The Groupe d’études d’architecture mobile or GEAM is known for its designs that have often been described as “utopian”. This interpretation makes a valid point insofar as many of the group’s most ambitious projects have never been realized, and their aim was, first and foremost, to scrutinize and criticize the contemporary conditions of architecture and planning. But though utopian, GEAM’s projects had strong ties with the “real” world. They were embedded within national planning debates and loaded with assumptions about the society and technology emblematic of the times.

Even if the group’s members were acting in different locations in both Eastern and Western Europe, they followed similar interests. They shared an interest in biological systems and cybernetic techniques, as well as in the models of humans, society, and space these techniques were associated with. In fact, the intermingling of social ideals with bio-scientific metaphors and models became a main feature of their architectural and utopian project. In “bio-technique”, as the GEAM member Oskar Hansen called it, the idea of a mass society was questioned through more heterogeneous models, and conceptions of modernist space gave way to new images and imaginations of “environmental” design.

1. Individual Mobility
GEAM was founded in 1958 as a loose network of architects living in France, Germany, the Netherlands, Luxembourg and Poland. Its beginnings are to be found in the aftermath of CIAM 10 that took place in Dubrovnik in 1956, where some of its first members, Yona Friedman, Günther Kühne and Jerzy Soltan had met. The members’ professional ambitions and their interest in the theoretical basis of architecture had imbued them with the will to participate
in international debates, but as CIAM had entered a crisis and the emerging Team Ten followed a restrictive line of membership, GEAM originated as a distinct group with a more technologically oriented profile and the intention to correct “rigidities” inherent in contemporary building practices through their concept of mobile architecture.¹

In this essay I would like to focus on designs by Frei Otto, Oskar Hansen and Yona Friedman. These architects had lived in different European and non-European countries by the time they became members of GEAM. By then, they all had directly experienced the effects of National Socialism and Hansen also of Stalinism. Most of GEAM’s members had also faced forced dislocation or detention in the war and the postwar period. In the 1950s, they were promoting a favorable idea of mobility, their professional practice was transnational, and they nourished high hopes for a new beginning.

Otto had served in the German air force during the Second World War and became a prisoner of war in Chartres (France). In 1950 he participated in a US-re-education program that permitted him to travel and study in the US for six months, and to subsequently publish his encounters with American modernism in German architecture magazines.² When he got in contact with the other members of GEAM in 1958, he had already realized some of the tent structures he would later become famous for. Since he had criticized the prestigious project for the Kongresshalle in Berlin in 1957, an American “present” to the Western part of the city, he felt that he could not get any commissions in Berlin and thus had a special interest to join in.

Friedman was a Hungarian Jew and had faced discrimination and fascist repression during the war. After the war, he migrated to Israel and participated in the state-driven construction projects to house the arriving immigrants of the early 1950s. However, he became increasingly skeptical regarding the building practices that were employed to fulfill the demands of the rapidly growing population. His visit to Europe at the CIAM in Dubrovnik in 1956, and the several trips he undertook to West European metropolises in the following two years prepared the ground not only for GEAM, through a network of personal contacts, but also for his re-migration to Europe. In the late 1950s, he settled in France.

Hansen, who grew up in Poland, had studied in France between 1948 and 1950. When he returned to Poland afterwards, he had to face the alignment of architecture with the principles of Socialist realism. His design for a temporary City hall in a former cinema in Warsaw was considered to contradict those principles and Hansen risked losing his license to work as an architect. It was not before the mid-1950s that the official building policies in Poland were shifting away from the paradigm of Socialist realism, and
Polish participation in an international and modernist meeting such as CIAM was again becoming possible. His older colleague Jerzy Sołtan, who was of Polish origin and had worked with Le Corbusier in the late 1940s, then suggested Hansen to participate in CIAM Dubrovnik and in response Hansen prepared a presentation entitled “Biotechnika y człowiek” (“Biotechnics and man”); but in the end, only Sołtan attended the congress. Sołtan probably also arranged Hansen’s contact with GEAM that did not commence before 1960. Hansen communicated with the other GEAM-architects through letters and the exchange of publications, and his work was shown in the group’s touring exhibition for which he organized the presentation in Warsaw, though he never participated in any of the group’s meetings.

