THNS Forum 2020

Transport and Major Events in Metropolitan Areas after the Pandemic
Thirteenth International Seminar on Urban Transport Systems for Sustainable Development

The THNS Forum, International Seminar on Sustainable Urban Transport Systems was established under the 2007 Cooperation Agreement on Sustainable Urban Development between the Chinese Ministry of Housing and Urban and Rural Development (former Ministry of Construction) and the French Ministry of Ecology, Energy, Sustainable Development and the Sea.
The THNS Forum is an annual conference, held regularly in China and France since 2008, with a total of more than 1,000 participants. In 2015, the Chinese Ministry of Transport and the French Ministry of Energy, Ecology and Sustainable Development renewed the cooperation agreement. The eighth Transport Forum, held in Paris the same year, was part of the parallel event to the twenty-first United Nations Conference on Climate Change. In 2019, the 12th Forum was received for the first time in three cities (Lyon, Paris and Valenciennes), with the strong support of international partners.
In 2020, 22-23-29-30 October, were held jointly:
• **Thirteenth International Seminar on Sustainable Urban Transport Systems** on the theme of **Transport and Major Events in Metropolitan Areas after the Pandemic**
and
• **Eighteenth International Forum on History and Transport and Mobility (T2M)**

organized by URBA 2000, the University of Tongji and the Technical University of Berlin, with the support of the Prospective and Innovation Foundation and the Association for History and Transport and Mobility (T2M) Those registered for these two international conferences were able to participate in all the meetings, which brought together 58 presentations and more than 200 participants.
This document provides an overview of the 25 French and Chinese presentations and of the conferences and round tables of the THNS Forum, attended by more than 100 listeners from national and local administrations, academic institutions and experts from private companies or international cooperation bodies.
Opening Ceremony, hosted by **Professor Dr Hans-Liudger Dienel (Technical University of Berlin)** In his speech in German and Chinese, subtitled in English, **Professor WU Zhiqiang, Vice President of the University of Tongji** welcomed the initiative of this joint T2M-THNS meeting on transport, mobility and environment after the Pandemic. Contrary to those who think that the health crisis has interrupted the process of globalisation, he believes that we are entering a higher level of this globalisation which will facilitate the exchange of ideas between students, professors and universities. This meeting in which we participate, while remaining at a distance, is a representative element of this new period in which the contributions of each other can be pooled to build new cities, new organizations and a better life in our countries." On behalf of the entire Presidency of the University of Tongji, he thanked the professors, students and all those who helped them to organize this meeting. He believes that the University of Tongji's international cooperation will now leverage these new networks and new ways of working together.

The ceremony was attended by **Professor Pan Haixiao** (University of Tongji), **Professor Mathieu Flonneau** (President of the T2M Association) and **Jean-François Janin (President** of the Urba 2000 Association, which co-

organizes the THNS Forum with the University of Tongji).

Conference 1: International Land Transport: New Land Transport Cooperation Between China and Europe

Professor Ma Bin, from FuDan University, presented the Belt and Roads BRI policy initiative launched by the Chinese government in 2013 as an axis of international cooperation. The September 2013 speeches in Kazakhstan and October 2013 in Indonesia launched this idea which was clarified in 2015 in China with regard to the vision and framework of actions. Long-term policy aims to facilitate trade, which implies national coordination of actions to encourage people-to-people relations, integrate trade from a financial perspective and remove technical and legal barriers to transactions and investments.

The actions originally announced and those actually carried out are different, which is explained by the fact that the initial documents were not in fact binding and programmatic, but were only intended to explain the objectives of an overall policy. The central government has coordinated, in particular through the allocation of funding, actions by local governments and enterprises in different fields, which cannot be compared or simply summed up in the short term.

One example is the Railways, which have been the subject of real coordination of train operating procedures, concerted investment in bottlenecks and commercial promotion of this new means of transport. There were rapid technical results, with an increase in the number of trains, the destinations served and the number of containers. However, it can be noted that these results are still fragile, that flows are not balanced and that profitability is uncertain due to the empty returns of the equipment.

The Chinese central government also now wants to involve the Regions of Western China in this policy, considering that beyond the development of infrastructure, economic and social development actions on the ground will have to be managed at their level.

Professor Lutz Metz, a specialist in political science, sociology and economics, **The University of Berlin** analysed the political and strategic components of China's diplomatic initiatives in Central Asia from a transport and energy policy perspective.

Professor Zhao Jian (Beijing Jiaotong University) presented some problems in the development of the Chinese high-speed train.
This is in particular the contradiction between the rapid expansion of the high-speed rail network and its low utilisation rate, which leads to the construction of very high-speed rail lines with very few customers. In the short term, the regional economic benefits of high-speed rail are very limited. Especially in the sparsely populated areas west of the Huwangbu line, China National Railway Group Ltd. is heavily dependent on gains in freight traffic. However, compared to the construction of the high-speed passenger line, the construction of the freight line is very late. In the case of coal transport between the provinces of

China, a large part is carried out by road transport, which increases carbon emissions and overall air pollution. For the future, it recommends stopping the development of high-speed lines but giving priority to urban rail investments, which could represent 40,000 km for the 20 Chinese agglomerations with more than 20 million inhabitants.

Professor Zhao Kin believes that high-speed rail significantly improves travel and encourages many people to travel to major cities to work and to live there. It also confirms that railways will have to be at the centre of future urban development.

