The History of GECUS: A Great Adventure in Contemporary Urban Development

R. Heim de Balsac

In light of the passage of the French law of December 17, 1963, which created GECUS (Groupe d'Etudes de l'Urbanisme Souterrain—Group for the Study and Coordination of Underground Urban Development), Underground Stack asked R. Heim de Balsac to recall the beginnings of underground urban development in France and to recount its history.

Introduction

It is an honor for me to outline the history of GECUS and the birth of the idea of underground urban development in France. It goes without saying that theCourant, the Union, and members of GECUS, the group founded, may well have done it better, but I do claim that this is because it is in spite of their international status. Courant and the work of GECUS still remain somewhat ignored or misrepresented, even though many distinguished architects, engineers, and urban planners have invested a deep interest in this subject over the decades.

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Despite the difficulties faced by underground urban development, this approach offers unique opportunities to address contemporary urban challenges. It leverages the potential of underground spaces to foster sustainable, resilient, and inclusive urban development. By integrating underground infrastructure and urban spaces, this approach aims to create new opportunities for urban living and mobility, while preserving the surface environment.

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Large underground urbanizations. In its evolution, the underground has evolved from small-scale tunnels and mines to large-scale underground cities and urban enclaves that span multiple city blocks. This transformation has been driven by a combination of factors, including technological advancements, economic incentives, and social needs.

The Underground: A New Frontier in Urban Design

The underground offers a new frontier in urban design, offering opportunities to create sustainable, resilient, and inclusive urban environments. By leveraging the potential of underground spaces, this approach aims to create new opportunities for urban living and mobility, while preserving the surface environment.

The Future of Underground Urbanization

Looking ahead, the future of underground urbanization will be shaped by a variety of factors, including technological innovations, economic incentives, and social needs. As the world faces challenges related to climate change, population growth, and resource scarcity, underground urbanization offers a promising path forward. By integrating underground spaces into the urban landscape, we can create new opportunities for urban living and mobility, while preserving the surface environment and enhancing the quality of life for all.

Conclusion

In conclusion, the history of GECUS is a testament to the importance of underground urban development. By leveraging the potential of underground spaces, this approach offers a unique opportunity to create sustainable, resilient, and inclusive urban environments. As we look to the future, it is clear that underground urbanization has a critical role to play in shaping the cities of tomorrow.
The disapprovingly long along the way were not so much due to violating ideas that are on the surface and that which might be developed underground. All your publications and documents and all the projects that have appeared since GECUSC initial publication in 1953 are a liv- ing testimony.

The press and the cities have never been more hopeful about the development of the city, speaking particularly of underground. As is, the underground development has improved and been a more realistic notion of what one will do with mankind.

Not to notice that underground urban development is not a substitute for urban development in the city, which, in turn, relies upon a paradigm of many systems. In these three dimensions, you have multiple model perspectives offered to those having the responsibility for planning of the cities.

Appendix A

Excerpt from Eduard Utudjian’s opening address to delegates of the First International Congress of Urban Developers (Paris, 1937)

"The essential contribution of underground urban planning..."
Major GECUS Projects

Les Halles (Utuljan and Heim de Bailleul, Paris)

This project, first planned in 1967 and continuing until 1970, summarises quite the manner in which GECUS was able to influence large urban projects. It is also an example of the outcome of all GECUS theories on urban planning and urban architecture.

It should be noted that construction of an underground urban complex at the ancient site of Les Halles (the covered market area) is the very heart of Paris was not the program initially agreed upon. An architectural consulting group had been organized by the administrative authorities in 1967 with a view toward development of a complex involving 800,000 m² above-ground construction and approximately 400,000 m² of underground construction, with very little interconnection between the two.

