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STRASBOURG EUROMÉTROPOLE, A CROSS-BORDER CONURBATION TOWARDS NEW SUSTAINABLE MOBILITY PATTERNS

Cristiana Mazzoni¹, Ecole Nationale Supérieure d'Architecture de Strasbourg, Strasbourg, France

Andreea Grigorovschi, Ecole Nationale Supérieure d'Architecture de Strasbourg, Strasbourg, France

In the French context, Strasbourg is an exemplary case study for the development pattern of the “city of short distances”: its local and regional components were developed in the long term after the polycentric “Rhineland model” of German, Swiss, and Dutch cities. According to the French law on cities of 27 January 2014, Strasbourg has become a local authority with special status – the Eurométropole – replacing the former local authority status (CUS). The new Eurométropole is supposed to “enhance metropolitan economic functions, transport networks and academic resources, research and innovation, in a spirit of regional and interregional cooperation and with a desire for balanced development of its territory” (LOW 2014-58). The concept of metropolitan development territory in Strasbourg includes thus the metropolitan system of the Upper Rhine, the idea of innovative governance of the projects shared between several institutional actors referring to multiple scales and diversified skills. Taking into consideration its particular geographical, cultural, social and economical context, ‘bottom up’ approaches and exploratory scenarios mark a joint effort to invent Strasbourg’s metropolitan development.

Key words: Strasbourg, Eurométropole, cross-border, slow-mobility, rails.

INTRODUCTION - STRASBOURG, A SINGULAR AND COMPLEX CONTEXT

Advocated by the European Commission’s Green Paper *Towards a new culture for urban mobility*, the “city of short distances” is a development pattern which aims to introduce the essential daily services within 800 meters of homes, transport hubs and park-and-ride, favouring service accessibility by promoting public transport and soft mobility (cycling, walking) at the expense of private car trips (CEC, 2007). This pattern – extended to the metropolitan scale and intended as a “city of easy access” – derives from the polycentric model of German, Swiss and Dutch cities: in the 1990’s in Germany and the Netherlands, the concept of the compact city in a polycentric metropolitan area emerged as part of the sustainable development philosophy. It incorporates environmental concepts: the fight against urban sprawl, the promotion of functional and social diversity, and the project of sustainable mobility reducing the environmental footprint. The concept was

also included in the European Union’s texts,² emphasizing the difficulties of its translation from theory to territorial realities: “Thereafter, the Swiss urban culture added the dimension of short distances and urban proximity. Actually, the problem is how to translate this theoretical model in the lives of residents and business practices” (CERTU, 2012).

In the French context, Strasbourg is an exemplary case study for its sustainable metropolitan development and its tension between the local and global: it represents a “balanced metropolis” with a strong symbolic border dimension to its regional claims. These local and regional components were developed in the long term after the polycentric “Rhineland model” of German and Swiss cities. Furthermore, geographical and cultural proximity to Germany - and its *Energiewende* - also makes the Strasbourg area an interesting case study when it comes to energy transition and its impact on the territorial development.

In addition, Strasbourg has recently become a local authority with special status – the Eurométropole³ – replacing the former local authority, the Communauté Urbaine de Strasbourg - CUS. Supposed to “enhance

¹cristianamazzoni@gmail.com

² first in the *European Spatial Development Perspective* (EC, 1999), and later in the *Leipzig Charter on Sustainable European Cities* (Ministers of the EU Member States, 2007).

³ According to the French law on cities of 27 January 2014.

metropolitan economic functions, transport networks and academic resources, research and innovation, in a spirit of regional and interregional cooperation and with a desire for balanced development of its territory" (LOW 2014-58), the newly created Eurométropole is thus a key actor for the future metropolitan development. This is a major challenge, especially in the particular context of Strasbourg, where the concept of metropolitan development territory includes the metropolitan system of the Upper Rhine along with the idea of innovative governance of the projects, shared between several institutional actors referring to multiple scales and diversified skills. In this perspective, one of the best ways for Strasbourg to prepare itself for the creation of the Eurométropole is to combine city and university into forming a cluster of excellence actors working on the new meaning of sustainable metropolitan development and governance.

SHARING AND SEARCHING FOR NEW IDEAS IN SUSTAINABLE METROPOLITAN DEVELOPMENT: STATE OF THE ART, FRAMEWORKS AND METHODS

The concept of Metropolitan development territory refers to the complex interdependencies between regional dynamics and worldwide challenges, in particular climate change and energy provision, which were considered as prominent issues with potential effects on spatial structures and dynamics (ESPON, 2013). Even if there is a growing agreement that the challenges of the metropolitan and transnational territories are important, it is not always clear for the local stakeholders in what ways they can build and represent these structures and dynamics (Mazzoni, d'Emilio, 2014). The competences necessary to act directly – and coherently – through an integrated metropolitan and transnational perspective on spatial dynamics are to be known and reinforced.