Round table 1: ***High-level education and research in transport: adapting teaching methods to the pandemic***

Françoise Manderscheid, Associate Professor of the ENPC presents the Specialised Master in Rail and Urban Transport Systems, which is based on a double partnership, professional and academic. As far as professionals are concerned, SNCF and RATP are present, as well as organizing authorities including Ile de France Mobilité and manufacturers like ALSTOM, BOMBARDIER and signalling companies like SIEMENS and Hitachi. As far as universities are concerned, the ENPC cooperates with INSA Hauts de France, the Technical University of Compiègne, the University of Birmingham and the University of TONGJI in Shanghai.
The Master programme consists of modules spread over 10 weeks and a study trip. 5 weeks are planned for deepening modules. A 4-week internship and a thesis complete the training.
As a result of the pandemic, a new pedagogy had to be found to carry out remote application studies, which were usually carried out at the site of the project whose technical and economic feasibility it is to study. The methodological approach remained the same, but the question of collecting information arose in a very different way.
For Dhaka (Bangladesh), a very congested metropolis of 24 Million inhabitants, the feasibility study focused on a railway axis of very long (55 km) and very high speed (two-stage trains with a capacity of more than 3000 people). The study quantified the cost of the project.
For Cotonou (the capital of Benin), whose economic development is currently limited by communications with the rest of the country, the students propose an original system of high-capacity gondolas over the lagoon, that would emit less greenhouse gases than other possible solutions and that could be implemented quickly. These elements were appreciated by the Ambassador of Benin in Paris, to whom the study was handed in July 2020.
This training provides students with the necessary basis to enter international companies present in advanced high-capacity urban transport systems, and in the consultancy and funding activities of public authorities, like AFD, which is also a partner.

INSA Université Polytechnique Hauts de France, Valenciennes. Céline Morin, University Professor, in collaboration with Sébastien Delprat and Christophe Delebarre, presents the theoretical and applied teaching of the Transport and Energy programme.
This international Master 2 focuses on technical and managerial issues in all modes of transport. It includes courses and small group work facilitated by industry experts. The group of INSA is composed of 7 institutions that train a total of 2600 engineers per year. For the school year 2020-2021, in this program, there are in Valenciennes 8 students in M1 and 12 in M2, who will take the courses of 33 professors and work with 20 industrial experts. Valenciennes is a very important industrial hub of the Transport Equipment Industry in France, with large companies such as Alstom, Bombardier, PSA, Renault, Toyota,...as well as reference research and testing centres such as the European Railway Safety Agency.
Ms Morin presents the details of the modules and the principle of the industrial projects that students carry out in groups of 2 or 3 with an industry expert and an INSA teacher. Work is also carried out with research laboratories, which allows students to use test or simulation equipment. For example, the Matlab software makes it possible to analyze the functioning of autonomous vehicles in different operating contexts and with different types of sensors. Students can work with an INSA autonomous vehicle and explore ways to make it work.

The contacts made with companies by INSA enable it to help students find internships that can turn into jobs in these new areas where companies are looking for young talent. Two examples of ongoing research are presented during the Forum:

Farouk BENMEDDOUR, Associate Professor at the Université Polytechnique des Hauts de France , **a** specialist in the diffusion of ultrasound in thin sheet metal, works on the creation of wireless communication channels for the automotive industry.
Car manufacturers, seeing the development of communicating objects in the future architecture of vehicles, would like to get rid of the connectors and cables that represent weight and sources of breakdowns. The electromagnetic waves do not propagate in the volume of the metal, but the ultrasonic waves of Lamb propagate in viscoelastic plates whose thickness is of the same order of magnitude as the wavelength.
These waves were used to check the integrity of the plates, which are used in composite assemblies and may have undergone shocks or aging that create propagation defects. Current research focuses on the use of these waves to transmit data over long distances and at high speeds. This requires compensating for dispersion, multiple reflections and reverberation in the communication channel. The first results show that it is possible to use new plates as damaged plates.

Iyad DAYOUB, INSA Professor, Université Hauts de France, IEMN Laboratory presents research on autonomous trains using 5G and its future developments. The aim of this research is to use 5G standards in the railway field, for example for remote operation of certain trains. Radio communication must allow information to be exchanged within the train, between trains and with the infrastructure. 5G standards bring speed, throughput, and low latency to data transmissions, as well as strong resilience to future technological developments. On the other hand, we must now consider that the current GSM-R system has become obsolete. Several projects are underway, including at the international UIC level, to update the definition of future needs. Shift2Rail is a European project, which aims to reduce the costs of rail transport and increase its capacity, in particular through reliable operation. Sustainability and client relationships are part of the programs.
It is expected that the communication system will adapt to several possible networks, with the train being able to choose the system that offers it the best service according with its location. Given the specificities of the rail system, it is now time to experiment and qualify the concrete situations in which it will be possible to offer better services or new services that will have economic value.

GU Jianghe, a graduate of the University of Tongji's School of Transport, is Director of the Product Center at THALES Sec Transport Automation System Ltd , after many years of research and development in the field of-train control based on communication (signalling and operational planning). His presentation focuses on the new **Intelligent Service Systems (IO&M TST)**

Industrial and technological trend: in 2020, the "Directive on the Development of Intelligent Rail Transport in Urban Areas" clearly highlighted the requirements of intelligent operation and maintenance. Rapid development of new information technologies enables upgrading the **Operation&Maintenance (O&M)** services.
Customer needs: Operational safety imposes higher requirements on communication and signalling equipment. The complexity of the equipment has justified higher requirements for operating and maintenance efficiency. The operation of the network and the guarantee of operating time require greater resources in O&M intelligence. Companies have new needs for full life cycle management and cost control.
Several generations of maintenance:
- First generation: repair in case of defection (corrective maintenance);
- Second generation: periodic reviews (planned maintenance);
- Third generation: risk and reliability maintenance (fault data analysis, equipment monitoring and management, data pool analysis, predictive and preventive maintenance, remote collaboration);

Professor Li Ping (University of TONGJI) in his presentation on the history of traffic management and traffic

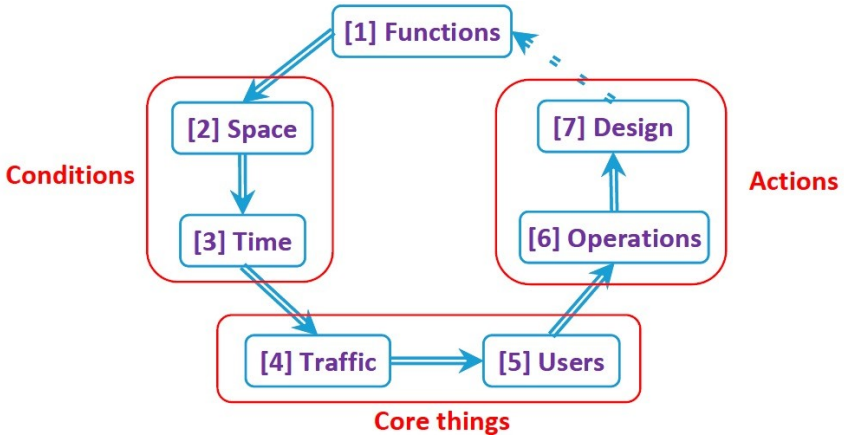
lights_education in China, describes the process of building this engineering of mobility regulation and congestion reduction services in China. Transport education and research in China originated from the Urban Architecture Education at TONGJI University in the 1950s. Those who participated in the THNS Forums in the early years (2007 to 2010) will be able to remember that digital systems were less developed in China than in Europe. Professor Li Ping recalls that the University of Tongji was founded 106 years ago, and that the School of Transport is only 20 years old. He hopes it will attract large numbers of students in this area where much remains to be done.

