

Entropic Migrant Conditions

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Mobility as an impetus for architectural design processes has many implications including its capacity to transform the conception, production, fabrication, occupation and interaction of the architecture, its occupants and its environment. The notion of designing an architecture which responds dynamically to its environment is one which must be investigated and defined through various modalities in order to reveal new and emergent models. Mobility in architecture refers to a dynamic performance which is defined by what the architecture does, how it acts, its cultural, socio-economical effects and its aesthetic value. It is a concept which is applicable and can be modulated at many scales, within varying material conditions and in response different conditions. Mobile architectures possess dynamic characteristics which include but are not limited to the ability to be adaptive/adaptable, flexible, responsive and deployable.

Adaptive/adaptable refers to the ability of a *body*¹ to physically change whether through inherent material properties or specific structural attributes. *Flexibility* also requires a capability to change but refers to motion which resides within a defined range with an identifiable limit which is based on readily flexing without failure. *Responsiveness* is a qualitative reaction of a body or system to external or internal stimuli which results in changes which may be irreversible. *Deployable*, describes mobility as an implementation and refers to a systematic, strategic distribution and organization of multiples bodies, elements, figures which develop some form of interconnectedness of relationships which can be understood as a network.

The intent of the projects developed within *Entropic Migrant Conditions* is to explore the potentials of mobility in architecture and invent dynamic topographic, geometric and programmatic architectural organizations in search of a new typology which sustains the capacity to accommodate oscillations which arise from existence within a contemporary environment. Rather than anticipate a decline in the role of mobility specifically that of the car, between home and work, the premise of the two projects, detailed in *Entropic Migrant Conditions* is one which capitalizes on and intensifies the notion of mobility.

Entropic Infrastructures and the *EM-House*, are projects through which I propose a new model for the dwelling and its relationship to the development of the *contemporary landscape* as an emergent, performance driven and user defined network.

"Landscape emerges as a matrix or framework for development, as living material in the functional sense, as a site of production, as structural tissue that supports often contradictory programs."²

The *contemporary landscape* is a network which as it exists supports specific relationships between various defined zones of occupation i.e. residential, commercial, business, farming, industrial, recreation and/or open-space. It has mainly been defined by intense suburbanization and increasing individual mobility, essentially extending the space between these defined zones of occupation. As a result, this type of divisional organization privileges an inherently static built environment thus failing to accommodate for change and variation and therefore increasing the frequency of and travel distances of the individual.

Each of these occupational zones characteristically, organizationally and functionally differ, residential zones are designed to sustain activities associated with personal lifestyles and therefore consist of elements which are/should be invariably linked with the identities of the user/occupants.

"The American dream" is a term that was first used by James Truslow Adams in 1931 in regards to the right of citizens of every rank feel that they can achieve a "better, richer, and happier life."³ This term has also been interpreted and associated with the individual's strive toward home ownership, and the rise of the acquisition of a "home as a status symbol which separates the middle class from the poor."⁴

The majority of residential housing models are quasi-optimized, utilizing repetitive layouts, partially in an effort to streamline construction, striving for uniformity and standardization, which extends from solely material and methods of construction through to affect the visceral experiences of housing environments. The imposition of a framework which is generic, places undesirable limitations on the users failing to accommodate for change and variation which is inevitable and rapidly occurring.

Entropic Migrant Conditions (EMC) is a term I use to describe an architecture which employs a series of design strategies that aim to introduce dynamism and locate fissures in apparently stable organizations, hierarchies and networks that typically developed equilibrium through habit, ritual and code.

By performing a series of investigations at multiple scales to developed these inextricably linked projects, *Entropic Infrastructures* and the *EM-House*, I envisage the contemporary landscape and built environment as a performative network which is adaptive, flexible, responsive, deployable and multiple. These investigations occur at various stages utilizing both analog and digital methods of analysis through the lens of the specified framework; through an oscillation between three scalar perspectives defined as follows:

Body: Refers to the main portion of an assembly-one which is responsive and adaptable to changing environmental conditions and programmatic/spatial needs.