The scholarly approach to sustainable planning was profoundly renewed during the last two decades (Bocquet, 2013). Not only was the content of the concept of sustainable planning stabilized (Naess, 2001), but also a series of reflections on the relationship between sustainable planning and urban morphology was explored in a several pioneering research works (Breheny, 1992) that themselves opened the way to more systematic explorations. During the 1990s and 2000s, the regional dimension of sustainable planning was progressively emphasized (Roberts, 1994; Haughton and Counsell, 2004): it became clear that reflecting at the scale of single cities considered as functional islands was impossible and that the biggest reservoir of sustainability was at the metropolitan level as well as at the level of urban regions. This introduced a new series of reflections on the dimension of multilevel governance in sustainable planning (Bulkeley and Betsill, 2005). After a decade of debates on the question, the concept of urban and regional politics of climate change was introduced, insisting on the necessity for local democracy to tackle the question of sustainable planning (Bulkeley and Betsill, 2013). In this situation, infrastructures and mobility have long been left apart, or at least treated by scholars coming from different research traditions (Rietveld *et al.*, 2011). But it is now clear that, in the context of the necessity of "tipping the balance"

(Riddell, 2008) between a variety of factors, the issue of present reflections on sustainable planning is to create the conditions for the emergence of decision making processes that take into account various dimensions pertaining to various spheres.

The creation of the "Atelier des mobilités métropolitaines"

In the field of sustainable urban planning and urban design, AMUP laboratory (Architecture, Morphology/Morphogenesis and Project) in Strasbourg explores this kind of articulation between various spheres, including that of multi-modal infrastructure planning and that of governance at the scale of the metropolis. Within this structure, the goal of the research-actions is to create collaboration with the local authorities on metropolitan mobility planning. Such partnerships have been initiated through national researches between 2000 and 2015 (supported by the French Ministry of the Culture-MCC and the French Ministry of Environment and Energy-MEDDE). In 2014, the cooperation between ENSAS and Eurométropole of Strasbourg (former CUS) resulted in the creation of a new framework, the "Atelier des mobilités métropolitaines" (AMUP-Eurométropole Strasbourg, 2014). Since the beginning, the Atelier focuses mainly on experiencing new methods for the construction of common objectives and knowledge, shared between researchers and stakeholders. This framework was enlarged further in 2014 through the "Atelier Franco-Chinois des mobilités métropolitaines" (ENSAS and Tongji University in Shanghai). The aim is to study the realities of the metropolitan governance in these agglomerations, in particular regarding aspects of integrated mobility and slow-mobility systems⁴.

The model of the Italian Urban Centers

In Europe, similar exchange platforms between academic world and political actors already exist. In Italy, the framework for the cooperation between university and the local authority aiming to stimulate an information exchange and to strengthen the knowledge and capacities of the local authorities is the concept of the Italian Urban Centers (Borghi, 2014). The success of this framework has already been proved by the Italian cities of Turin and Bologna.

Within these Urban Centers, databases on innovative mobility solutions can be developed and published in interactive metropolitan maps to promote advanced urban

⁴ The team already researches these topics within several national and international projects (selection): *Tram-train, ou l'énergie des courtes distances dans Strasbourg Métropole. Acteurs, logiques et processus du projet métropolitain durable*, research programme «Ignis Mutat Res. Penser l'architecture, la ville, le paysage au prisme de l'énergie», MCC/MEDDE, 2013-2015; *Strasbourg: la démocratie locale pour construire un récit sur la métropole durable*, research programme «Plateforme d'observation des projets et stratégies urbaines» (POPSU), MEDDE, 2011-2013. Also, recent international seminars and round tables were further discussing these issues: *Urban Public transport*, round table coordination (C. Mazzoni, ZHUO Jian), 7th Forum of Sino-French Sustainable Urban Transport Systems (THNS), CAUP-Tongji, Shanghai, November 1st, 2014. *FabLab on Urban mobilities France-China: Nanjing and Strasbourg, new tramway projects*, seminar-workshop coordination (C. Mazzoni, ZHUO Jian), Urban Institute of Shanghai, November 30th, 2014.

mobility, ICT and digital development as well as socially inclusive mobility approaches. Workshops and conferences further enhance the exchange between the universities and the city. These centers present both a digital platform to share information and research results, and a real place within each participating city to inform and interact with the local community.