However, the Parisian public reacted with profound shock during the exhibition of the project, particularly because of the extraordinarily high density of the proposed construction. This was a setback to the project, and the administration found itself deadlocked. GECUS had just presented an underground urban development design for Les Halles, involving the creation of a very large, modern underground urban complex. The idea came at just the right moment; the plan was adopted by the Parisian Council in 1968. The GECUS project developed not only solutions, but also a very precise methodology for carrying this great complex to completion. It foresees:

- Changing from a surface density, judged as irreparable in this district, to an underground density;
- Creating an exchange platform linking all the common underground transportation networks: subway, express subway (R.R.), buses, trams, stations, parking facilities, etc.;
- Thoroughly utilizing all resources to coherently fill the open excavation as required to allow the construction of an express subway station, but at the same time retaining the great "negative volumes," or craters, so as to permit air and light to reach the outermost (underground) areas of the complex (see Fig. 1); and
- Encouraging programs of a sociocultural nature, and treating the free surface with paving stones and steps, and with numerous gardens or green urban areas.

The principle of subsurface development was adopted by the Parisian Council over the objections of several opponents. Thus the project proceeded with a certain uneasiness, with plans very often questioned or modified, and with authority for decision divided among different organizations. And to ensure a "walking around" of decisions and inflections over several years, with regard to such issues as:

- Whether to preserve or not to preserve the "Passerelles de Béland";
- Whether to stop work on the International Trade Center;
- Whether to re-examine the design of the buildings to be constructed above the excavation;
- Whether to have French gardens or English parks (a question that was discussed unstirringly).

It should be noted that GECUS had brought a global conceptual vision to the project, and that it had to fight long and hard for several years for this vision to be maintained—one which set forth, at the outset, certain principles of underground planning and design that it was imperative to respect.

What is an Underground Urban Complex?

An underground urban complex is one that handles below the surface, in three-dimensional development, a network of connections for underground or surface transportation lines, circulating a large public through commercial, administrative, public, private, and accommodation installations. This definition assumes that in order for the various functions to exist side by side, a considerable degree of conceptual coherence must prevail, along with the maximum amount of constructive logic.

In the design of the Les Halles project, GECUS also proposed the methodology that it felt should be followed: unity of concept, adhering closely to an overall plan; familiarity with excavation techniques; and spatial overlapping of the different offices and functions, to form a node of commercial of backfilling, utilization, and use of centers.

Les Halles, An Underground Complex

The underground complex of Les Halles is nearing completion. To date the complex is following the principal conceptions of the GECUS complex: an exchange platform integrating the various forms of transportation with the parking facilities, bus stations, and pedestrians; huge open pit excavations; and spatial overlapping of the different offices and functions, to form a node of commercial and circulatory exchanges in the center of Paris.

On the other hand, certain important points were not carried out, such as connecting the operation to a network of deep subterranean thoroughfares and, particularly, at least an underground North-South route traversing Paris. In addition, the crisis principle was yet another point that was left out—or rather, that was retained in such modest dimensions that it loses all of its value.

For GECUS, the Les Halles underground complex has been simultaneously a great victory and a source of much bitterness. It is interesting to note that this project was performed without an architect and that it now lacks a three-dimensional urban development—the feature that had the unique capability of creating a great spatial vessel that could have been one of the glories of urban development in Paris.

The English Channel Tunnel (1939, 1945, 1957, etc.)

In 1939 GECUS, which had previously formed the Study Committee for the Joint Tunnel under the English Channel (Le Manche, Panorm, Sabre, Union, etc.) published a project plan advocating the Cap Gris-Naz-Pollenhof design, by the Varne bank. The project was then constructed in the Jurassic rock layer and would be essentially a dual-purpose, rail-highway tunnel, i.e. serving both trains and cars.

After the war, the GECUS commission recommended its studies, advocating the construction of two distinct tunnels for a highway, the other for a railway. The commission further pursued its studies of geological areas, the project course, and the linking up of the system on each side of the Channel.

In 1957 a special edition of Le Monde Souterrain, GECUS review No. 102, addressed the English Channel tunnel issue and again opened the matter to public opinion. France and England then formed the Study Group for the Channel Tunnel, which found itself confronted with fundamental questions that needed to be answered—e.g., whether to construct interconnecting tubes on the sea-bed, how to excavate the tunnel, how to connect the tunnel, how to handle ventilation, and whether to have two separate tubes or a single tube for both rail and highway. GECUS has recently continued to advocate rail-highway tubes allowing gradients covered, with an intermediate ventilation station at mid-length, to the right of the Island of Varne.