Surface: The surface mitigates the relationship between the body and the landscape-it is flexible and multifaceted and its role is as a mediator between the inside and outside, public and private, secure and vulnerable. It protects from the elements, has the capacity to induce cultural phenomenon, it can communicate information and respond to interaction. **Landscape:** The landscape provides continuity-an infinite boundary continuous and blurred conditions that extend from the body, to the surface, to the site and to the city. It redefines the relationship of the body and surface to the landscape by substituting demarcation with unanimity creating zones of influx and variability.

The projects are positioned in the space between habitation and transportation attempting to transform the notion of shelter- the dwelling, a ubiquitous component featured in contemporary landscape, by examining its relationship to the dynamic patterns of the activities and experiences related to human habitation, occupation and migration.

Through both projects I explore conditions perpetuated by constant mobility and the potentials for integrating the infrastructures necessary to accommodate this continually changing condition essentially revising the notion of architecture as inherently static in exchange for dynamic organization based on cultural and environmental flux.

With a convergence of telecommunication and data communication, advanced digital applications have relied on seamless wireless networking and have thus become inherently mobile. Similarly, the social structure of our time is heavily dependent on the ability to efficiently and easily move while remaining 'connected' and having access to and exchanging information instantaneously. This condition favors nomadic lifestyles which are perpetuated by the act of 'commuting' as part of daily life activities; the mediator between work/play, home/office, public/private, and efficiency/duration and has the capacity to blur the existing boundaries which have stabilized the division that subsists between these zones.

One of the main ideas explored in *Entropic Infrastructures* is the contemporary landscape and the issues revolving around the existing

infrastructural organizations and their inability to efficiently respond to influx in population and shifting densities due to increased migration and mobility of users. The proposed network is designed to anticipate temporal change and is able to adapt and transform at various scales reforming successively as emergent organizations. The *Entropic Infrastructures* proposal integrates an organization which is initially undefined but one that emerges from an interaction between the individual and their landscapes respectively.

As performative requirements change and shift, the contemporary landscape re-configures its network to accommodate that change; this is not suggesting that it must be able to exist in completely kinetic state but argues against the opposite by suggesting an existence based on the potential for multiple states. The resulting architectures can be described as *formless*, a potential for varying networked aggregative organizations comprising of multimodal structures which have the ability to be adjusted and respond to change.

***L'informe*: Formless?**

L'informe is not a concept(s), it describes an operation of de-categorization and destabilization. Although it remains untranslatable, *L'informe* can be understood in architecture as remaining in a state of 'formlessness'.⁵ It can be interpreted in this context as an operation for the subjugation of form through a continuity or perpetual maintenance of potentials or "lack of closure" of a system.

Entropy, one of George Bataille's initial postulates, suggests that there is a constant and irreversible degradation of energy in every system that leads to a continually increasing state of disorder and non-differentiation. Entropy is not about chaos, it is a negative movement, presupposing an initial order followed by a deterioration of that order.

Within the project for the *Entropic Migrant Conditions*, the stability and permanence of urban life is uprooted and set into motion. The aim is to destroy the capitalist notion of urban life, i.e. "property value" and the low-grade, low-tech, labor-intensive, inflexible creation of the phenomenon. The urban landscape is then to be configured based upon an intensification of connotatively negative notions of the migratory patterns of urban sprawl.

Entropic Infrastructures

Entropic infrastructure is a project which employs the notions of George Bataille's *L'informe*, as an operation in opposition of a form. This idea is interpreted as the ability of the contemporary landscape to transform in order to accommodate influx and varying rates of change in density and informal organization. Conceptually, it maintains a constant potential, an anticipatory energy rather than definitive zones.