Referring to this Italian model, the methodological and practical approach in the “Atelier des mobilités métropolitaines” is turned towards building expertise at a local level. This framework acts both as observatory for local projects of innovative solutions for mobility, as well as theatre dedicated to the creation of exploratory scenarios. Last but not least, the main goal is to make this Atelier a place of shared experiences between scholars, decision-makers, technical experts and the civil society.

Assessing innovative metropolitan mobility solutions. Karlsruhe experience.

Within AMUP laboratory, ongoing researches refer to one specific form of urban mobility: the tram and tram-train. However, the idea is not to limit the research to the discussion of the pertinence and feasibility of a light-rail/rail infrastructure in Strasbourg, but rather to explore a whole set of solutions that innovatively articulate different scales (inner city/metropolitan area/urban region) and different transportation modes in order to facilitate the development of sustainable transportation and urban planning configurations.

The light-rail/rail infrastructure for which Karlsruhe has become a model is used as a starting point in order to study the relationship between transport infrastructure, decision-making processes, and the nexus between urban and transport planning. This innovative transport solution is analysed in the context of challenges (e.g. economic, social, environmental) that the metropolitan area of Strasbourg is confronted with.

According to German experience, developing a “slow mobility” strategy is a process with substantial involvement of citizens and stakeholders who often have strongly divergent interests. Local authorities have to be able to moderate diverging interests and bring them to a productive end, i.e. produce decisions that will be beneficial to the community as a whole and its long-term development. Once the mobility strategy has been formulated there will again be very controversial discussions to establish the necessary projects. And again, after the projects have been decided upon, more controversial discussions will ensue as to the projects’ exact designs and refinements including the permission and building processes. In order to be able to carry out these tasks and decisions, local authorities have to be strengthened with respect to both their general expertise on the relevant issues and their capabilities to moderate the decision processes. They need help to find new strategies and processes along the whole decision-making chain.

From the territorial development viewpoint, the Karlsruhe experience in the matter became a reference. The public transport system in Karlsruhe and its surroundings is managed by the Karlsruher Verkehrsbund GmbH (KVV),

which is the third largest public transport system in the Federal State of Baden-Württemberg. The KVV provides services on 931 km rails and its coach lines have a cumulated length of 2,300 km. In 2013, 177 million passengers used the transport system, and the overall revenues of the service providers were 133 million Euro. In order to provide more attractive routes from the city to the surrounding regions without changing trains, the city of Karlsruhe has implemented a tram-train system – the so-called Karlsruhe Model. In 1992, the first two-system-tram was introduced. Nowadays the tram-train traffic uses the railway network of the city of Karlsruhe as well as the railway network of Deutsche Bahn in the surrounding areas. The system also features flexibility in the choice of electrical concepts. The wide range of the tram-train system is remarkable and this is partly due to the fact that cities and villages of the surrounding region wished to be integrated into it and also contributed to the required investments.

REVEALING POSSIBLE FUTURES FOR STRASBOURG’S METROPOLITAN DEVELOPMENT: THE EXPLORATIVE SCENARIO APPROACH

In the transition from *urban project* towards *metropolitan project* as a new way of thinking and projecting urban development, the explorative scenario approach is a key feature, among other conceptual and methodological trends and weak signals (Grigorovschi, 2015). In this regard, for our Atelier, explorative scenarios became one of the main tools for inventing and questioning the future Strasbourg metropolis. The approach favours an inductive mode of thinking in search of possible futures for the “city of short distances”. Unlike other ways of scenario development (predictive or normative), the explorative scenarios support the idea that it is impossible to predict what will really happen as well as to try to define and then reach an ideal configuration. In other words, this scenario approach, aims the exploration of “what can happen?”, by unfolding a range of possible consequences (risks, strengths, gaps, etc.) without trying to predict probable futures, nor to find the most preferable one⁵.

Initiated by AMUP laboratory’s researchers, PhD students and interns, scenarios developed within the Atelier are conceived as a way to stimulate and enrich the collective reflexion and debates on the metropolitan development territory in Strasbourg. In this sense, they are not to be confused with action-oriented proposals as in a range of choices for decision-making. This gives scenarios a chance

⁵ Even though in literature there is a rich variety of scenario approaches and methods, several authors (Amara, 1981; Dreborg, 2004; Börjeson *et al.*, 2006) seem to agree on the fact that there are three types of future: the probable, preferable and possible. Referring to these categories, Martin Borjeson, (Swedish strategist, scenario developer and futurist) and his colleagues within the field of Future Studies, published in 2006 a scenario typology pointing out these three ways of thinking about the future, resulting in three scenario types: the predictive, normative and explorative scenarios.

