface will have on space behaviour. Imagine the effect of 'remote control' furniture, objects, doors, lighting, and wall transparency. Email has already reshaped the people communications. But e-mail is just the beginning. How will life be restructured when we have an easy virtual communications tools?

And this is just the beginning. Computation is moving out of concentrated areas, such as computers, and into our walls, desks, ceilings and furniture in ways we have barely begun exploring. In a limited way in laboratories right now, rooms can sense activity, morph their appearance, and dynamically adapt to workflow or activity needs. We can collimate sound so that two people can speak across a room without others hearing them. We can project light onto walls or through translucent surfaces. And, of course, we can create shared virtual environments inhabited by digital libraries, software agents, avatars, and telepresent versions of ourselves which can assist in the creation of interactive information spaces – *three dimensional intranets* – which can help us manage the impossible increase in information now confronting us.

6.1 DIGITAL OBJECTS ARE NEW KINDS OF OBJECTS

The first step in integrating different materials is to understand the basic nature of each. This is especially true for our efforts to wisely integrate the digital with the physical. Two things should be kept in mind: ***Digital*** and ***Physical*** objects have different basic properties and so digital objects can be exploited in ways that are impossible with physical materials. Interactivity with digital objects can be defined by us, so the limiting factor in how we interact with digital objects has more to do with our imagination than with natural constraints.

Should we expect less from the design of rooms and buildings? If we just use digital technologies as substitutes for existing physical ones, we will fail. To make the best use of the additional functionality which the digital world can offer, we must think outside the physical box in two ways. First, we must think of how to use the digital in ways we cannot use the physical; and second, we must invent new forms of interactivity which liberate us from our conventional modes of relating to objects (Raskar et al, 1998).

Nothing helps free thinking more than reflecting on ultimate principles, in this case, the irreducible differences between physical and digital objects. It is at this point that we must free our thinking. Digital objects can be delivered at lightning speed almost anywhere. They can be duplicated essentially for no cost and they need next to no room to be stored. Indeed, there is no longer any real sense to the question of where they are stored since 'the network is everywhere' and systems are becoming increasingly distributed. One file, a thousand copies anywhere, just in time, and just the way you want it (big font, small font, annotated, read only, modifiable). Moreover, the very rooms in which these digital elements are embedded soon will contain thousands of sensors and small actuators. How shall we exploit this new found interactivity?

6.2 THREE DIMENSIONAL INTRANETS

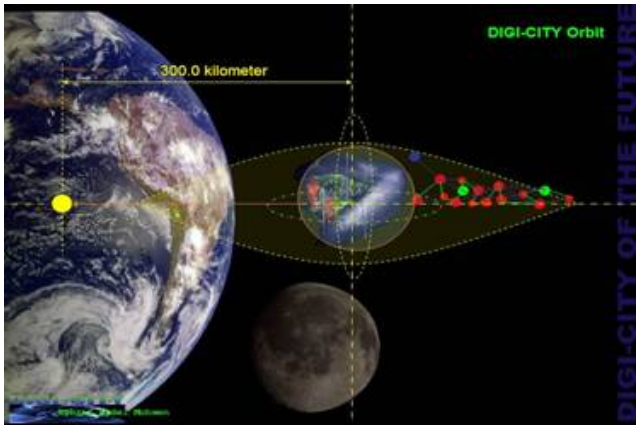
A second major change digital everything makes possible is three dimensional intranets and anytime, everyplace personal information networks. At present, corporate and personal intranets are accessed through computers. As these move out of laptop and desktop boxes to walls, windows, furniture, and ceilings, and as our means of interacting moves beyond the confines of mice, pointers, and tablets, we will interact using speech, gesture, and everyday objects. Sensors will be everywhere and processors will be devoted to making sense of this new level of context awareness. Perhaps this will take another five years in laboratories, perhaps it will take fifteen.

Even now, though, projection of information onto walls and work surfaces allows users to interact standing up and by touching and pointing, often on a writable surface such as a whiteboard. The extra space this provides for organizing information means that we now can massively increase the number of entry points to information we have in a room. Intranets and digital libraries can take to the walls. But with that increase in power comes the need to design the interface to all this information with the presentation parameters of walls and ceilings in mind. Information architecture will have to take account of physical architecture (Raskar et al, 1998).