Entropic infrastructures proposes a conceptual model of future contemporary landscape patterns, it addresses two issues, the first, '*live points*' requires a reconfiguration and relocation of municipal/public services into specific locations within the network, each defining its zone of influence. The second, is a material and tectonic revision of the idea of a 'building foundation' which rethinks and reuses the notion of mass or thickness in the slab as being a '*light weight platform*' with integrated utility connectors with the capacity to tap into the network supplies. The new model proposes energy nodes called "live points" which influences the emergent organization and growth patterns over time, the patterns are geographically aggregated and non-linear and are dependent on the locations of these live points within the network. The proposal promotes energy efficiency and self-sufficiency through a contemporary means of distributed energy and utilizing districted heating/cooling. *Mini-grids* or *micro-grids* distribute energy through a set of generators and load-reduction technologies which have the capacity to satisfy the electricity demands of a localized group and can significantly increase efficiency by transmitting electricity over shorter distances reducing the cost of distribution.⁶ This contrasts the existing which exhibits characteristics such as sprawling land use, parallel growth and linearity, energy dependency, and energy waste.

The *light weight platform* redefines the typical idea of a foundation as being a heavy, underpinning which grounds, instead this EMC prototype platform is lightweight, hollow, and translucent and touches lightly on the ground reducing its environmental impact and use of energy. This lightweight platform structures the chassis and has the infrastructure required for accessing and providing enough power to sustain electricity for lighting, channels to col-

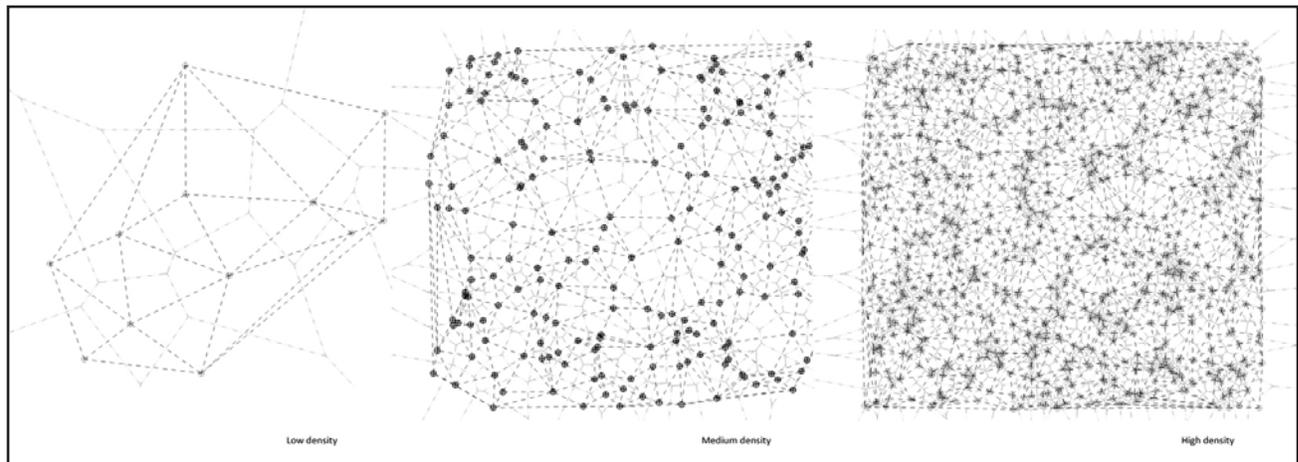


Figure 1 Network Diagram (Fareh Garba)

lect/dispose of waste, and the connection/channels to access public water supplies integrated within its depth. The overall organization operates as an open system by physically releasing the architecture from the ground and elevating it atop a platform which serves as a foundation for the structure and contains some infrastructural services. The emergent network organization is based on the tactical and strategic location of the *live points* within the network which provide utility connections and can be accessed individually. There is a direct relationship between the locations of these *live points*, their zones of influence and the varying local densities that emerge within the network. (Figure 1)

EM-House

EM-House is a research project which deals with the individual, potentially autonomous, flexible, programmable, structure defined by the relationship between the body and its container. The project acts as an operative device which renegotiates the space between the body and the building and interrogates the normative function and size of the dwelling in contemporary culture.

EM-House collapses the spatial relationships between habitation, transportation and the landscape and is materialized in the project through operations of hybridization, inversions, intersection and extensions of program, occupation and use. Daily activities that were previously limited to or associated with specific places shift into a non-hierarchical system.