Within our disciplinary field, regarding the question of scenarios as a tool for envisioning possible territorial futures, we refer mainly to Paola Viganò. Viganò, P. (2012) *Les territoires de l’urbanisme. Le projet comme producteur de connaissance*, MetisPresses, Genève; Viganò, P. (2010) “Explorer l’avenir”, in Masbouni, A. (eds.), *La ville est une figure libre*. Laurent Théry. Grand prix de l’urbanisme 2010, Parenthèses.

(at least during their initial development) to fly free of any ongoing political trends and directives, escape the institutional constraints and administrative perimeters and set aside the question of governance. However, this should not be confused with utopian or romantic approaches, since the scenarios' baselines are always attached to territorial realities, as in geographical and landscape features, local landmarks, cultural representations, and ways of living and sharing this metropolitan space. Thus, scenario developments as experienced within the Atelier rely on quantitative and qualitative data in order to cover and explore not only explicit features, as physical layouts and ways in which the territory functions, but also implicit ones, such as mental constructions related to the former. This implies both a spatial and a conceptual exploration of possible futures during scenarios' development.

The *Integrated mobility scenario* is one of the first created within the Atelier. Its starting point is the idea that the essence of Strasbourg, as a metropolis of short distances, could be a light-rail/rail infrastructure associated – on a very local scale (e.g. the neighbourhood scale) – with a soft mobility network.

For this scenario, the upstream preparation requested a proactive scientific watch on the current mobility issues and debates within the metropolitan context of Strasbourg, a microdata mining regarding railway network's use, as well as a "stocktaking" cross-border cartographic work.

The hypothesis is questioned and articulated on three different scales: the Upper Rhine metropolitan region, Strasbourg's metropolitan area and the metropolis' urban cores. Each of these frameworks was determined by geographical and urban configurations as well as human practices within the territory, and they all focus on the cross-border dimension. Also, two different timeframes are

considered: the middle-run, settled in 2030, and the long-term horizon of 2100. This is mainly due to the fact that some developments require restoring several abandoned rail corridors and the construction of new railway sections, for which the investments would be impossible to obtain within a short period of time.

The integrated mobility scenario: spatial exploration

The scenario envisions a denser network of regional express train lines (RER/S-BAHN), which, on one hand, consolidates the North-South urban development of the Upper Rhine territory and introduces transversal East-West, cross-border connections, on the other (Figures 1 & 1a).

On the scale of Strasbourg's metropolitan area (Figures 2 & 2a), several express lines (RER) highlight the "30 minutes cross-border metropolis" since they are almost all diametrical (passing through the city center) and their maximum travel time between the termini is about 1 hour long. Moreover, certain lines crossing the Rhine are connecting Strasbourg's hinterland to their German neighbours, without breaking bulk or change in the mode of transportation. In the same way, most of the sites of high economic, cultural and touristic value of the metropolitan area, such as airports, airfields, leisure parks, as well as typical villages and resort towns, are connected to this express network which makes them easily accessible from both sides of the Rhine.

Even though most of the lines rely on the existing railway infrastructure, there are also a few new sections to be built (as a second step) in order to increase the network coverage and improve accessibility. This would also enhance the attractiveness and thus the urban development of some areas, which for the moment are only covered by the regional bus services or only accessible by car.

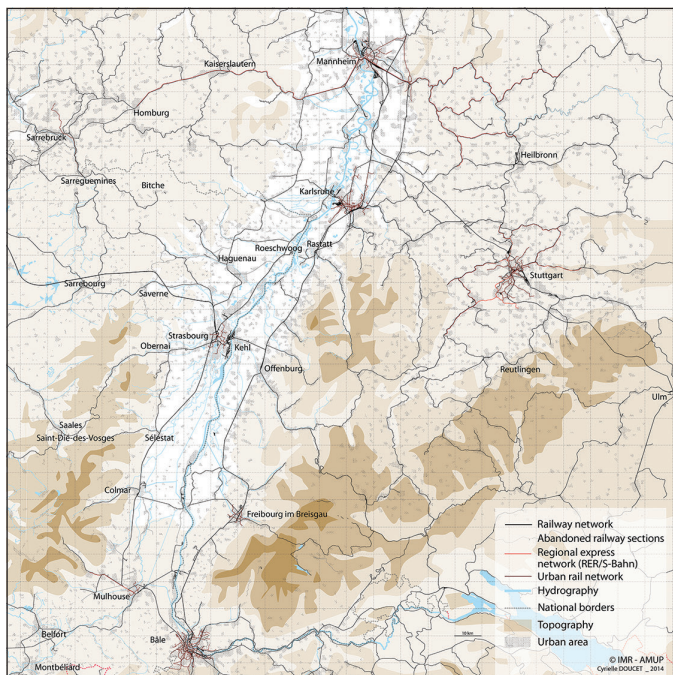


Figure 1. Rail/light-rail network of the Upper Rhine metropolitan region. Current state.
(© IMR-AMUP, Cyrielle Doucet, 2014)