Since 1975 the English authorities, for political reasons, have essentially suspended all consideration of the Channel tunnel, with a few episodic comments. We have no doubt, however, that the dossier on this project will be reopened in the near future.

Editor's Note: Since this article was written, plans to build two railroad tunnels under the English channel have been announced.


In 1954 the President of the Parisian Municipal Council called upon GECUS to study the installation of parking areas...
beneath the capital. The group thus re-
opened its examination of the idea of a
deep underground transit project, and
proposed the creation of 41 garage-park-
ing facilities that would be capable of
sheltering the approximately 54,000 ve-
hicles that were then congesting the city
of Paris.

This global study responded to the
fears commonly expressed by the oppo-
sers of these parking facilities: the lack
of suitable sites in Paris or difficulty in
accessing them; the cost of the construc-
tion as a function of the actual clustering
of the underground; and the difficulties
associated with their ventilation.

The study noted that new construction
techniques—in particular, those dealing
with construction of slurry walls—allow
open pit excavation of large sites. These
sites would be able to accommodate a
seven- or eight-level parking ramp, even
in very narrow spaces situated under
streets or public areas.

The city of Paris organized a compe-
tition for the design of eight garages; GE-
CUS was the winner of seven of them.

To date, nearly 80 underground parking
areas have been constructed under the
city. It has taken almost 20 years to con-
vince the municipal authorities of the
rationality of such a project.

Underground Freeways (1957, GECUS Project: Uchjian and
Tschemli, Architects)

In 1957 the Minister of the National
Economy asked GECUS to study the pos-
sibilities of using the area beneath Paris
for an underground transportation net-
work. In effect, this question had already
been raised by GECUS since its creation
in 1953, and was included on the agenda
of the Urbanization Congress of Bor-
dex in 1934. That presentation de-
scribed the first project designed to co-
ordinate freeway networks at great
underground depths. The project dealt
with relieving the congestion of the cap-
ital’s aboveground traffic that was already
increasingly snarled and had a very ad-
verse effect on the commercial busi-
nesses. In addition, the characteristics of
the proposed transport routes would al-
low them to be used during war times as
anti-aircraft shelters.

After a detailed geological study, GE-
CUS chose to construct the network at
large and medium depths (30 m and 80
m) in order to avoid various obstacles
located in the city’s shallow subsurface
(e.g., all sorts of networks, building ba-
ments, subways, and other underground
passageways), thus saving them from
huge expropriation costs.

This raised the question of liaison with
the surface via ramps and large vertical
accessories leading to the outskirts of the
city or exiting at major intersections. Ar-
chitect/planner Jean Tschumi’s drawings
of the proposed auto routes clearly
showed that these major intersections of
the city formed an almost regular mesh.

In Tschumi’s drawings, diagonal lines of
underground routes were superimposed
on the orthogonal axes of major surface
transportation lines. In this way, a pow-
erful order beneath the city was perfectly
joined with the very flexible surface to-
sors, and was extendable from various
junctions.

The diagram won by virtue of its force
as well as by its clarity. The multidiscipli-
ary team addressed each aspect of the
project—ventilation, lighting, hygiene,
geological constraints. The project was
reviewed again in the context of the un-
derground complex of Les Halles. The
French administrators of that project
were interested in this type of solution,
which could at least give the city of Paris
a North-South route. Unfortunately, such
a solution failed to materialize in the ren-
ervation at Les Halles. The Les Halles
project provided an opportunity to create
one of these underground route junctions
while foreseeing the very large parking
facilities that could be used in conjunction
with the subways, route stations, and mass
transportation systems on the surface. By
using the underground routes, the cars
would have been able to avoid the afore-
mentioned facilities. Today the problem
still remains: no doubt, the use of electric
car would offer technical, economical,