The *EM-house* is a hybrid condition which can accommodate variation in spatial usage and respond to changing environmental conditions and topographic territories; it is comprised of a 'flexible' chassis as the main structure which defines the spatial and structure performance, it is designed as an open triangulated structure which allows for its members to be adjusted through rotation and horizontal sliding or slippages permitting this prototype to be transformed and reconfigured efficiently within the same framework. The structures can be situated in spatial configurations which vary from open (canopy-type) forms to completely closed living spaces. (Figure 2)

Design Parameters

As a point of departure for the project and as a generator of a series of design parameters employed in the design process, I utilized concepts and ideas drawn from the Dymaxion inventions of Buckminster Fuller; a key contributor to the discourse of mobility, mass production and architecture.

he Dymaxion term was invented in approximately 1928 and was derived from a combination of three abbreviated words which had been used frequently by Buckminster Fuller when describing his inventions: "*dynamic maximum and tension*". Buckminster Fuller's Dymaxion inventions were based on the concept of optimization through streamlined, aerodynamic designs and efficient and innovative material use and integration. Within the series, he invented the prototypes for the Dymaxion Map, Dymaxion House and Dymaxion Car.

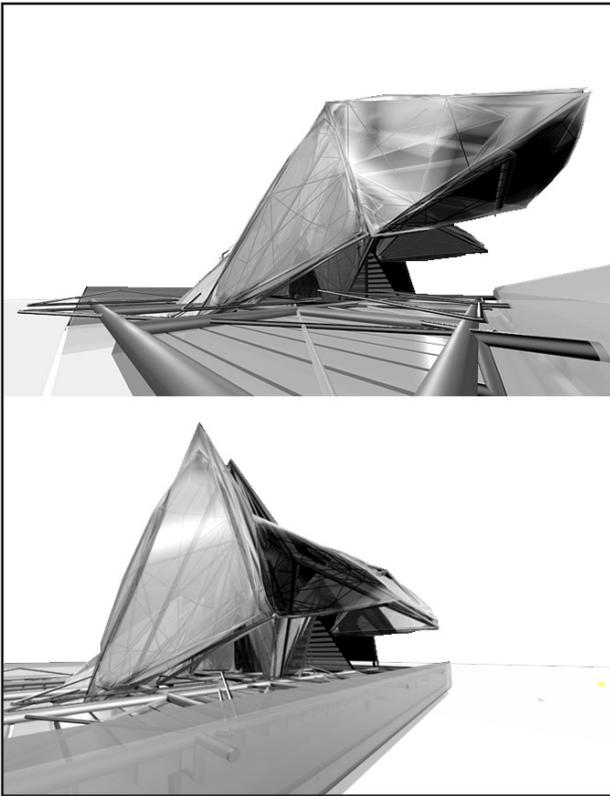


Figure 2 EM-House (Fareh Garba)

The Dymaxion Car was a teardrop-shaped vehicle designed to achieve maximum output and service with minimum material use. Its concepts of production, assembly and performance were instrumental in the development of design considerations relevant to conceptual development of the EMC projects.

Employing a recombinant process, I examine and utilized the *Dymaxion* concepts and the operations of *L'informe* to produce a taxonomy of performative parameters as specifications for the design of the EM-house. This taxonomy is intentionally discontinuous, documented in a format similar to that of George Bataille's 'critical dictionary'; which was a journal Bataille created "as an act of 'sacrificial mutilation of the classical dictionary...instead of being organized by meaning the *critical dictionary* was organized by tasks of words, trying to release the irruptive energies. This release often involved a play between the critical dictionary entry for a word and its accompanying image." The following describes the design parameters by which the EMC projects were conceived:

B: Belly wall: The belly wall is a surface which covered the underside of the *Dymaxion* vehicle, originally conceived of as three aluminum formed sections, which were designed to overlap but without contact and be mounted flush providing a smooth underside for the car while leaving small gaps between each piece. The way in which this belly wall met the body allowed the three parts to slip past one another in accordance with the action of the springs in the chassis; this also made it possible for air to move through the body of the vehicle to reduce the amount of drag. While it was made from metal, Fuller specified an option on his patent drawings which proposed the belly wall could also be made of a fabric. The EM-house proposes a conceptually similar assembly using the idea of the belly wall to develop a double layered flexible fabric skin with integrated reveals which would allow light and air through, even more critical to the EM-house is the idea that the entire skin would act like the belly wall responding to the movements of the flexible chassis. (Figure 3)