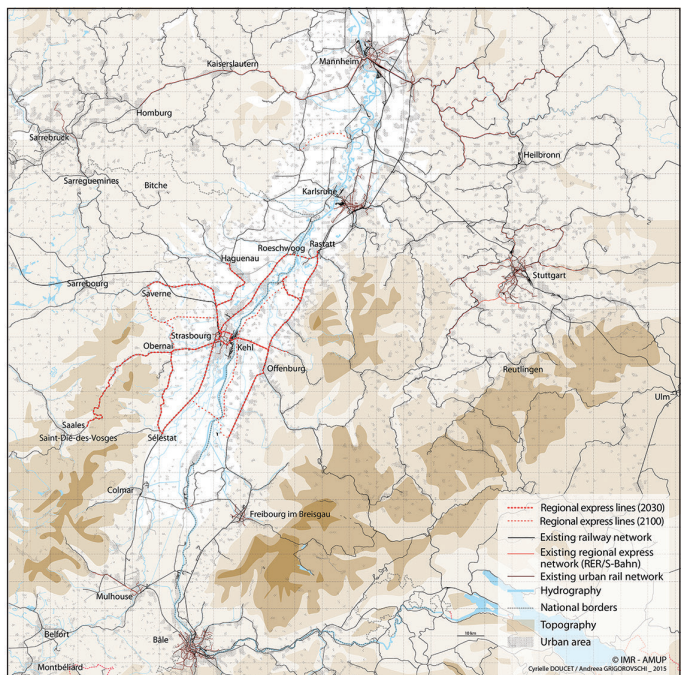


Figure 1a. Possible development of the Upper Rhine metropolitan rail/light-rail network. Scenario of Integrated Mobility.
(© IMR-AMUP, Cyrielle Doucet, Andreea Grigorovschi, 2015)

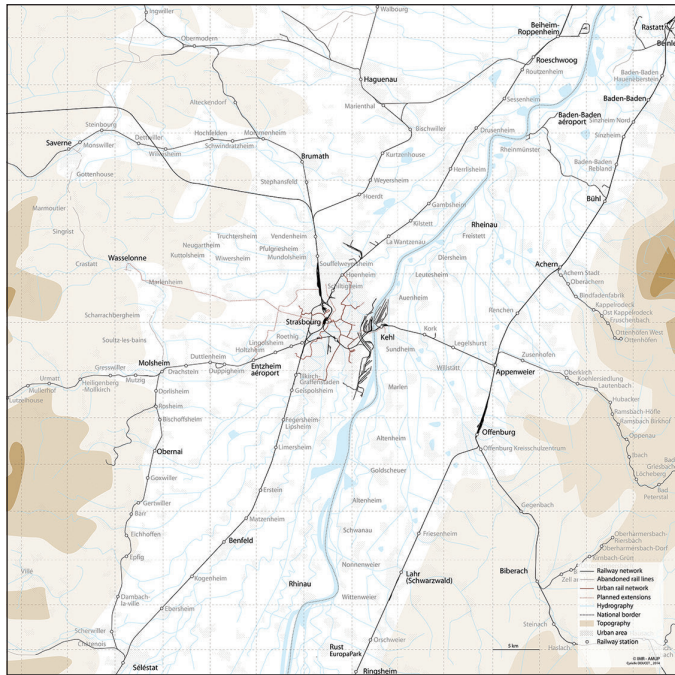


Figure 2. Rail/light-rail network of Strasbourg's metropolitan area. Current state.
(© IMR-AMUP. Cyrielle Doucet, 2014)

Finally, regarding the metropolis' urban cores (Figures 3 & 3a), it is interesting to outline that although the railway connection between the main cities of Strasbourg and Offenburg already exists, the fact that they stop being termini stations (the RER lines disserving further destinations within the scenario) gives a new status to the territories situated in-between. An accelerated urban development is thus to be expected for this area.