Panel 2: Evolution of urban transport systems

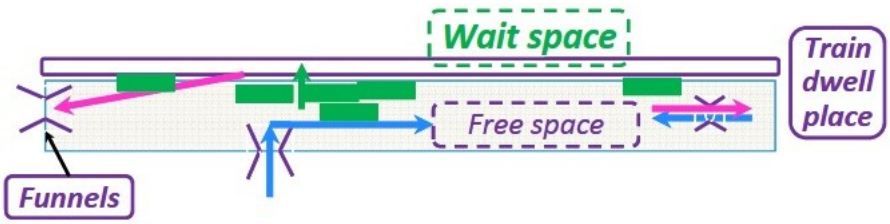
Fabien Leurent, Professor at the Ecole Nationale des Ponts et Chaussées, introduced the session dedicated to train stations, especially at the platforms. A major issue is the quality of service perceived by rail users. Two speakers after me will be Kang LIANG, who will become a PhD student at the ENPC and at Gustav Eiffel University and XIE Xiaoyuan, who has been working with me for almost six years now.

The massive flow of people in a metropolis is done by trains. For small distances, it is possible to walk or cycle, but for large distances, which require a motorized means of transport, buses and e-bikes are much less efficient than trains. For example, the regional trains of the Paris A line have a capacity of 3000 passengers and the track is equipped to accommodate in both directions 30 trains per hour. This system has a capacity of 90,000 passengers per hour.
On the platforms, these massive flows of train descent and embarkation must be cleared at all stations before the arrival of the next train. The proper management of these spatial entities, which are the platforms, must first ensure that the clearance times are sufficient to avoid congestions between the downflow and the boarding flow of successive trains. There is indeed a risk of accident (fall of person on the track) if congestion occurs. This causes delays in train operations and a cumulative decrease in the quality of service on the entire line.
The commonly used density index is the number of people per square metre. There are 6 levels in this index (from level A to F: A characterizes the conditions of free circulation, F characterizes a crowded train and an impenetrable crowd of passengers waiting)

This theme of dynamic dock management is gaining increasing interest today among researchers and transit operators. This research focuses on models of the phenomena that occur on the docks, the effects of which are events that have links between them, including causality.
The adjacent diagram describes in seven points what we seek to understand and model.
We start from the two functions of the platform, [1] which are to ensure the capacity to run trains and passengers flows. The platform space [2] must be regularly cleared [3]. To the extent possible [4], the wharf shall allow for the storage of standby passengers in suitable locations to facilitate their boarding [5]. The management of the dock [6] is an issue for operators, who must rely on a suitable design [7]



This involves organizing long objects (Diagram opposite) with “connectors” (pink and blue lines) between the “free” spaces for passenger traffic, those they are waiting to board and other parts of the station (and/or the outside world).



Train arrivals and departures have a similar effect on the pace of platform activity as the programming of the green/red phases of the traffic lights on the network of streets they control. If the train cycle cannot regenerate the capacity of the platform to store new incoming passengers, the system enters a critical situation.
The movement of passengers in the restricted space of the quay can be analysed as a market of rights of crossing between passengers: lateral crossing between the flows of access and exit, longitudinal crossing between the flows bi-directional between traffic and storage spaces.
Users will be modelled as autonomous entities, with a physical and «economic» decision-making process (time efficiency, comfort, social distance...) taking into account their various activities.
Operators manage train departures and arrivals using the signalling system, which makes it possible to regulate train flows by giving priority to the disembarkation or boarding phases. They can channel flows by floor signs or variable message signs. Flow control strategies may include demand management, such as the transmission of dynamic information to passengers or even car differentiation (e.g., women only or premium)
Many kinds of design problems can arise at different levels: formatting, arrangement preventing flows, links between platforms along the line, external flows, for example when the platform is between two tracks that have independent flows, or connections.

Kang LIANG, researcher at GUSTAVE EIFFEL University (laboratory-GRETTIA)
My presentation follows Fabien LEURENT's presentation. It's a review of the existing models of passenger traffic simulation on the docks to see how they fit with what we need. In particular, how they represent the events of the real world, with what limits and with what degree of precision.
I will present the models by type and then analyse them according to the generic objectives of the users.
Train traffic management requires that the simulation of the phenomena that slow down passenger traffic be reliable enough to prevent the congestion of the platform. Station management must have a strategy to control access to the platform in the event of a disruption and the simulation tool must be consistent with that strategy. We could also model the way passengers are distributed on the platform, the operation of the station or the line.
Some will also want to improve the multimodal information available to travellers who see the train as a link in their daily commute.
Among the models I analyzed, a first type is oriented towards flow simulation: EMME, Capta,Bus Mezzo, MassMotion, Vissim, A second type models entities (trains, services, platforms) and the interior of them: Capta, Delft2020 . A third type models the dynamics of events: MassMotion, Vissim.
Three models are presented for the management of a transport network or a line, with the objective of assessing the level of service resulting from different modes of operation.
For pedestrian traffic flows, two models simulate "microscopic" phenomena and there is a "mesoscopic" model.The analysis grid makes it possible to specify the choices made by the authors of the 6 models and to compare what they bring in relation to the objectives of our research.
Ultimately the best solution for our research would be to combine one of the two MassMotion and Vissim models that represent the circulations along the quay with the Delft2020 model that represents the dynamics of the circulations crossing the quay.