M: Maneuverability: Originally, the *Dymaxion* concept car was controlled by a single, rear wheel steering which made the operation of the vehicle counterintuitive to drivers and led to the speculation that it was the cause of an accident involving the car, killing its driver and essentially putting a stop to the production of the vehicle. The EM-House incorporates dynamism with a flexible chassis design and through intricate detailing of points of rotation within a single triangulated structural system, the EM-house has multiple points of rotation and slip which are all interdependent and can be adjusted for various conditions becoming more refined and specific. This structure, is designed as the main body of the EM-house, the chassis builds in a redundancy of elements which can serve as structure and create unique spatial conditions. (Figure 3)

G: Gravity: The center of gravity in a static object is known and remains constant while in a dynamic object(s), it must be continually redefined. Each component in the flexible chassis has a center of gravity which is dependent on its own orientation relative to that of its adjacent structural members and the system as a whole. The parametric nature of this framework is advantageous for maintaining structural stability.

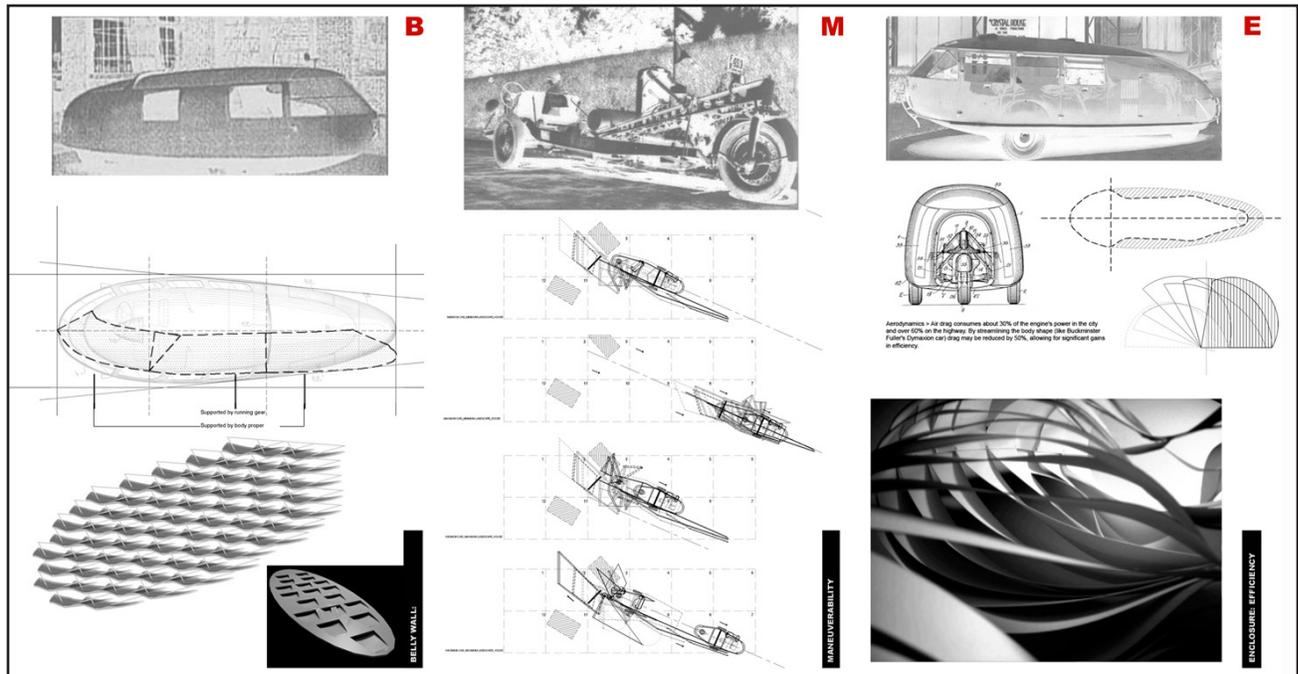


Figure 3 Performative Taxonomies (Fareh Garba)

R: Rotation: The ability of the Dymaxion Car to make a 180 degree turn on its own length was the premise for the flexibility of the structure. Each joint between the components of the framework rotates 180 from flat to completely upright at 90 degrees, this defines the limits of the structure. The components are all the same size and shape creating an equally parametric relationship to one another which is necessary for its framework to be maximize its ability to be reconfigured and adapt to multiple spatial configurations.