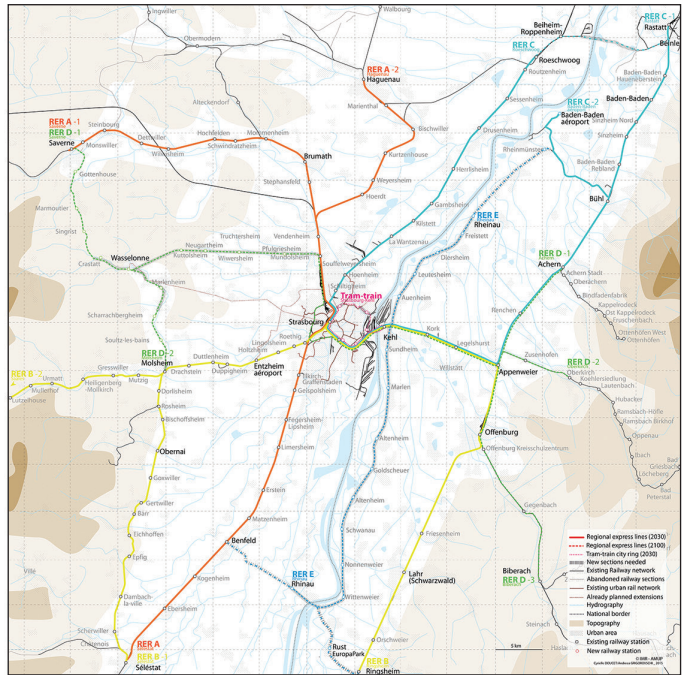


Figure 2a. Possible development of the rail/light-rail network of Strasbourg's metropolitan area. Scenario of Integrated Mobility.
(© IMR-AMUP. Cyrielle Doucet, Andreea Grigorovschi, 2015)

At the inner city level, a cross-border tram-train draws a city-ring-line defining a bigger center district in-between the main railway stations of Strasbourg (France) and Kehl (Germany), which offers a direct connection to the European Quarter. Passing through the harbour area (on the French side), the city ring could also be used for urban logistics, covering the "last mile" delivery, particularly during night-time. This line would use both rail and light-rail (tramway) infrastructure, therefore, two interconnection platforms would be needed.

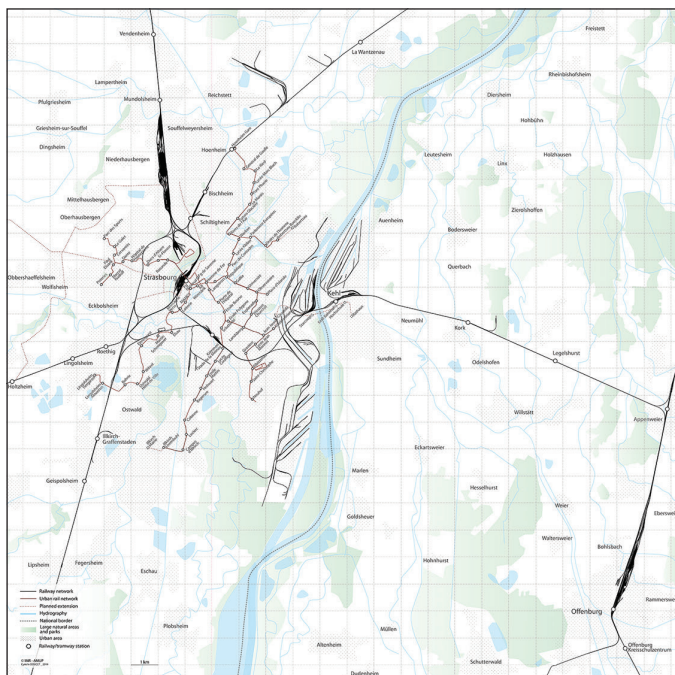


Figure 3. Rail/light-rail network within and in-between the metropolis' urban cores. Current state. (© IMR-AMUP. Cyrielle Doucet, 2014)