<u>Discussion</u>
Kaisheng LIU's question: In the railway industry the software "LEGION" is used to simulate the behaviour of passengers in public transport. What do you think?
Answer from **Kang LIANG**: I know this software which is used in several countries. For this research we first wanted to look at generic models that link what happens on the platforms with the operation of the rail system, but I will remain interested in what other software is doing.
Comment:**Fabien LEURENT** asks if we know of cases of use of this software for the management of the entire public transport line.
Kaisheng LIU believes that the company that develops this software has a comprehensive approach to the behavior of people in buses, stations, trains and also in places receiving from the public to evaluate its operation and safety.

PAN Haixiao asks if it is possible to integrate people with reduced mobility in the flow modelling **Kang LIANG** responded that it is possible
PAN Haixiao asks if any studies had been done on the behaviour of these people.
Kang LIANG replied that there have been studies on this subject which is very broad and **Fabien LEURENT** gave the example of work which has been done on the strategies that people use to adapt their journeys to the fact that there are stairs to climb in the stations of correspondence.

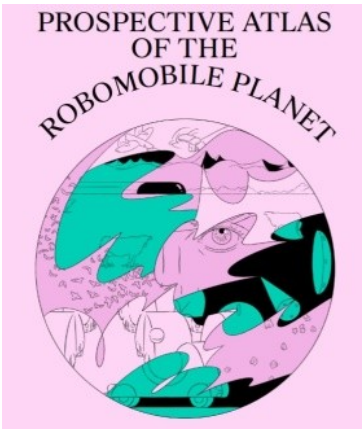
XIE Xiaoyuan, Researcher at the ENPC presents her current work on access conditions for RER passengers. The time it takes for a passenger to get on a train back into the station depends on the speed of the passenger and the geometry of the station. I started working on this issue in 2015 by using data from the ticketing system as a measure, and gradually improving thinking. The researchers who followed these questions for the road sector spoke in 2011 about the dynamic distribution of users, and then in 2014 about interactions between passengers and PTAMs trains. Today we are talking about a physical and statistical method under the acronym PTAMs to take into account the strong variation between individual behaviours, but also the analysis of the data by statistical methods that we implement. We will detail four examples:
M1: We tried to determine how long it takes users to reach the train, assuming that the speed of travel is the same for everyone.
M2: Since the individual speed distribution is different, we calculate the probability that the passenger can reach the area where he wants to stop to wait for the train. This amounts to looking for the distribution that passengers think is optimal to wait for the train
M3: By introducing the movements of outgoing and incoming travellers, it is possible to calculate the additional distance that a traveller must make to reach his place of waiting when he has to bypass the flows of travellers that go in the opposite direction.
M4: We are trying to determine the probability of a passenger not being able to take the train arriving at the station.

<u>Discussion</u>
Question from **Michel Rostagnat**: Do the figures you give come from observations or theoretical work.
XIE Xiaoyuan's answer: the observation data are not yet sufficiently available for us to have been able to process them directly, it was first necessary to work in a theoretical way. They start opening slowly now
Pan Haixiao: is it possible to change the characteristics of the dock?
XIE Xiaoyuan's answer: No, this is not yet envisaged in this research.
Hervé de Tréglodé: What are the possible applications of this research?
XIE Xiaoyuan's answer: data from validators are used very little. There is in fact a whole field of research in the analysis that could be made of the quality of the service provided to the client.
Pan Haixiao: Could we also analyse the overall OD data of passengers including the metro part? We have started studies on this urban development in Shanghai. We would be interested to know if there is any work completed in Paris.
XIE Xiaoyuan's answer: we would also be interested but we are only looking

Conclusion of Fabien LEURENT: Ticketing data and train movement data are not integrated in real time and it is still difficult to make a posteriori operation. The current work could be carried out as research to justify the interest of a change in the organization. We would obviously be interested to know whether a Chinese team has made progress in this area and to share with it a research project and results that are useful for all.
Thank you all for your contribution to the preparation and delivery of this conference. Wishing we'd meet again soon!

Hervé PHILIPPE, Senior Official of the Mission for Innovation, Digital and Territories at the Ministry of Transport, presents the forward-looking workshop on robomobility. This initiative, launched in 2016, aims to prepare public and private actors (government, scientific academic institutes, private companies, industry, etc.) to organize themselves to welcome automated vehicles by providing them with evolutionary visions on our soci-

eties beyond the 2050s, during which they could generalize. The new Gustave Eiffel University, which includes laboratories of former IFSTTAR (Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux) and the LAET (Laboratoire Aménagement, Économie,Transports) in Lyon are participating.
This workshop is structured in 3 circles of participants: a steering committee with a small number of participants (Ministry, Gustave Eiffel University, LAET) to define the orientations and programs, contributing members who participate in seminars and activities and propose studies and topics, a large circle of members (companies, experts, local authorities, etc.), who exchange on production and activities and attend the annual "Grand Rendez-vous". The workshop has a website and a newsletter is sent out periodically.
Robomobility raises several areas of issues, mainly focusing on social, societal, organizational impacts.
The 2019 «Grand Rendez-Vous» brought together nearly 100 participants at the Gustave Eiffel University: experts from different countries (USA, Germany, Africa, China, Brazil, Australia ..). They shared their political, cultural and development perspectives. These experts agree that autonomous vehicles (AVs) should be shared, not private.
Demonstrations around the world are good opportunities to show autonomous vehicles and educate people.



What do people expect from these vehicles? Is the SAE-J standard with its 5 levels a good reference point for populations to be impregnated with robomobility? This is a technical description of the functionality of autonomous vehicles that does not give a good idea of the quality of service provided to the end user.
This seminar provides a vision for the future and it was decided to publish a prospective atlas on the robotic planet. This edition is available on the website. Artists contributed to this Atlas and they imagined stories and scenarios. Then, a «Grand Rendez-Vous» on robomobility for cities and territories will be scheduled in 2021, but in the meantime, more intermediate webinars will be held.