In my vision to build the future healthful city, it's the reactions of the Era technology. According the vast acceleration of digital technology in the last 20 years, we can predict the fact of mixing the real into the virtual and vice versa. But the question that we have to think to solve and save our souls from new diseases, what equation or what Code we have to use to integrate the virtual into the real? I think the digital technology is going to control everything, so we need to protect our souls from its diseases (viruses) that might destroy the human nature.

7. The DIGI-City

DIGI-CITY is a Real Space City orbits the Earth, 300 kilometres above the surface of our planet. This structure orbits the Earth in the same orbit as the Moon in a stable position that is equidistant from both Earth and Moon, It has a Digital Infrastructure, its urban environments is a data transformation according to energy absorption of its users. It's the interaction between physical and digital environments.



DIGI-CITY proposed orbit; Author.

Abundant solar energy and large amounts of matter from the Moon are keys to successfully establish a community in space. Not only does the sunshine foster agriculture of unusual productivity, but also it provide energy for industries needed by the city. Using solar energy to generate electricity and to power solar furnaces that colonists refine aluminum, titanium, and silicon from lunar ores shipped inexpensively into space (Streitz and Holmer, 1998).

7.1 DESIGN SPECULATION GOALS

This system is intended to meet a set of specific design goals established to guide the choice of the principal elements of a practicable colony in space. The main goal is to speculate the design of permanent community in space that is sufficiently productive to maintain itself, and to exploit actively the environment of space to an extent that permits growth, replication, and the eventual creation of much larger communities. This initial community is to be a first step in an expanding colonization of space.

7.2 THEORETICAL FRAMEWORK

Houses, buildings and public spaces sensitive to the incidence of information and its development in mechanisms within and with which they relate and interact with one another. The innovation with which the digital world is constructed needs to be carried over into the physical world. Technological advances in effect makes it possible -and with ever increasing rapidly- not only to simulate models of growth but to animate structures, anticipate processes and generate flexible, interactive systems whose definition is based on fundamental patterns/programs and duly processed and transformed messages/data.

The digital world is ushering in -it is still in its early stages- a space rich in embryonic possibilities; a space open to new programs and new spatial definitions born of operative environments/systems ("reactive" mechanisms) that are capable of "reacting" to and "mutating" with reality, and thus capable of "tuning in" to and "acting" in and with it at the same time. This heralds a new period of architecture in relation to other spheres of production, a new phase that will in all probability see the introduction of previously unimagined -or at best vaguely intuited- techniques and formal concepts in every aspect of the construction -and the whole conception, representation, design and simulation- of a dynamic and changing, evolving and elastic space and its connection with the very development of techniques and technologies themselves. These dynamics affirm themselves as merely the "potential" of what is anticipated as a new "phase" among the last vestiges and reformulations of modernity, the most forceful manifestations of which can be envisaged as a new **"advanced architecture"** related to the extreme operativization-both **virtual** and **real** of the new technologies and the assumption of a multiple and as such more complex space-time-information, definitively linked to what has come to be known as the **"digital universe".**

This will be an architecture involved in the conception, organization and design of possible evolutionary systems capable of responding to the

challenges of the new informational environment that is already being anticipated: the analysis and strategic reformulation of a city in equilibrium with and within the territory (and not only of its movements and growths, but also of its infrastructures and relational spaces); the definition of a technical development and an intelligent construction capable of interacting effectively with an innovative industry by means of versatile, combinable systems of production; the application of new operative concepts in the design of an "interface-habitat" (of the residential cell and the scenarios - interior and exterior- associated with it); the assumption of the new eco-media and the relation between these and an instrumental approach to the landscape -and to a possible "new nature"- associated with a (paradoxically) more radical because artificial ecology: the new possibilities of programming and computer animation translated into a possible digital "genetics" of form and a possible definition of simulated scenarios, real and virtual, etc.

How architects resolve the material with the virtual will shape our experience of buildings and enclosed space for the foreseeable future? The problem is not theirs alone. Fundamental concepts are in transition and it is the job of cognitive scientists, new media analysts, and computational scientists to understand the implications for human interactive behaviour (Popma, 1971). I have argued that the concepts of psychological space and place are changing; that the concept of enclosure is changing; that our idea of what is furniture and what is architecture are changing.