The experiences of war and migration, and the confrontation with totalitarian regimes violating the rights of individuals and restricting their personal frames of action for the sake of a homogeneous and malleable mass society have to be kept in mind to understand the idea of a “mobile” architecture, as it was articulated by the group. GEAM’s idea of mobile architecture fundamentally opposed contemporary building practices that originated from the need to compensate for the damages of the Second World War and to satisfy the growing demand for housing. GEAM criticized the redundant forms and layouts, which they saw as resulting from a standardized understanding of the human being and society and the application of rigid planning schemes. This critique also addressed the idea of mass society, and criticized normalizing tendencies within modern architecture. Architecture, according to GEAM’s members, should become more adaptable to the actual changes of society, notably to individual needs.

Part of this claim may be connected to a “new humanism” in architecture emerging in the 1950s. This new humanism is often attributed to Team Ten, as some of its members discovered the anthropological component of buildings and showed a growing interest in the phenomenological philosophy of Martin Heidegger, or in Martin Buber’s philosophy of dialogue. However, Otto’s, Hansen’s and Friedman’s “humanism” rather followed Karl Popper’s theories of an “open” society and the prospect of a humanization of technology and the sciences, as it was promoted in the writings of Lewis Mumford. Accordingly, they directly addressed the technological side of architecture, redefining it as bio-technique, meaning a technique that should both resemble and serve the human (or, as they rephrased it: biological) world in a new way.

It is thus not surprising that the idea of mobility was articulated in technical terms and biophysical metaphors: They seemed to aptly illustrate the core ideas of mobile architecture: as for example in the case of Hansen’s Pavilion
“Biotechnica” that was designed for a fair in Rio de Janeiro in 1957 and finally assembled at Sao Paolo in 1959. The pavilion consisted of a thin membrane that protected the visitors and the objects exposed from tropical rain and sun. The membrane directed the wind along its surface, but it was also permeable and reactive. Moving with the currents of the wind, it staged an amorphous breathing and seemed to be imbued with life (fig. 1).

Other examples are Otto’s early designs for individual houses in which he studied how the building could be inscribed into its natural surroundings, how heat could be gained from the sunlight falling in through the windows and how heat would slowly pass back outside through the architectural envelope. In his writings, Otto highlighted the connection between the individual and nature and the role of architecture as an active membrane in between. He illustrated his idea by using images of bubbles that enclosed individuals or groups, thus circumscribing the human environment. As his drawing suggests, these bubbles would react to growing spatial needs (fig. 2).

These metaphors of natural growth also influenced the perception and description of socio-spatial processes inside housing units. In 1957, Jan Trapman, a Dutch member of the group, published his project Kristallbouw, in which inhabitants were to have been able to “crystallize” freely, i.e. choose their own place and their personalized layouts inside a pre-established building structure (fig. 3). These ideas circulated among the members, and Otto and Friedman designed their own versions of “adaptable” architectures. Their main features were a fixed structure or grid, in which flexible elements – walls, windows and flexible furniture – could be inserted at will, and were able to remain continuously exchangeable and “mobile”.

2. Large Scale Design and “International” Planning Euphoria

From the early 1960s onwards, GEAM architects addressed new scales and redirected their interest from housing towards urbanism and territorial planning. Their designs bore utopian features as they were projected into a near but radically different future. However, they were rooted in their contexts of origin and bound up with contemporary tendencies in architectural debate. The field of planning, at the time when GEAM members began to envisage it, was undergoing rapid expansion: New alliances between political and technocratic planning experts became possible, as institutions of territorial planning and large-scale projects were integrated into governmental practice – a phenomenon that could be observed in European countries on both sides of the iron curtain.

Referring to the 1960s as the point of culmination of modern planning initiatives, historians such as Dirk van Laak have argued that these years were
fig. 1 Oskar Hansen, Zofia Hansen and Lech Tomaszewski, Pavilion Wachlarz, Sao Paolo, 1959. Zofia & Oskar Hansen Foundation.


a decade of international planning euphoria. However this argument needs to be refined for the particular cases we are looking at: While this new interest in planning can be considered as an international phenomenon, its implementation was articulated by national planning laws and planning policies that were specific to national contexts. In some aspects, French planning policy of the 1960s seems closer to Eastern European models than it was to West German practice. In Poland as in France, centralized physical planning institutions were founded; they were integrated into or harmonized with economic planning in the 1950s and early 1960s. In the Federal Republic of Germany, the legal framework for physical planning was reformulated in the 1960s, but there was no central institution that would have been responsible for the design or drafting of national plans; the implementation of planning legislation remained in the hands of regional institutions.