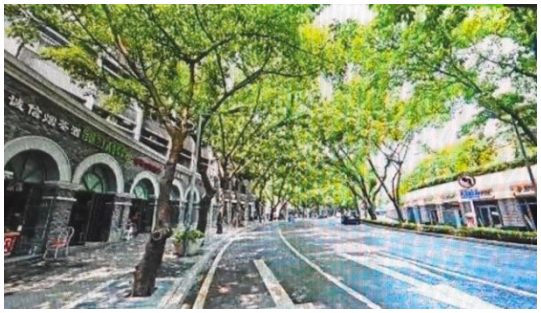
Engineer Fu Yan, Vice President of the Chongqing Institute responsible for the design and management of Transportation infrastructure, presented Chongqing Bridges.
The territory of Chongqing has an area of 82,400 km². 90% of this territory is mountainous. The Yangtze River, which crosses it from west to east for 670 km, is the main axis of communication.

Chongqing has a large number of bridges, with a wide variety of shapes and technologies, including modern high-tech bridges. In total and including the bridges in projects, there are 13,000 works and some are very long bridges with spans of very big dimension. That is why our city of Chongqing has been recognized as the «bridge capital» of China.
To make it possible to move in this very accentuated terrain, Chongqing has built cable transport of different principles: vehicle clinging to a moving cable, lift, cable car, ferry: the funicular of LiangLuKou was put into service in 1954. It was replaced by a modern funicular system. Chaotianmen was put into service in 1984. To adapt to the variation of the water level of the Yangtze, the lower station is connected by a floating platform to the barge on which the passengers embark. The Kaixuan elevator was put into service in 1986. It crosses a 43m drop between Chuqi gate and Jiaochangkou. The construction of the Yangtze cable car was started in 1986 and opened in 1988.

Construction of bridges to serve new neighbourhoods on both sides of the river. Many bridges and docks, which are equipped for walking, cycling and sports courses are not accessible to cars. Examples include the Hutouyan Fitness Trail in the

Yuzhong District and the Binjiang Fitness Trail on the Nanbin Road. construction de ponts permet de desservir les nouveaux quartiers de part et d'autre du fleuve. Beaucoup de ponts et de quais, qui sont aménagés pour la marche à pied, le vélo et des parcours sportifs ne sont pas accessibles aux voitures. On peut citer le parcours de remise en forme de Hutouyan dans le District de Yuzhong et le parcours de Binjiang sur la route de Nanbin.

The most beautiful street in Chongqing is called Zhongshan. It has a length of 800 m. There are many historical memories (residences of the leaders and Chinese national command center during the Second World War). The stone and brick architecture adorned with arcades of this time, the museums and all the shaded streets evoke these events. It is always places of education and culture that make the attraction of the city.



Yang Lin Chuan, Urban and Rural Planning Researcher at the **School of Architecture and Design at Southwestern Transportation University**, gave a presentation on the influence of BRT on the price of real estate along the line.

BRT (Bus Rapid Transit) is a bus transit system designed to improve capacity and reliability over a conventional bus system. It aims to increase the transport capacity of buses with lower flexibility and costs than the metro. The first Chinese experimental BRT program was launched in Kunming in 1999. At the end of 2017, 21 major Chinese cities had a BRT system. These systems have resulted in higher prices for neighbouring properties (accessibility-based benefits), but proximity to transit corridors is often linked to a disorganized urban form, air and noise pollution and traffic congestion. These two contradictory phenomena result in very different price variations along a line. This spatial variation is correlated with the level of housing prices, which are much more sensitive to the negative effects of this concentration of flows than commercial properties.

Modeling (Hedonic Price Theory) : Hedonic price theory assumes that the prices of goods can be broken down into fictitious prices of a set of specified attributes. The work involved more than 5,000 real estate transactions in the vicinity of a BRT line in Xiamen. The models used are spatial autocorrelation models by quantile (spatial shift (SLM) and spatial error (SEM)) which allow to estimate the correlation coefficient with respect to the quantile of distances to the line (which causes nuisances for the dwellings) and distances to stations (which provide accessibility to properties).

Results

The study shows that price heterogeneity is well correlated with the position of the properties concerned. There is a clear idea that buyers are willing to pay more for homes that are less affected by BRT nuisances. The quality of housing itself, which is a positive factor for purchasers of housing in the peri-urban area, is less important than the distance from the BRT for homebuyers in the city centre.

Recommendations based on these findings

- It is recommended to construct acoustic barriers and plant vegetation along the BRT corridor to avoid adverse proximity effects of the BRT. It may be more appropriate to develop commercial areas along the corridor, as they are better valued by customer accessibility.
- Given that the effects of BRT accessibility are more noticeable in suburban areas than in urban areas, it is suggested to improve transit service in suburban areas, where low-income people reside.
- Housing prices are more predictable near city centres than outside the region

Conference 2: Bus Metropolises: How will these daily mobility systems evolve?

Professor Robert CERVERO reviewed the new problems and challenges facing public transport and urban development. For more than 20 years, it has been following the expectations of metropolises whose daily mobil-

ity is ensured by buses. His first book on the subject “The Transit Metropolis” was published in 1998. He believes that today these cities need to better coordinate the developments of road transport by bus and urban rail transport to adapt them to the situation of the region and to the needs of customers. In addition, new social factors such as the emergence of political ecology, the development of electronic commerce, the change in the structure of employment and the growing ageing of the population open up new perspectives to the old concept of metropolises whose daily mobility is based on buses. Professor CERVERO explored several examples of policies to develop, guide and implement public transport priorities in the future. He believes that each region must adapt to its context and in a flexible way the link between the development of public transport and urban development . Finally, referring to the challenges faced by public transport as a result of the pandemic, he believes that in the future public transport services could be more flexible and move towards greater personalisation.