Architects, until now, have been able to concern themselves almost exclusively with the experience of spatial structure, functional effectiveness and aesthetic feel. But henceforth they will have to be concerned with information architecture too. That for how people navigate through information space. They will also be linked to how they move around their offices and use the shapes therein. Buildings will forever serve to support and house, but as the digital permeates our physical world the way we experience architected structures will have less to do with the material nature of those structures. The wired world is not the same old world (Kirsh, 2001). DIGI-CITY vision has been created according to NASA researches and studies as the present space technology source. But I have built out my view with the prediction of the future vast technology exchanges.

7.3 DIGI-CITY FRAMEWORK

It is a computer system that contains social and physical way of life. It is the digital and physical interaction environmentt.

7.4 DIGI-CITY DATA: "THIS IS A PROPOSED DATA"

Date of construction:	2050
City Volume:	24 Million cubic meters
City Orbits distance:	300 kilometres from Earth surface
Energy:	Nuclear + Solar Energy
Expected age:	500 years
Earthy Wight:	22 Million tons
Orbit Wight:	00 Million tons
Capacity-dwellers:	12 Million individuals (4 millions families).
Start Capacity-dwellers:	50 families = 200 persons

7.5 DIGI-CITY URBAN

New Method of Construction:

Constructing under zero gravity and with good vacuum it may be practical to form new shells and new materials. Using Robotized Labours we could build the dreams constructions.

Streets:

Light structure Streets are constructed whenever you go, connected

Landscape:

Fibre Optics, laser and virtual 3D. screens landscape structure connected also to the main frame, which leads users or inhabitants order the environment of landscape they prefer, and they will see what needs, and each person will see different view according to some signals from a personal microchip fixed to the human body, this means that you can fly by your car above the pyramids and the Nile river "Egypt" or you can dream that you are flying on the top of the Eiffle Tower "France". Real farm "forest" is an important part of the city; it's a highly controlled farm that produces every thing using the genetic science, even producing new products and new healthy vegetables and fruits. It has many kinds of trees and animals.

Vehicles:

Cars are flying such as "flying saucers" by nuclear power engine; which wireless connected to the main frame. People can move around the city in no time, they could also move out of city with some precautions and permissions to visit other cities around.

NASA space vehicle designs

Walking passages:

It is anti-gravity environment in general, but you can find the gravity = "Earth gravity" inside the buildings, you feel like in your Earth home with all the furniture and equipments, but in addition, all objects and furniture are intelligent and connected to a personal computer system which is connected to the city mainframe. DIGI-City is our future city, orbits in the space.

Recycled infrastructure:

DIGI-CITY is a Recycled, Intelligent and Environmental City with an electronic Brain "Mainframe" that controls every thing. Water gained from evaporating absorbing solar energy using the Sun lighting and heat by electronic cells, drainage system is connected to recycled operation and reused for plants in the settlement. Oxygen is produced from the main part of the city "City Farm".