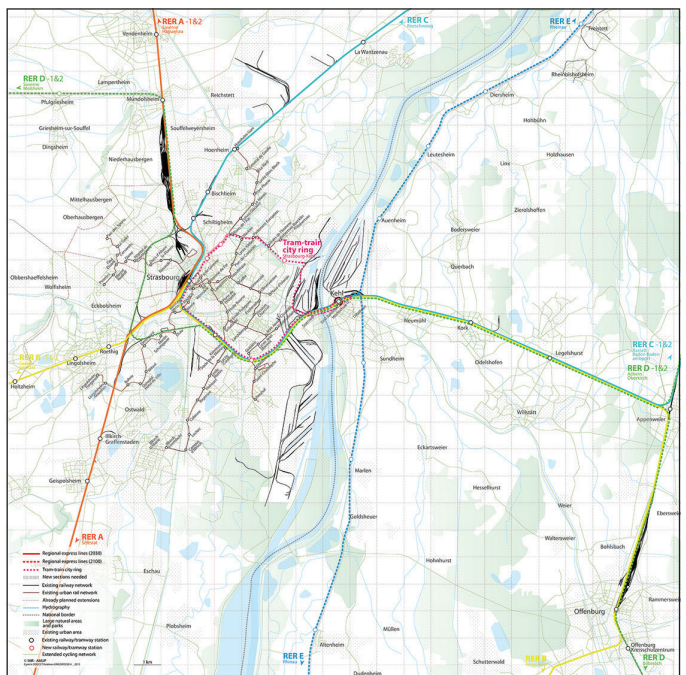


Figure 3a. Possible development of the rail/light-rail network within and in-between the metropolis' urban cores. Scenario of Integrated Mobility.
(© IMR-AMUP. Cyrielle Doucet, Andreea Grigorovschi, 2015)

All these express and tram-train connections create the conditions for increasing the urban density in the districts surrounding the stations. On this local scale, it is also interesting to imagine “soft”/ “slow mobility” solutions, such as an extended cycling and pedestrian network, which would finely further irrigate the territory around stations.

The integrated mobility scenario: conceptual exploration

From a conceptual viewpoint, the scenario questions the mental constructions of the territory. On a large scale, the Upper Rhine metropolitan region, currently set out as two North-South parallel axes along the river, acquires a new East-West dimension by reinforcing and increasing the cross-border connections. A new structuring image appears, that of a territorial skeleton supported by the Rhine as a backbone. Symbolically, this image tells the story of two parallel urban systems (which used to function independently one from another) coming together and turning towards the Rhine in the process. Previously seen as their dividing line, the river emerges as a shared valuable element, keeping them together (Figure 4).



Figure 4. The territorial skeleton of the Upper Rhine. Scenario of Integrated Mobility _ Conceptual development. (© IMR-AMUP. Andreea Grigorovschi, 2015)

Furthermore, Strasbourg's metropolitan area becomes coherent and recognizable throughout another territorial figure – the *diameteral beams*. In fact, by analogy, the concept of *beams* recalls the human energy flow drained by the new express lines envisioned within the scenario. Their *diameteral* nature is really the key point for understanding this image, highlighting the fact that metropolitan cores become truly central for the entire metropolis, French and German sides jointly. The metropolis' territory comes together as a whole since the beams pass through the cores and continue their journey towards the opposite metropolitan fringe. However, the diameteral aspect is not to be confused with a circular configuration per se. It

is rather the symbolic interpretation behind the circle that gives more meaning to this image as it implies the idea of unity. Indeed, put together, these *diameteral beams* reveal and structure the wide surface of the new “30 minutes cross-border metropolis” (Figure 5).

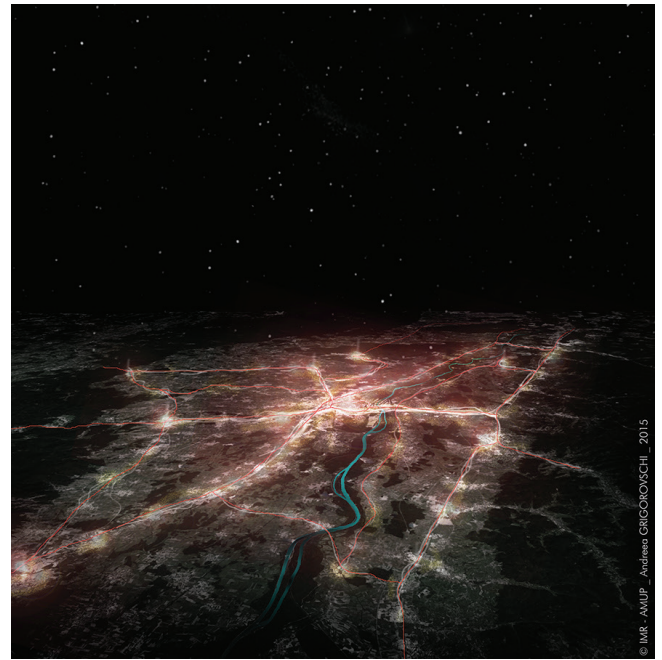


Figure 5. The diameteral beams structuring Strasbourg's metropolitan area. Scenario of Integrated Mobility _ Conceptual development. (© IMR-AMUP. Andreea Grigorovschi, 2015)

Last but not least, on a smaller scale, another conceptual image synthesizes the architecture of the metropolis. The *Dual-Core braiding* offers an alternative mental construction for the whole metropolis and especially for the territories in-between the cores. The metaphor of the *Dual-Core* stands for the two main central cities of Strasbourg and Offenburg connected to each other and working together. Without really merging into one single metropolitan center, the two cores continue to co-exist, each with its own autonomy, but together they mark a central part of the new metropolis throughout this single integrated mobility network. The *braiding* suggests precisely the intertwining between the rail, light-rail, cycling and pedestrian networks irrigating the territory and structuring it on different levels, scales, speeds. Although the image of *braiding* applies within the whole metropolitan area, the *Dual-Core braiding* narrates the development of this new metropolitan cross-border centrality (Figure 6).