Panel 4: New Ways of Getting Around the City

Dominique RIOU, Transport Engineer at the **Paris Région Institute** in the Transport & Mobility Department, presents the **RER-V**: **the regional express bicycle network**

Here are some key figures from the Ile de France region: 12.1 million inhabitants, 6 million jobs, 12000 km2. Paris is the center of the region.
Cycling has had a slow and gradual integration into regional urban policies. In 1976, a first document was created: «the two-wheeler in the city». The bicycle is then taken into account as a real mode of transport but without act and almost without effect. In 1994, a new regional master plan integrated cycling but associated it with leisure. In 2000, the first Regional Mobility Plan (SUMP) integrated a regional network dedicated to cycling but without any real means of implementation.
Finally, in 2013, a new regional master plan and the new mobility plan integrate together a regional cycling network. In less than thirty years, 6,000 km of cycling routes have been built. This network consists of 1,854 km of dedicated bike paths, 999 km of tracks and 2,120 km of roads in parks and forests. It is a good job but not enough: 0.5 m/ inhabitant and 0.5 km/ km2. It is not a real network and there are many discontinuities, many too short sections, a very variable quality, a lack of signage. Bike mobility has thus increased very slowly, reaching 2% of the modal part in 2019 (public transport is the main one).

The city of Paris is a special case: 900 km of bike paths (8.6 km/ km2); 3 times more traffic in 20 years. Other European cities (Copenhagen, London, Berlin) show us the way forward. They have set up a super bicycle network on a regional scale. These 3 cities make cycling a real public transport system.
At the beginning of the year, before the pandemic, a new vision of cycling in Île-de-France was finally born: the RER V project - the project of a regional express network for bicycles. It consists of 9 lines and 650 km of continuous routes. It is designed for heavy traffic (cycling as a mode of public transport). It is built by local authorities and the Region. It receives regional financial support (€300 million in funding).
Following Covid-19 lockdown, 140 km of new routes were built in 4 months. Many people decided to ride their bikes and the number of cyclists doubled compared to the previous year. The solution is simple: reduce the number of traffic lanes and better protect existing bike lanes.

It was a success: Rue Rivoli, the main street in Paris, broke the record of 20,000 bikes a day. In the 1970s, Rivoli Street was used only by cars, in 2010 by cars, buses and bicycles and now only by bicycles and buses.
Promoting cycling is good for the planet (zero-emission transport mode), for the city (it’s compact, flexible, fast), for health (cycling is a sport)

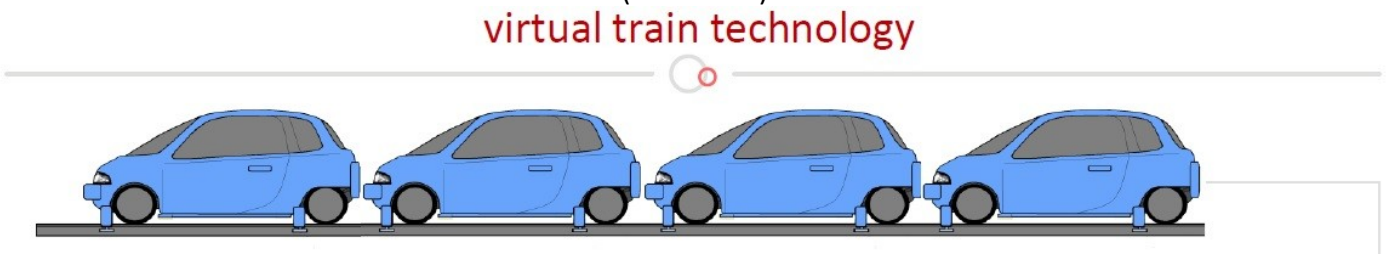
Michel PARENT , who was a pioneer in the development of autonomous vehicles in Europe, now President of SuburVAN, presents his reflections on the contribution that autonomous vehicles can make, after the Pandemic, to increase the modal share of public transport in peri-urban areas.
Before the health crisis, 46% of trips were for reasons of commuting and 21% for leisure. To go to work, people who live in Paris use public transport but also walking and cycling. When they live more than 50km from the center of Paris, they come mostly by car.
The lockdown took place from March 17 to June 22, 2020. The survey by INOV360, an independent consulting firm, between 8 June and 17 June found that: 41% of the workforce worked from home and 36% worked part-time. Car congestion decreased by 35%. The share of the car increased as users found themselves safer by car, especially in the areas furthest from the centre (+39%). Public transport was used less (-40%) in these areas. In the centre, the modal share of cycling and walking increased.

Autonomous vehicles were tested in many cities as part of European experiments and projects between 2000 and 2016. The range level of the vehicles is characterised by range levels: Level 0 (no assist and fully manual driving); Level 1 (assisted driving, such as speed control); Level 2 (partially automated like the Tesla); and Level 3 (highly automated). For these 4 levels, **the attention and presence of the driver are necessary**. At level 4 (completely automated, the steering wheel is no longer needed) and at level 5 (autonomous, no more need for human assistant), the system supports the operation of the vehicle.
The tests focused on the social acceptance and economic conditions of these services. For this research phase, the speed of these shuttles was limited to 2 km/h, with a human presence on board.

To continue the development of autonomous vehicles today, it is necessary
• Establish these systems in geographic areas where traffic is high.
• Increase the modal share of sustainable modes (PV) with better travel time compared to the car and with equal or better comfort;
• Integrate these systems with public transport: VA/TP time synchronization, ticketing, passenger information
• Lower cost / km and move towards greater profitability
• Safe operation at higher speeds
• Ensure more comfort compared to the car
• Remove human presence (when level 4 is reached)
The objective of the autonomous minivans SuburVAN is to provide pick-up services on demand from home to the TER stations in 10 minutes within a radius of 10 km. SuburVAN service will be accessible through a mobile application to plan and book your trip. The service must be balanced with a ticket price equivalent to that of a journey of the same duration by public transport.

Zhang Ruijing, an expert engineer in the field of autopilot, presents an alternative to public transport systems that are being implemented today, but that do not replace cars. Under the name of Rapid Rail-net Transport (RRNT), it offers an alternative to metros, and trams (Light Rail) which are expensive and long to install. These are personal vehicles that are more comfortable and flexible than public transport on dedicated infrastructure. There have already been demonstrations of such People Rapid Transit (PRT) but of low capacity. To increase the capacity, it is necessary to constitute virtual trains with several vehicles by reducing the inter-distance (which increases the capacity of the infrastructure, now penalized by the emergency braking distance, which increases with speed). It specifies the technical issues to be resolved in order to operate these systems safely (radio links, information sharing, convoy control, speed control, braking procedures, etc.). He calls on the rapidly advancing specialists of these technologies to implement this idea in order to eliminate urban congestion caused by private vehicles.
Michel Parent thanks **Engineer Zhang Ruijing** for his presentation which confirms what he has heard and seen himself with regard to PRT. They then discuss the exact meaning of the small blue bars that seem to rigidly link

the vehicles to the infrastructure on slide 6, while driving at 1 m/s for example. It seems that there must always be a small gap between the vehicles if they are not attached. These blue bars, that are virtual, correspond well to the functions described in slide 18. (here after)



It appears that research is underway on some of these functions in several countries, but without active international cooperation at this time.