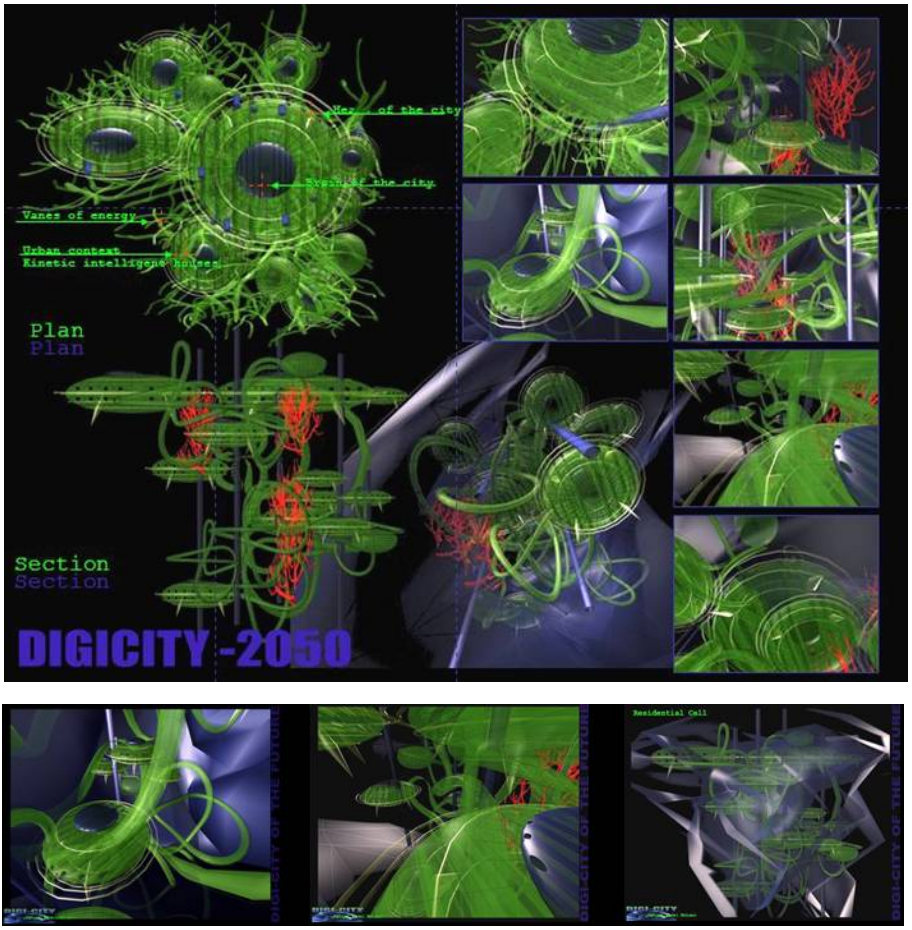
Industries and Agriculture:

The main Industries in our city are Medicines, Electronics and all technical industries for Earth people that need high degree of anti-polluted environment. They are all produced and controlled by technical robots, those industries will be exported to every country all over the Earth. DIGI-City Agriculture, produce the best healthful vegetables, fruits and beans all over the world in this time, it is production is controlled by a very accurate and sensitive technical system with the cleanest environment have ever gained.

Services and civic centre:

DIGI-City Civic Centre is mostly a virtual centre, it contains some physical buildings for social communication as: restaurants and cafes, cinemas and theatres, sports and social club. All services are connected to the city network which is connected to universe network UWL; Universe Web Link. One can use all services through the network and will be delivered to his accommodation cell or unit by another kind of Robots, those services include: shopping, registrations, official documents, entertainments, social

relationships by connecting and viewing any point in Earth using satellites hyper technology or by moving to another city.



DIGI-City Architecture; Author.

City Governorate system:

DIGI-City Governorate is an electronic system controlled by another type of Robots connected to special system, updated automatically. This system has human administration, but they are working as technicians for that system, this system is empty of corruption but could be full of viruses that need technicians to avoid its attacks.

Community hierarchy and relationships:

DIGI-City is a sort of community that has new rules and new kind of relationships not far away from the existing relationships of this electronic age. People now spend most of their time sitting in front of computer

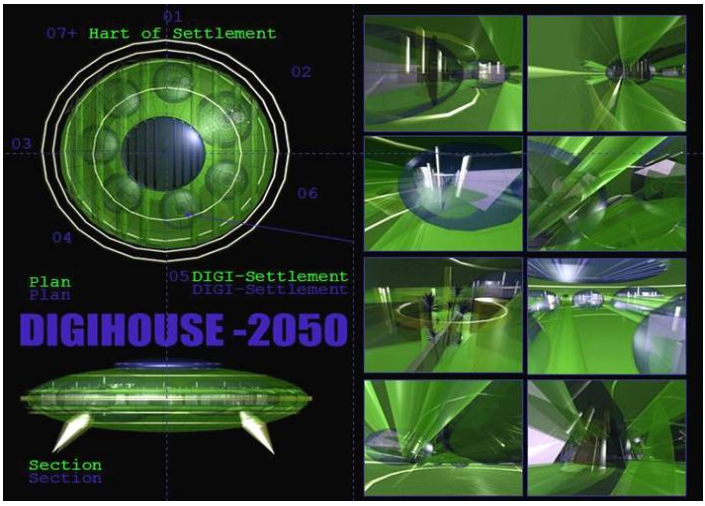
monitors, but tomorrow computers will control human beings, but they will never reach their hearts and brains.