Besides the above-presented version of the integrated mobility scenario, other possible futures are envisioned through this exploratory approach: alternative developments regarding later timeframes or even completely different visions are thus explored. From a methodological point of view, we also question the ability of the common graphic representations (especially maps and plans) to synthesize and communicate the multiple messages and meanings developed within the think tanks. In this sense, our research team also explores different ways of optimising graphical and visual communication tools, like aerial oblique viewpoints and moving maps.

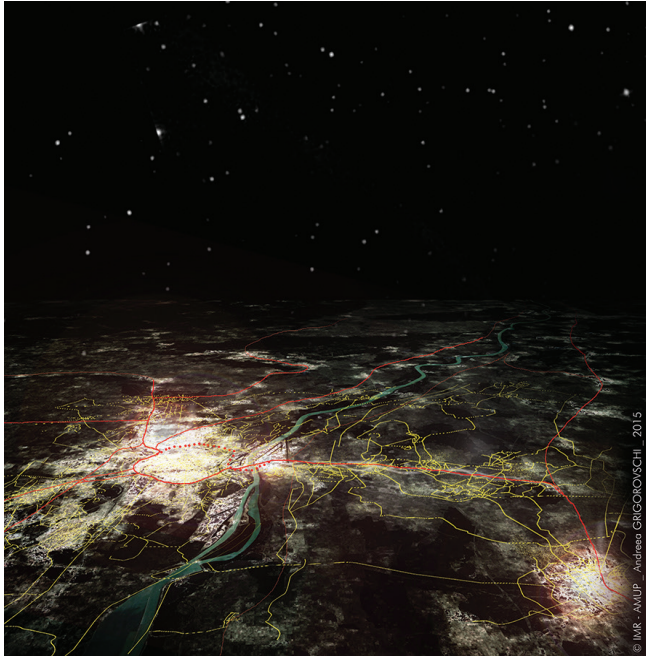


Figure 6. The Dual Core braiding.
Scenario of Integrated Mobility _ Conceptual development.
(© IMR-AMUP. Andreea Grigorovschi, 2015)

In sum, this kind of explorative scenario is meant as a basis for discussion during the Atelier's meetings. Even though it can be considered naïve, it is its "immature", unfinished and sometimes even incredible nature that seems to be able to provoke actors and open up the debate. Raising awareness to possibilities, rising technical or political question marks in terms of governance, cross-border cooperation, legal frameworks, practical implementation, the scenarios become a tool for sharing knowledge and moving forward in seeking innovative ideas for metropolitan development. In other words, explorative scenarios (as the one presented above) inquire possible futures on the "what" and "why" levels – *What can happen?* and *Why would it be interesting/risky/damaging for it to happen?* – whereas the revealed possibilities are meant to evolve and further trigger the "how" level – *How could this be possible?*

CONCLUSION

The sustainable urban mobility topic is going to be central both in local and metropolitan scale. In the context of the current process of energy transition, the stakeholders of the newly created 'Eurométropole' of Strasbourg are looking for new integrated strategies and planning approaches for urban mobility. These strategies are intended to be developed on multiple scales (local, regional), especially that of the Upper Rhine territory. Therefore, new cross-border institutional frameworks such as the Upper Rhine Conference are supporting the integration of both science and civil society pillars as new important actors in the local and inter-regional projects. In the main cities of the Upper Rhine territory - Strasbourg, Basel, and Karlsruhe - new visions are emerging, linked to an interesting "bottom up" approach (cf. project "IBA Basel", "Tramway in Strasbourg" and "Tram-train in Karlsruhe"). This way of thinking and acting takes into consideration geographical, cultural,

political, social and economical features and allows better coordination between technical and sensitive data, according to the idea of a "creative" territory (Héraud, 2011). Moreover, bottom-up approach reintroduces in those three cities old forms of slow movement, closely and increasingly related to contemporary lifestyle changes. Articulated to the contemporary hi-speed mobility, the concept of "to slow down" is not a synonym of "out of date" or obsolete world vision. Locally as well as regionally, the sustainable project of public mobility has to integrate the idea of this new slowness, of new break times which appear to be essential for a creative economy and a new quality of live.

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