Panel 5: Digital Mobility in 2020

Michel Rostagnat is a member of the General Council on Environment and Sustainable Development, at the Ministry of Ecological Transition, responsible for transport issues. It is responsible for monitoring a Franco-Chinese transport cooperation agreement.

His presentation focused on the May 2020 period: Deconfinement in France, government objectives, challenges and results

The Covid-19 crisis began in Wuhan, China.

- 16 March 2020, the French President orders the general confinement.
- May 11, return to work and primary school are allowed. Two further deconfinement steps followed.
- 2 June: return to high school, reopening of restaurants and churches.
- 22 June: return to normal life.

But in October, the epidemic returns and one-off restrictive measures are taken.

The deconfinement has led to transport problems:

- transport organizing authorities and their carriers have taken “social distancing” measures. They warn about the risk of «chaos» and economic blockage;
- People do not understand why they travel on crowded transportation and cannot travel to a public park or church;
- 30% of RATP officers did not come to work because they had to keep their children at home during the deconfinement; it is difficult to be careful during peak periods;
- The obligation to wear a mask is a source of verbal and physical abuse.

At the end of September, the level of urban traffic reached 80-90% of the previous level, except in the Paris region where it remained at about 65%. Commuters avoid public transport in larger cities as much as possible, but the Covid-19 Science Committee says no more than 1-2% of clusters come from public transport. However, people keep in mind the constraints of social distancing.

Users have adapted their behaviour: teleworking; travel outside peak hours; choice of individual transport (including the car) to avoid public transport. Traffic decreased by 50% during peak hours.

The authorities have reduced the space dedicated to the car and «coronavirus pathways» have been created in the streets and dedicated to bicycles. Cycling is increasing but remains marginal: before the health crisis, cycling accounted for 2% of trips in major cities, 3% in downtown Paris and Lyon, plus in Strasbourg and Grenoble. Its traffic increased by 40% in September 2020, by 70% in Paris where it currently reaches 5% of travel modes. Traffic should return to normal.

Conventional models are poorly suited to traffic forecasting. Mobile operators provided smartphone data to assess long-term population movements and make a comparison before and after confinement by depart-

ment. The data allows us to pinpoint the location of people. Movit evaluates the global flows on the axes and Kisio makes traffic statistics on the origin destination routes with a vision in time.

In the future, employers should encourage telework and staggered peak hours; employers, property developers and local authorities are invited to work together; multimodal information, facilitating modal shift and integrating slow or shared modes of transport are encouraged.

Jean-François JANIN, President of the **Association URBA 2000**, presents his personal reflections on the Evolution of mobility policies in France during and after the health crisis of 2020

The health crisis was first perceived as a crisis of mobility, which brutally challenged the unconscious links between different notions: mobility and the freedom it allows, the economic activity that accompanied them and the social progress that resulted. Everyone is sensitive and very attached to these notions, but these links are complex.
At the time economic activity was allowed to resume, with detailed precautions, our society appeared as vulnerable, in a vulnerable world in many ways.
Mobility policy has appeared to be fragmented and variable from one territory to another, as have other policies that are the responsibility of the States, while the challenges of the fight against the greenhouse effect, biodiversity, water resources and health remain global issues. It was not until the end of 2020 that political developments allowed those who believed that the Paris Climate Agreement was the beginning of a new era to regain a sense of appeasement.The generation that believed, because it had been taught, that our planet is a rare and unique treasure will certainly be more determined to defend it in the coming years. The new cycling policy is an example.

But there are many possible solutions to contribute to sustainable development. Some have generated interest, such as driving automation, but seem less fashionable than others at this time. Monitoring of solutions remains important, as do the scientific tests and evaluation articles that are written, re-read and published. So there is a risk to the dissemination of innovation. The territories may want to defend the solutions they have started to test, without taking the time to compare the results of other solutions tested elsewhere. There are a lot of benefits to putting a lot of weight on the decisions that are made by the territories, but there is a need for cooperation among those involved in the change processes, and it would be very helpful to facilitate those communications, especially since the events have changed the traditional organisation of interpersonal exchanges.

Kaisheng LIU is president of the **Franco-Chinese Association for Sustainable Urban Development (AFCDUD)**. It promotes the concept of Smart City Green Life in the face of the challenge of new urbanization. In his speech he describes **Marketslib, a community sharing platform:**

Context: With the health crisis, digital services have developed:
- Online activities such as telework, education, entertainment…
- contactless credit card, online payment
- Delivery service/driver: shops, supermarkets, etc.

A new application: Marketslib is a **collaborative digital solution** where citizens can share information on:
- The Neighbourhood Retail Queue
- Availability of necessary products

It allows:
- Better control of exit time for shopping and reducing exposure time to the virus;
- to self-regulate the number of consumers in the shop.
In addition, the app also provides other information and services: click and collect, store opening hours, promotions and current selections.
The application uses open data and the OpenStreetMap mapping system (via an API). Web address: https://webapp.marketslib.com
The application is simple, without software installation, and does not require account opening. The application guarantees the confidentiality of user data: no collection of personal data. After 2 months of use, users visited 2,800 stores (mainly in Paris) and 105,000 consultations were held. The application is relayed by social networks (Facebook, Twitter, Instagram) but also by national media and organizations (CGTN in France, French Mobility, Menil Info, a local media)

Outlook/ What is the future of the app? What is its purpose? Show COVID-19 test points or vaccination sites? Get more information to avoid crowds or easily access services?