Residential cells = neighbourhoods:

Residential complexes consist of many houses starting from 5 to 50 houses for each cell or neighbourhood, each cell have its heart < "civic centre" and it is Brain < "intelligent services control system". Houses are planned to move from one cell to another, from city to another. A house is a space vehicle that contains a local vehicle which people can use to walk or move inside the city. Cells are connected to each other by energy beams that change its colours from blue to red related to energy absorbed from the movement of people through the urban environment of the city. This energy is one of the energy supplies of the urban environment.

7.6 DIGI-CITY ARCHITECTURE

The "DIGI-City Houses" is thus conceived as an electronic cell, it is a technological environment, oriented primarily at objects, it is a new interaction between the physical world and the digital world, in order to lay the foundations of a new "art of dwelling"-future space city. The "DIGI-House" will not be "a house with a computer"; instead, the house will be the computer. As Neil Gershenfield says, architecture will never be inert again. Walls and ceiling are covered with one of the technological wonders of the 21st century: Phases array optics, it's an intelligent optics connected to the Personal Identification System (PIS). Here is my point of view to the future space house architecture, after solving all problems concerning the space extreme environment. They are three main points concerning Space, Technology and Society.



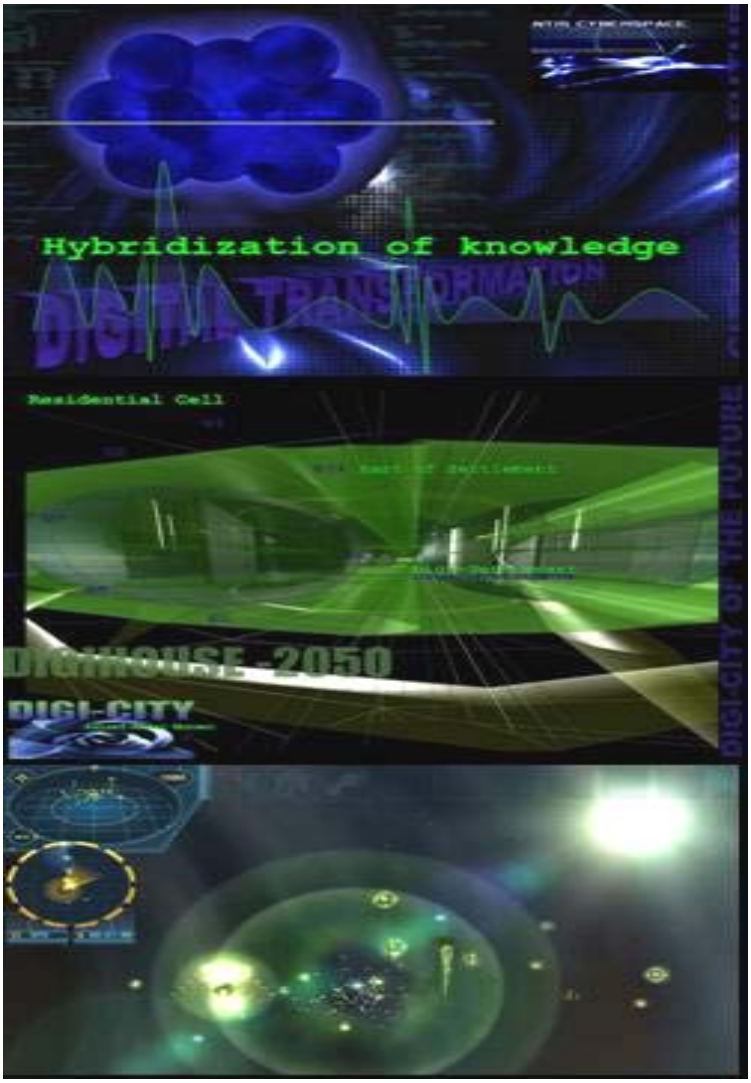
DIGI-House Architecture; Author.