It is against this backdrop that we have to read the large-scale designs by Hansen, Friedman and Otto. They were shaped by (and also partly addressed to) an international experts' discussion in architecture magazines, in which they manifested the integration of planning discourses into architecture in a somewhat lofty and “utopian” fashion. But since national or regional institutions were the main actors in charge of implementing these kinds of projects, planning law and planning practices originating from these sources were perhaps the more graspable frames of reference for the GEAM architects.

Furthermore, the role of technology and science within society should be taken into account in order to identify the architects’ individual agenda, and to elucidate their utopian divergence from the present situation of their fields of action. If today’s theories in the field of Science and Technology Studies tend to describe politics and science as entangled with each other and as co-productive, in the 1960s there was a strong belief in the independence and neutrality of technology. This presumed neutrality endowed the individual designer (if he assumed the role of a technocratic expert) with a certain authority that could be used somewhat paradoxically to argue from a seemingly “neutral” position within a politicized debate.

In the late 1950s and 1960s, Hansen designed housing estates for the cities of Warsaw and Lublin in cooperation with his wife Zofia Hansen. They were a first step towards the larger scale of urban and territorial planning. In 1966, he began to work on his idea of a Linear Continuous System (LCS). This large-scale organizational scheme, which he was to develop well into the 1970s, encompassed the entirety of the Polish territory. It consisted of four urban strips complemented by transportation infrastructure and by industrialized strips, traversing the country from North to South. Large strips of greenery,
Nested Utopias: GEAM’s Large-Scale Designs

in which the sites of historical cities were to remain untouched, would be separating the living space from industry (fig. 4).

Hansen’s argumentation for a more homogeneous distribution of the population is characteristic of the planning experts of the time; it was used in a similar way in France, where projects of linear cities were developed for the congested Paris region from the early 1960s onward. At the time, Hansen was in contact not only with GEAM, but also with Team Ten and other Western European architects and urban planners. Hansen himself inscribed his design for the Linear Continuous System in the tradition of plans for a linear city that were the common heritage of an international community.

However, the proposal focused on Poland, where economic planning predominated physical and urban planning. Hansen approached the spatial layout from the position of a designing architect. His proposal aimed to modify the consequences of the subordination of spatial layouts to the logic of industrialized production which had led to the concentration of the population around the economic centers. Hansen underlined the specific power of the socialist state to realize his proposal. He described his system as model for a socialist method of planning, which was at the same time permeated with Polish nationalism: From the sea in the North to the mountains in the South, it should constitute a sense of belonging. His design can thus be considered as an opposition against the dissolution of Poland into the Eastern Bloc – or a cure against recent history. His strips seem to oppose concentric planning schemes that were projected onto the Polish territory during the Second World War, when Poland was partly occupied by the German army.
When Frei Otto first addressed the subject of physical planning in the 1950s, positions stemming from the German planning practice of the 1940s were still graspable. Otto’s early interest in physical planning can best be explained through the education he received. He had studied at Berlin Technical University with Gerhard Jobst who had been employed during the Nazi Regime and, at the time, stood for traditionalist positions in planning. In Otto’s writings we can find features that point towards these influences such as a certain hostility against the city and a tendency to idealize the village. We are also confronted with an unquestioned use of the ideas of Walter Christaller, whose Central place theory had been an important element in the German “Generalplan Ost” (a secret large-scale design for the German colonization of Central and Eastern Europe) during the war. Indeed, a kind of technocratic amnesia had permitted the political implications of Christaller’s schemes to be neutralized and “forgotten” and his model to be used as a neutral instrument of planning.

In an essay published in 1956, Otto described the principles of an adapt-able building practice that was to reach from the individual house to the patterns of urban growth. Compared to Christaller’s idealized schemes, Otto’s layouts look distinctly less ordered, more complex, and more adapted to local topographies (fig. 5). However, the most outstanding feature of Otto’s layouts is not so much the presence of topography but the absence of territory – that of any regional or national point of reference. Otto does not refer to a specific territory; maybe partly due to the lack of an institutional framework that addressed planning on a national scale. But it can be supposed that he also refrained from the political implications that the mapping of a “German” space would have encountered – with regard to both the “Raumpolitik” of the recent past and to the political division of Germany, split between East and West.

