

# Crisis In/Out, Emergent, and Adaptive Urban Organisms

Y. Hadjichristou, A. Swiny, M. Georgiou

**Abstract**—This paper focuses on the questions raised through the work of Unit 5: ‘In/Out Crisis, emergent and adaptive’; an architectural research-based studio at [ARC] University of Nicosia.

Students were asked to delve into state of Art Technologies in order to propose sustainable Emergent and Adaptive Architectures and Urbanities, the resulting unprecedented spatial conditions and atmospheres of the emergent new ways of living are deemed to be the ultimate aim of the investigation. Students explored a variety of sites and crisis conditions seen through their primary ingredient identified as soil, water and air and their paired combination. Within this methodology, crisis is seen as a mechanism for allowing an emergence of new and fascinating ultimate sustainable future cultures and cities by taking advantage of the primary materiality of the sites.

**Keywords**—Adaptive built environments, crisis as opportunity, emergent urbanities, forces for inventions.

## I. INTRODUCTION

THIS paper focuses on the questions raised through the work of the 4<sup>th</sup> and 5<sup>th</sup> year students of the Unit 5 ‘In/Out of Crisis, emergent and adaptive’, an architectural research-based studio of the architecture professional degree at the University of Nicosia, run during the years 2013-2015.

The research focusses on sustainable architectural and urban explorations tackling with the ever-growing crises in its various types, phases, and locations.

The Unit 5’s identity and environment facilitates the students to respond optimistically, alternatively and creatively towards the Global Current Crisis. It also aims at helping the students to create their path of investigation in order to constantly find out how to remake things and environments. Thus it largely comes in alignment with the premises of the cradle to cradle approach, especially by engulfing the remaking the way we make things concept, and its Einstein quotation that the world will not evolve past its current state of crisis by using the same thinking that created the situation” [4].

The issues of the Crises are examined thoroughly with scientific methodologies and in relation to their impact on the production of spaces and urban environments. The Unit meticulously observes, investigates, and discusses the issues that create the crises, take place during their various stages, and ensue as their aftermaths. It then chooses not only to accept their presence as already derivatives of the human

actions, but also to sort of celebrate the opportunity given by their negative impacts in order to optimistically and creatively work towards the emergence of better, unique, sustainable living environments. Mark Wigley’s notion that “Crises are ultimately productive” and “They force invention” intrigued, inspired, and defined the premises of the Unit [3]. ‘Weather and nature are coauthors of the Built environment’ Jonathan Hill states in his ‘Weather architecture’ discourse [2]. The weather is constantly changing and new environments, the subnatures are created which derived from the human activities David Gissen explains [1]. This challenging set of premises triggered innovative responses by the Unit’s students. They thoroughly investigated the various kinds of crisis and their causes in relation to their various types of Terrains. The tools used for the research and investigation were chosen in contradictive pairs to generate further crisis situations: the Re-Used/Salvaged competed with the new, the Handmade rivalling with the Fabrication, the Analogue juxtaposed with Digital.

The approach with always a binary content led the students to follow a path strongly engaging state of Art Technologies. On the other hand, students were expected to have always in mind the social aspects of the community as the core of the investigation in order to manage to propose sustainable Emergent and Adaptive Architectures and Urbanities. The combination of the two counterbalancing aspects of the architectural approach enabled the students to lead their investigations and experimentations towards the emergence of exceptional spatial living environments and urban atmospheres that eloquently render new ways of sustainable living. The unit followed the notion of emergence stated by Steven Johnson [5] as a tour of what are called adaptive self-organizing systems. The systems were seen as made up of many interacting agents that collectively come up with intelligent behavior. The approach did lead to proposing of unprecedented built environments and the emergent and adaptive urban organisms.

The focusing on the social issues naturally entailed the in depth engagement with materiality. Thus, the Unit examined and dealt with the Crises through their Material expressions which in fact formulated the essence of each one of the Crises.

## II. CRISIS ELEMENTS

The main ingredients of the ‘crisis’ projects that the students dealt with could refer to the main ingredients or environments of life: soil, water, air.

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### A. Soil

Definitely, the soil was and still is one of the major environments for inhabitation, starting from the primitive human and animal shelter the cave. The recent threatening expansion of the deserts due to the rapid climatic changes forces us to invent new ways of inhabitation.