7.6.1 Space

If the home is a place for work, leisure, shopping and rest, DIGI-CITY-House is a micro-city. It should be designed as multifunctional house. It's the real interaction of natural, artificial, virtual and digital spaces. It fits the physical requirements of human beings as it fits to carry out the personal dreams by the personal interaction of virtual world. That can be done by:

- DIGI-Houses "cells" should be designed to ensure a total flexibility of the future Era uses; it's a Data Use House.
- DIGI-Houses is the place where people Tele-work within the system network.
- DIGI-Houses is the place of Leisure, people can play at scale 1:1, virtu-physical playing tools.
- DIGI-Houses have a unique space for personal Vehicle "flying saucer", it's an intelligent vehicle connected to (PIS) and to the main frame, it could select the ways of moving according to the city traffic plan in that moment. It moves with a speed almost the speed of light, it has a nuclear endless power engine, and it flays or moves through light structure streets. All are connected to the city mainframe system.
- DIGI-Houses have off course an immersive. VS "Virtual Simulator" and conference space to live in any place on the whole world, or to connect with any persons or aliens all over the universe.
- DIGI-Houses Kitchen have to be connected to (PIS), all its components are intelligent recycled objects, they feel and obey house keeper "Robot" orders.
- DIGI-Houses Bathroom have to be connected to (PIS) and the Infrastructure Network System (INS), all its components are intelligent recycled objects, each house have one water treatment unit that leads to reuse the used water for planting and supplying the flash units .
- DIGI-Houses Bedroom is the deeming space, you can choose or control your dreams besides you could choose the romantic atmosphere you need to sleep in. All skin layers reshaping the sleeping space are intelligent enough to reflect what you need.
- DIGI-Houses have many real windows to the virtu-physical landscape, and it has also many virtual windows. LS "Land-Screen" leads you to select what you need to see over.

DIGI-House; Author



DIGI-House & Hybridization of knowledge; Author.

7.6.2 Technology

- UWL; Universe Web Link, DIGI-Houses are computers connected to the universe web link network < it's a new way of internet.
- PIS. "Personal Identification System" is the human house interface, which controls the flows of information between the physical and the digital world at the house (cell) or at the city as whole or even at Earth; it's connected to the city orbiting satellites.
- DIGI-Houses are wireless houses. Information's reach objects and spaces using a kind of infrared cells and radiations.
- IO. " Intelligent Objects" and furniture
- INS. "Infrastructure Network System"
- H2H. "House To House" a house does think by incorporate their IPS and incorporating genetic learning algorithms. Houses are related to each other, they could recognize and behave. For example if there is a fire in a house, all neighbour houses start to apply for the emergency proceedings such as: cut off electrical fields, start cooling the exterior skin of the house, collect all flammable objets to emergency case.
- HRS. "House Recycling System" = sustainable house, including water, drainage, oxygen, garbage, food and even electricity could be recycled by a way of reusing the energy of light.
- ILS. "Intelligent Layering Surface". House spaces could modify their size in relation to their activities and energy. It has an intelligent sensitive skin layering, some are virtual layers and others are real and they both construct the real house surface. Those layers could control the energy import or export from a house, it also save the house (cell) from any external environmental changes, besides it gives many types and kinds of meaning and feelings to space users.

7.6.3 Health and Society

- New social relations produced in DIGI-City, the technological systems such as UWL, PIS, IO, and city mainframe are the structure of the virtual social relations in this society. Besides the physical relations gained by the city civic centre.
- Health Care and Medical treatments is going to be natural treatments according to technical specific calculations of personal health evaluation data which stored each hour by (PIS) and then reacts as accuracy orders to the other systems specially the Kitchen system (healthy food and drinks needed in this sutation), besides some physical treatments will be done using the furniture system which it can do it in a specific period.

- Homesickness will disappear gradually by virtual treatments. A period of one age needed to free.
- Food and Water, are always fresh healthy. DIGI-City agriculture in the main farm, produce the best healthy vegetables, fruits and beans all over the world in this time, it's production is controlled by a very accurate and sensitive technical system with the cleanest environment ever existed.

8. Conclusion

This is my vision to the future space life that architects will face; it's a complicated virtual-real clean life. Technology is a vast growth field. Researchers should dream more and more to create new quality of architecture that match electronic media of life. Universe is endless, our minds and creations should be endless in the next era, I believe it will act as real one day.

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