Though Otto claims a seemingly neutral, imaginary terrain, his description suggests a distribution of the population that would contribute to a pluralistic society. Otto explained the process of urbanization as the result of attraction and distraction between human actors. He harmonized his proposal with contemporary sociological theories on German society: For him, distraction – meaning the individual’s desire to determine his or her own place – resulted from a resistance against the normalizing force of the masses. The subtext of his argument was the opposition to “Gleichschaltung” (totalitarian control) of German society with the principles of Nazi ideology; the right to determine one’s own space was thus essential for an anti-totalitarian design.

Compared to Hansen’s and Otto’s designs, Yona Friedman’s proposals were more international in scale and more utopian in character. From the
end of the 1950s to the early 1960s, Friedman’s interest shifted from the design of the modular unit, passing designs for Paris spatial, an urban agglomeration above the city of Paris, and for several Ville ponts, large mixed-use infrastructure conglomerates, towards the design for the Cities of Europe. In this design Friedman drew a network connecting 120 existing European metropoles, bound together by traffic infrastructure (fig. 6).

Similar ideas can be found in international publication networks of the times, where architects and designers such as Richard Buckminster Fuller and Constantinos Doxiadis promoted “world planning” on a global scale. However, Friedman was well aware of the French debates. His designs for Paris spatial were a contribution to the debate on Parisian urbanism, for Ville ponts coincided with the French “grands projets” in port areas. Friedman’s Villes d’Europe projects have to be read as a statement regarding the aims of contemporary French territorial planning: While the official plans intended
to decentralize existing agglomerations, and to build nine *Villes nouvelles* in their proximity, Friedman proposed the densification of existing cities and their connection along new and more efficient axes of traffic and infrastructure.¹⁷

But on a more abstract level, his design was an outright refusal to think in the categories of French institutionalized planning. With his design, Friedman deliberately ignored both the limits of political agency of the national planning institutions – the French territory – and existing political borders: notably the political division of the European continent in the Cold War. He drew an alternative – utopian – map, binding together East, West and Central Europe, drafting a system through which individuals could circulate freely. Friedman’s position at the time was close to a technocratic anarchism (and he occasionally came to question politics by means of neutral technology in a radical way): In a 1962 paper prepared for a conference in Amsterdam, Friedman criticized the state’s monopoly on violence and suggested a strategy to subvert its power. His idea was to introduce automated systems of administration and distribution of goods in the city which should tacitly undermine the raison d’être of the state apparatus and thus initiate its erosion.¹⁸

**Forecasting Change – the Individual and the System**

David Harvey has described the end of “Fordist modernity” as the starting point for a new organization of space, which tends towards its dissection into places and the absorption of space into time.¹⁹ GEAM’s designs and descriptions shift from a functional space-bound logic to spatial orders that tend to dissolve into a flexible network of forces. However, the spatial concepts in GEAM’s designs differ from the spatial refractions that Harvey describes. Instead, they developed a more nested, “environmental” conception of space. In this respect, cybernetic metaphors and terms were an important reference. Indeed, cybernetics brought up a new understanding of modeling techniques and the idea of self-regulating systems, which tied in with biotechnological ideas.

In the 1960s, societies both in Eastern and Western Europe became economically more homogeneous than ever before. At the same time, the utopias of the mass-movements of the interwar years were already unraveling,²⁰ and a tendency towards individualization and a more pluralistic conception of society was articulated among sociologists and in politics. Cybernetic accounts were attractive to the architects, as they permitted the harmonization of planning with pluralism. They allowed the ideas of bio-technique to be transferred into the domain of large-scale planning. If Hansen’s team did not allude to cybernetic accounts in its large scale projects, the idea of hous-
ing individual agency and human interaction with space within the a large scale design was central to the Linear Continuous System. The relation of the inhabitant with the environment that the LCS suggested was twofold: Firstly, the inhabitant should be able to participate in shaping her or his own place as proposed in GEAM’s concept of adaptable architecture. The inhabitant – on the basis of a homogeneous parceling of terrain – should choose how to build her or his own home. Individuals should choose how to build their own homes on the basis of a homogeneous parceling of terrain. Secondly, Hansen also underlined the close connections that inhabitants should have to nature as the linear layout of the LCS ought to guarantee the proximity of recreational space. Moreover, in the studies of the early 1970s, he adapted the layout to specific regional landscapes by including geographical data – topography and wind directions were considered important and measurable factors.\textsuperscript{21}