The “Inverted utopia: lost things in the sand” project proposed by P. Vasquez poetically addressed the problem in the small town of Araouane, Mali, the last crossroad of the Sahara (see Fig. 1). Existing water wells and the existing 200-year old ruins, which have been buried in sand for decades, inspire inversed vertical structures. By seeking to preserve the archaeological treasures of the village, the proposal focused on creating a new living underground network that serves to protect it from catastrophic sand storms. “Inverted utopia: lost things in the sand”, weaves a series of tea-houses, a library, as well as communal and private spaces together, transforming once lost artifacts and transcripts into a complex underground labyrinth. New technological advances in sand solidification are elegantly used to support the inversed vertical structures, connect them and generate organic forms that complete the orthogonal-like existing structures in a unique playful and atmospheric environment. The proposal is grants water access to the inhabitants deep within the sand. This allows for the creation of underground gardening areas with punctured light beams generating photosynthesis deep within the earth’s core.

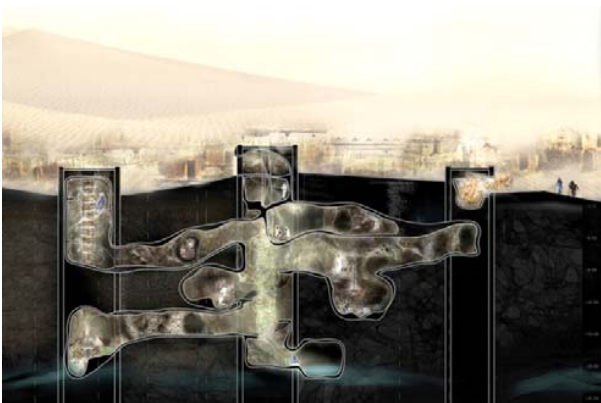


Fig. 1 Student Project, “Inverted Utopia: lost things in the sand”

The soil, as the solid material of the earth of course started to be altered by human actions in various ways including the unbelievable bulks of waste.

The C. Pariza’s “Do\_MESS\_stic Implementator” project deals with the contested and misused spaces of Lakatamia Park, Cyprus and its old radioactive battery factory replete with illegal waste disposal, vandalism, and graffiti (see Fig. 2). The proposed ‘Drop-Off’ Community Center instigates a synergy between graffiti artists and residents aiming for the production of useful public installations made out of recycled materials. In other words the collected ‘mess’ of the area generates a creative hub where interesting and diverse activities take place.



Fig. 2 Student Project, “Do\_MESS\_stic Implementator”

### B. Water

The immediate water body that surrounds all the continents and covers the 70% of the earth surface, which might as well thought as the origin of life in various ways, is under an alarming threaten. This escalating polluting tendency can be most evidently noticed in the enclosed seas such as the Mediterranean.

The T. Ragkousis’s “Marine Debris Up-Cycling Center” project deals with a dilapidated area in Piraeus in Greece containing a nonfunctional port and a silo (see Fig. 3). It aims at collecting, stacking, and treating the expanding marine debris from the Mediterranean Sea taking in advantage of the already established ship network on the site. Organism-drones attached to the ships will collect the abundant marine debris from the routes to the islands. The marine debris itself, the process of its treatment and the produced recycled structures, transform the derelict infrastructure turning it into a unique interactive urban experience and a vital urban booster of the neglected site and its surroundings.

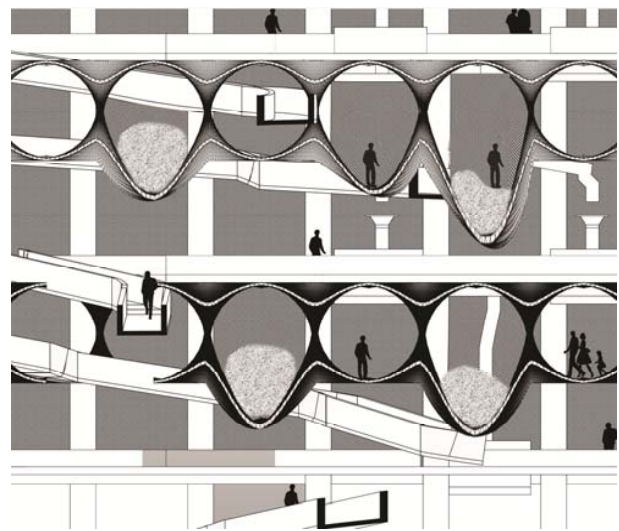


Fig. 3 Student Project, “Marine Debris Upcycling Center”

The salt lake of Larnaka in Cyprus actively participates with its pristine beauty in the urban-scape of the town. The C. Vasiliou’s “Salt Lake Urban Games” project deals with engaging urban activities in the process of cleansing its polluted water environment from the adjacent airport and the busy roads. State of the art technology is incorporated in mobile living structures that can be used by the inhabitants as an urban, social activity. The engagement with this activity

which is thought to be pleasant and enticing to various groups of people will trigger mechanisms of cleansing the salt water body of the lake. On one hand, it aims at turning the salt lake to a vital urban, social space while on the other hand it will safely accommodate the migratory birds.