E: Enclosure: The enclosure of the Dymaxion concept cars was originally constructed of canvas and aluminum, it was designed to be lightweight and aerodynamic in order to drastically reduce its fuel consumption when compared to other vehicles its size. The EM-House is designed to be a lightweight, compact and easy to assemble dwelling; the skin is double layered, its first layer acts as the water-tight layer and consists of a lightweight, durable architectural fabric which allows the transmittance of daylight and is flexible enough to be folded and tensioned to the structure. The second layer functions as a screen to diffuse daylight.

A: Axial Section: The body of the Dymaxion car was designed so that every axial section had a full streamline contour and each were evenly spaced

along its length to enclose the entire chassis and wheels. Each section was tapered to fit the streamlined teardrop shape of the vehicle. The EM-House is supported by a flexible chassis, composed of equilateral triangles which control the shape and stability of the its body, the spacing between these members can be adjusted because of the redundancy of members within the chassis and makes it possible to be adaptable without compromising structural stability.

R: Resistance: A water-tight roof window was provided on the Dymaxion Car to give the driver a view to the rear of the vehicle, it also was equipped with a rearward open hood to avoid wind resistance. The idea to slightly lift the skin from the body of the vehicle was reinterpreted in the prototype as a double skin which allows water and wind to flow between a rain screen layer and the water-tight skin. In doing so, its resistance to lateral loads is reduced significantly also contributing to its stability given the lightness of the structure and its delicate relationship to the ground plane.

E: Efficiency: The Dymaxion Car required aerodynamic efficiency, energy efficiency and material efficiency, the EMC prototype strives to maximize its potential programmatic, spatial, environmental responsiveness with minimal dimensions, mate-

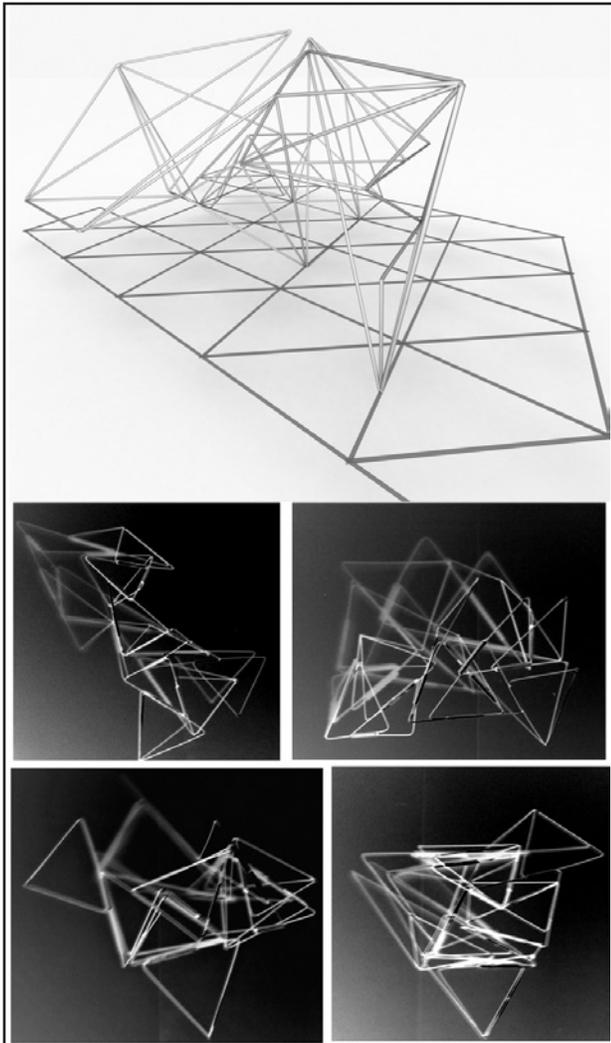


Figure 4 Flexible Chassis

rial use and energy consumption in production and transportation. The prototypes seemingly excessive material use in its structural model is offset by its performative efficiency.