For Otto and Friedman, the most promising way of harmonizing large-scale planning models with individual agency was to replace spatial layouts with mathematical or experimental tools. Departing from a set of assumptions on spatial processes and human behavior, they served to model social systems with many individual actors. In 1963, Friedman published his ideas on Comprehensive systems, an axiomatic that (co-)related different factors of the urban environment (the group structure of society, the physical structure of the built environment and the distribution of goods) (fig. 7). What is interesting about this project is not so much the results it produced but the role it occupied in the design process. According to Friedman, it could serve as a tool for architects and urbanists to analyze and model different urban “types”, corresponding to specific social orders and their spatial behavior. Otto’s earlier ideas on physical planning were re-actualized in a similar way. From 1964 Otto directed a research lab for lightweight construction at Stuttgart Technical University, the Institut für Leichte Flächentragwerke, where Gernot Minke and Günther Schöfl developed a modeling technique, or rather a tool for optimizing connections between human settlements with the help of soap films. The technique used the nonlinear, self-regulating properties of the soap film and can be described as a simulation practice that worked on the basis of a physical analogy. It served to develop “optimized” path systems, between specific topographical landmarks (cities, houses …) that minimized the distances for people walking along those paths.\textsuperscript{22}

The Comprehensive systems and the soap film experiments both have to be considered as prognostic tools for the emergence of spatial orders. They are simulations of bottom-up processes that connect material configurations to human movements rather than finished large-scale designs projected onto a territory. Especially the studies that originate from Otto’s laboratory simu-

late an interaction of human and material forces and the emergence of spatial orders through this interaction. These designs respond to descriptions of space present in GEAM’s writings, where it can be noted how the idea of a flexible system of forces replaced the idea of function as the driving force behind form. Physical forces were used to describe the formation of human agglomeration and the built environment.

Following this imagery, Otto’s designs of the times offered the most appropriate symbolic forms for a society that no longer conceived of itself as an indistinct mass. Parallel to the experiments with path systems, Otto designed the German Pavilion for the world exhibition in Montreal 1967 together with Rolf Gutbrod. Its complex shape had been developed with the help of soap film experiments (fig. 8). Indeed, for the Belgian philosopher Henri van Lier, its spatial layout represented a contemporary society that was structured according to the principles of communication. In this society, van Lier claimed, power could not be organized hierarchically, but would follow the complex layering and the polycentric arrangements created by the interactions between individuals (fig. 9).

Comparing the projects by Hansen and Otto, one may conclude that Hansen’s designs were influenced by a more pronounced institutional context, whereas the idea of the “self-regulation” of society appeared more prominently in Otto’s proposals. Friedman in turn had an equally strong interest in the latter, but his projects also answered directly to the framework of French institutional planning. Despite these differences, GEAM’s ideas originated from a shared type of environmental thinking. Their approach was not exclu-

sively technological, it rather used a technical imagery that overlapped with a participatory view of architecture. GEAM’s environmental designs demonstrate how the scales in which architects thought had widened. But their main contribution was the refinement of planning on the micro-level, the idea of a bottom-up approach that went hand in hand with cybernetic accounts. The designs were environmental not only in dimension, but also in the way they bear proof of a post-Fordist thinking in networks, in which the scale of individual environments was nested into and reconnected with a social and geographical landscape.

Endnotes
1 On GEAM, see Cornelia Escher, Den Zufall behausen: Architekturentwürfe der Studiengruppe für mobiles Bauen (GEAM), (Zurich: gta Verlag, forthcoming).
Kegler, Zentrale Orte, 230–78.

On the role of technology in German postwar society see Gabriele Metzler, Konzeptionen politischen Handelns von Adenauer bis Brandt: Politische Planung in der pluralistischen Gesellschaft (Paderborn: F. Schöningh, 2005), 64–69; on the reception of Christaller see Kegler, Zentrale Orte, 443–500.


Towards the middle of the 1960s, plans for the construction of nine Villes nouvelles were formulated by DATAR, with the aim of relieving the pressure on urban centers such as Paris, Grenoble/Lyon and Marseille, but they had been circulating well before: see for example Pierre Randet, “L’urbanisme de notre temps: Un exemple: Toulouse – Le Mirail,” in Techniques et architecture 22, no. 5 (1962): 83–4.

Yona Friedman, La société et l’urbanisme mobile, [05. 1962], RKD (Netherlands Institute for Art History), archief Constant, 2.7.334.


Gola, Hansen, Towards Open Form, 41.


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