#### C.Air

In parallel to the soil and water, the air's pollution is aggravating in even worse rhythms. Besides the CO<sub>2</sub>, various emerging natural phenomena cause diverse emissions.

"The Plume Project" derived from such a phenomenon that started in 1962, when the underground coal mine of Centralia, USA caught fire (see Fig. 4). The small town literally became devastated by the flames and smoke turning it to an uninhabitable earthy-hell. "The Plume Project" created by G. Hadjimatheou and A. Tarkasi, takes advantage of the alarming crisis by inflating an elevated cloud-like, ethereal series of capsules, utilizing cutting-edge technological devices. Researches and Inhabitants not only find refuge and they manage to survive and even prosper in this unbearable environment due to the process of the captured plumes of smoke and heat. The technological entertainment with the polluted air did aim at not simply substitute a bearable living environment. Rather it resulted to unprecedented spatial conditions serving the filtering of the air by utilizing various spatial arrangements functioning for different purpose of filtering each one of them. At the same time the inflating structure and the endorsing mechanism managed to control the temperatures and offering a nebulous, floating and almost dream-like living environment. The emergent urban scape, like a living organism, shrinks and expands, multiplies its layers, changes from opaque to translucent, gets compact or fragmented depending on the new ever-changing climatic conditions of the site. The resultant living experience in these new urban structures solves for the uninhabitable conditions of the site, merges with the air scape of the site, changes together with its ever-changing conditions.

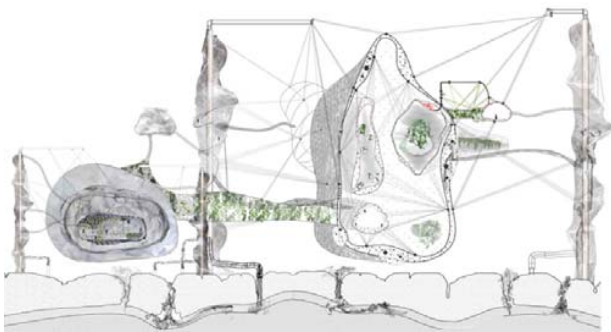


Fig. 4 Student Project, "The Plume Project"

#### D.Air and Soil

The soil might keep various surprises for the safety of the human inhabitation. There are moments that the inhabitation on or even under the soil is impossible anymore. The escape to the air can be a unique alternative for the continuation of the inhabitation of the endangered site.

The menacing smoke and noise in the heart of the Greek capital Athens makes the peoples life unbearable. At the same time, it enhances the decaying process of the concrete structures, which is the major element of the buildings of the city, ringing the alarming signals for its time limit. These exacerbating conditions inspired the 'reuse, remake, and mutate' of existing material by the utilization of cutting edge technologies. The state-of-art processes enable the found, old materials to be recycled and transformed. The project succeeds in recreating innovative inhabitation and other activities creating new urban qualities located both over and underground and in green filtering zones. Insertion of public space, greenery, and light, qualities that are lost in the city generate new emergent atmospheric spatial conditions. These humane urban qualities are carved by the t. Ragkousis's "Trashformer" project within the existing rigid built environment, while it grows and expands into the surrounding neighborhood like a living organism (see Fig. 5). Likewise the unstable state of the soil in the earthquake regions requires new 'topographies' for the emergent living environments.



Fig. 5 Student Project, "Trashformer"

In the earthquake torn town of Crevalcore, in Italy, the E. Mitsiou's project "Parasitizing the Void: Post-Quake Vision" proposes to implant 'urban branches to help restore the city over the ground towards the air (see Fig. 6). Inspired by the transformation of the interior courtyards with cultivation practices and the seasonal gastronomic festivals, a series of 'urban branches' operates as support structures growing upwards, activating the existing 'ruined' old buildings. The lightweight skeleton stretches and leans like a seed, which is dropped, grows and parasitizes the remained built environment. It embraces the traditional courtyards and regenerates the notion of the skin, providing an abundance of aesthetic and spatial qualities, which respond to the ever-changing programmatic requirements. An elegant dialogue with the surviving architecture takes into consideration issues of memory, heritage, development, and possibilities of upcoming disasters. It raises all these cultural and social treasures of the local settlement in the air to safeguard the



continuation and the evolvement of the earthquake bound cities.