C: Chassis: The Dymaxion Car went through several iterations; the first concept car was constructed with a heavy two frame chassis while the second had a lightweight three frame chassis. The relationship between the structural capacity/resistance, size, shape and weight of the chassis was critical to vehicles performance. The EMC prototype maximizes its potential chassis configurations by incorporating multiple-plane equilateral triangular frames which are arranged to slip and rotate along their associated axes, this flexible structure exposes both the potentials and defines limitations

of the system depending on the size and number of triangles in the framework and the number and location at which they connect to one another. This framework model is a repetitive yet parametric and infinite system. (Figure 4)

U: Useful space: The interior space of the EM-house is continuous, the redundancy in its framework is evident and can be used to divide the space if necessary but the intention is to provide enough space to live comfortably. The prototype will require the user to abandon their normative or typical notion of living space. It is compact and modular essentially reducing the amount of living space within the structure to the minimum, its premise is one of 'proving shelter', integrating the technologies of an increasingly mobile, wireless lifestyle, with constant access to information through virtual networks and the embracing trends towards smaller more compact products with increased functionality.

In the context of building production, the *EM-House* adopts processes from the automobile industry's streamlined production, fabrication and assembly techniques. The project represents an alternative to existing residential construction practices and techniques, it is not oppositional in nature, but suggests that by applying the logic of Dymaxion to these situations of habitation, it repositions prefabricated housing as a desirable option for contemporary living thereby affecting the demand for these techniques, dramatically reducing the issue of construction site material waste, and construction time.

The majority of its assembly process takes place in a controlled factory setting producing it in sections which are compact enough to be transported to its location, where minimal assembly would be required for its installation. The flexible chassis is designed to be flat packed and stacked. With this change to the process of constructing dwellings; architects can tailor the product utilizing the same method of fabrication within a reduced amount of time and labor required.

The EM-house is reliant on the necessity for a new living model which would replace the existing models of prefabricated and/or mobile architectures and dispel their associated, often negative connotations. The prototype of the EM-House considers the social and cultural relevance