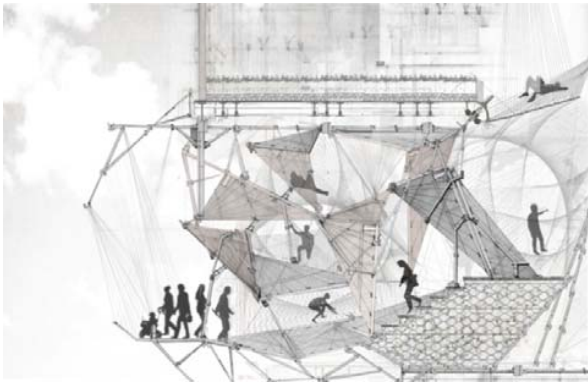


Fig. 6 Student Project, "Parasitizing the Void: Post-Quake Vision"



Fig. 7 Student Project, "JUNK-e Rehab"

#### E. Soil and Water

The soil, as the solid material of the earth of course started to be altered by human actions in various ways which definitely affected the underground water bodies. The electronic waste is becoming one of the disparate new solid materials that start mixing and polluting the actual soil with water on the immediate surface of the earth.

In the village Guiyu of the Guangdong province in China, the electronic waste has been described as an E-Waste Nightmare by Greenpeace since it has caused several problems to people's health and environment. The village became an informal recycling space for any kind of electronic devices. Many of the heavy metals and the toxics that are included in this kind of equipment have been contaminating the soil and the water. This has also resulted in the terrible pollution of drinking water which leads to the deaths of the majority of children as well as the poor health condition of the rest of the citizens who work there. The 'JUNK-e Rehab' project by A. Tarkasi and G. Hadjimatheou deals with the e-waste as an alarming factor of the pollution of the soil and the water due to the rapid increase of the population and the development of technology (see Fig. 7). The project took this 'opportunity' as a great challenge to search for diverse architectural solutions and to create innovative materials out of this kind of waste. The treatment of the solid e-waste led the engagement of technological processes and the assortment and reuse of the masses of the processed and 'cleaned'

material as the main ingredient for the living conditions of the inhabitants. The adopted technologies also refrain from any further contamination of the water resources, providing a healthy environment. Thus, new building typologies and urban infrastructures are proposed to provide the people their living environment out of the remains of the abundance of the e-waste.

#### F. Water and Air

The flooding is a parameter that forces people to seek for other environments to safeguard their living. The soils might be prone to flooding disasters, therefore the air might be the saving environment for maintain their living during the crisis' time.

The P. Vasquez's 'meta/ daptic' project deals with areas that are in constant risk of flooding (See Fig. 8). The recent devastations due to the flooding in Quillabamba city in Peru called for immediate interventions to allow the city not only to survive but also to enhance its own identity. Thus, the project aims at celebrating the seasonal cycles which are one of the vital elements of the uniqueness of its people and the everyday life, and to perform as a generator of a safe environment for the maintenance of the social structure during and after the 'flooding' crises. A beehive like infrastructure with tensegrity technology out of the available bamboo is developed to allow the settlement rise in the air. The proposal provides the enduring of the social activities during the crises seasons within Quillabamba, bridges the city over the river and offers accommodation to the actual beehive cultivation. The local techniques, materials, and craftsmanship are engaged in order to allow this growing social shelter made and altered by its actual inhabitants.



Fig. 8 Student Project, "meta/ daptic"

The currently sinking and constantly flooding city of Venice requires an immediate response. The project, "Conundrum - The New Uniqueness of Venice" attempts to regain lost footprints and targets the evolution of the uniqueness of Venice into a new uniqueness of an emergent Venice growing in the air.

### III. CONCLUSIONS

Unit5 sees crisis as a direct or indirect derivative of human activities. Gissen suggests, "...we promote a dialectic that

radically rethinks both architecture and nature” [1]. Contention rises out of the results of the close interrelationship of humans and their natural environment. In Unit5, this built---environment is strained and tested by the ever---increasing extreme shifts in weather conditions. Nature is violent and after an ‘attack’ often leaves us with nothing but ‘traces’ of the once existing ‘intact’ built environment.

The crises have their own environment. Unit 5 identifies this environment with its actual materiality seen it as the soil, the water and the air, that is the primary ingredients of the earth. In order to manage all these kinds of crises, there is a need to drive our explorations to the activities that essentially tackle with these primary materials.

The living environments need to safeguard their initial materials or even shift their accommodation from one material to the other, yielding the emergence of new unprecedented, sustainable living environments.

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