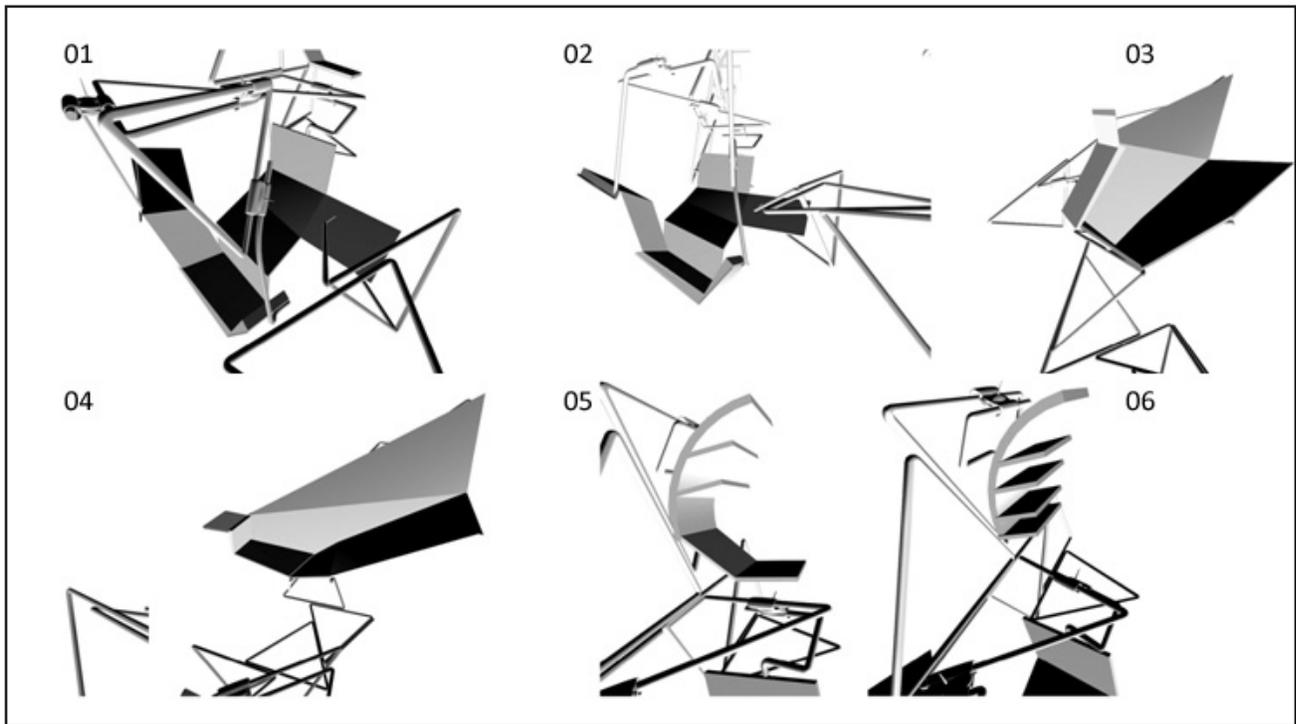


Figure 5 Living Options (Fareh Garba)

associated with and placed of the aesthetic quality of the dwelling and the need for the users to have the ability to have some control of its appearance.

The proposed “living options” can be customized for each user and/or selected from a catalog of basic configurations. Similar to the consumer options available when purchasing a new vehicle, the EM-House is associated with these “living options” which replace some of the functions of typical pieces of furniture necessary for living. These options are designed to be connected to the main structure once it has been erected and are also based on a triangulated structure. (Figure 5)

Existing municipal zoning laws often keep the informal or non normative dwelling hidden from view, segregated from the more normative aesthetically pleasing dwellings, but the EM-house strives cater to users who are increasingly in search for affordable, sustainable and aesthetically pleasing dwellings.

“With the rise of zoning as a primary tool of planning, it’s often the case that manufactured homes exist as a separate homogenous entity...Local codes have specified in the past that manufactured housing be located in less desirable areas – the other side of the tracks or low-lying land, down by the river.”⁸

The *Entropic infrastructures* and *EM-House* projects propose new ideas at various spatial scales, a macro scale dealing with larger systemic issues as a critique to previous ideas such as the ‘factory under the sky’⁹ proposed by William Levitt. The micro scale re-envision the structure- its production and performance. The Dymaxion Car, Dymaxion House and several other existing manufactured housing concepts are based on mass production processes which are efficient, low in cost and reduce construction waste. When a similar process is applied to the production of the contemporary dwelling, the results may unfortunately lack two extremely important factors: an acceptable aesthetic and the provision of substantial options which give the user the ability to individualize the product.

“Mass customization is a process which does allow for a high degree of individuation and a certain kind of unpredictability in the line of production that takes advantage of the efficiency without necessarily producing the same product.”¹⁰

Although the EMC project proposes a quasi-utopian condition for our contemporary landscapes and shelter, these structures may also be deployed as emergency shelters, as in-fill for urban voids and even be located on rooftops and within existing structures.

These projects described above explore the potentials of integrative advances in building materials, the production of contemporary dwellings and landscapes. They provoke thoughts on how architects can position themselves in industry as participants in innovative research and practice and no longer solely as a service profession, offering a home as an attainable product to its consumers. I envision this premise will have a profound effect on the way architects participate and collaborate within the building industry and produce novel effects which affect and transform culture.

CONCLUSION

George Bataille argues that efficiency and excess exist at once, the energy supply to any system is in excess and is expended to support its processes but once the system reaches its limit it can perform unpredictably and produce results which are emergent and unanticipated. The research is motivated by the notion of excess and its potential for instigating a shift in the relationship between domesticity, environmental behavior and the contemporary landscape.

ENDNOTES

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