Li Jiamin, researcher at the **School of Urban and Rural Planning** of the **University of Science and Technology HUAZHONG** presents work on the new design of **Road Safety.**
Three words are used to refer to transportation safety: the word "transportation" which refers to the movement of persons and goods: "travel" which refers to travel services that are rendered to customers who are at the origin or destination, “traffic” refers to vehicle traffic on infrastructure.

At the beginning of the 20th century, urban planners were sensitive to the density of buildings in cities that threatened the health of the inhabitants. This health problem raises a number of issues, in particular road safety in cities, which is a question of both infrastructure engineering and vehicle pollution. At the same time, research is currently developing on the sociology of urban space, its vitality and the fairness of its management. These two dimensions of urban mobility research can be called “hard” and “soft”, which is no longer just transportation planning and urban planning.

The Chinese universities have basic programmes on traffic engineering and construction, but we are seeing the development of courses on the analysis of mobility demand, environmental impacts, transport policy, transport financing. To some extent, this technical discipline now includes thinking about governance.
The Natural Science Foundation of China (NSFC) “Trafic” project is still based on systems and information theories as well as cybernetics of the 1940s and 1950s, with new developments on intelligence, humanization and the environment. The basic assumption is that infrastructure adjustments and advanced management systems will solve recurring traffic problems. In the last three years, there has been research on potential crises, particularly global warming. However, scientists believe that it is becoming increasingly difficult to treat urban space management and the transport system separately, while they interact with each other in a complex way.

Health is an example: studies have shown for several years that pollution has multiple effects on health: this is now quantitatively true for air pollution and noise. Two recent studies justify the study of ways of reducing this health risk for residents of traffic routes. This could result in new research topics on urban public space planning: low-carbon slow transport, sustainable technology standards, rapid mass rail transport, street quality standards. New needs have emerged as a result of the pandemic: Identify how the city works to better manage contagion risks, exceptional flows (major events), life rhythms and lifestyles.

Safety is always linked to accidents: the community must protect people and property. To reduce the objective risks caused by transport, it can regulate and educate citizens.

QI Yuan, PhD student **TONGJI University**, (**Professor YONG Chen** TONGJI University), presents an ongoing work

on the **Assessment of Elderly People's Street Travel Conditions** (Case Studies of 4 Neighbourhoods in Shanghai)
China is in an aging phase of its population. Walking slows the rate of cognitive loss. The research aims to understand how urban seniors work, what could be done to improve their environment, and how to do it.
The method consists of recording movements actually made by persons for whom an investigation has been carried out into their cognitive and walking abilities. At the same time, the built environment is analysed (commercial density, distance and number of crossroads to cross, comfort, safety). The study involved 133 people over the age of 60.
The analysis is done by a Classification and Regression (CART) algorithm to relate the more or less direct paths followed by patients to go from one point to another with the characteristics of the built environment. From the same starting point, we analysed 4 families of itineraries in different neighbourhoods and different contexts (going to the hospital, going shopping)

The results show, with good reliability, that the elderly make short trips (within a 7-minute walk) But they rarely take the shortest route and are sensitive to the environment in which they walk. Some detours can be explained by attractiveness factors (for example more than 48% of the street line occupied by store windows) or repulsion (disordered environment and narrow sidewalks).
As the number of cases studied is small, these results will have to be compared with other research carried out in other contexts.

Jacques BREGEON, **President** of the **Ecole des Métiers de l'Environnement - EME** describes a **Living Laboratory project** called "Le regain" at the service of changing territories, applied to symbiotic ecosystems in sparsely populated areas. Sectoral approaches are not suitable for territorial logics which by their nature are transversal. The Living Lab needs a systemic and complex approach that integrates life and is therefore similar to 'symbiotic systems'.
We understand that ecological, climatic and health problems are both local and global. A new economy is emerging, integrating the human and dynamic understanding of the company. The current transitions involve collective and territorial competences. The missions of the living lab are to accompany the territories in their transformation with and for the actors, facing ecological, climate and health issues. Sustainable strategies are co-built with the expectations of stakeholders and citizens and those of future generations.
This project is a joint initiative of the EcoOrigin cluster (Le cluster des éco-activités en Bretagne) and CHEDD Bretagne (Collège des Hautes Etudes pour le Développement Durable), with the support of H2X Ecosystems (a company that promotes sustainable energy and sustainable mobility) and UniLaSalle-EME (Ecole des Métiers de l'Environnement), symbiotic economy, CNAM (Conservatoire national des arts et métiers), in partnership with universities, engineering schools, training organizations.
The Living Lab brings the knowledge and know-how of the territory through multi-stakeholder projects. It includes several activities: creative workshops, design reflection, surveys and diagnostics, experimental projects, modelling & simulations, applied studies & research, training certification & development of collective and territorial competences, monitoring and evaluation.
Climate is a cross-cutting field and here are the topics to cross and synergize, applied to eco-responsible territories where life is good: clean renewable energy, mobility and living environment, eco-responsible industry, skills, employment, health, environment (water - food, biodiversity).
The advantages of the Living Lab are that the ecosystem of local actors is linked to the Living Lab network. Regional industry, economic activities and employment are stimulated by a clean energy ecosystem strategy and the use of local natural resources; these activities generate synergies and fruitful cooperation, promote innovation and new concepts such as the circular and symbiotic economy approach; The actors of the territories concerned are sensitized, collaborative practices are encouraged, collective skills are developed.
The living lab is based on three pillars (technology, methodology, ecosystem) and three logics (economic and symbiotic logic, energy logic based on an ecological and ecosystem approach, collective skills based on the human wealth of the territory.) It uses the ENoLL (European Network of Living Labs) method.

The project is in pilot phase until June 2022. A consolidation phase is then planned between 2022 and 2025 and after 2025 the project should be operational.

Conference by Marc Guigon Director at the UIC (International Union of Railways):

Organisation and actions of the railway sector during the health crisis

Since February 2020, the UIC Covid-19 working group has held 13 meetings, Covid-19 web conferences (South East Asia, Africa, Latin America region), presentations at UIC regional assemblies (Europe, Asia, Middle East). 120 videos are available on the UIC Media Library, 5 guidance documents have been translated into many languages (French, Spanish, Portuguese, Russian, Japanese, Serbian and German) and 500 other documents have been shared.

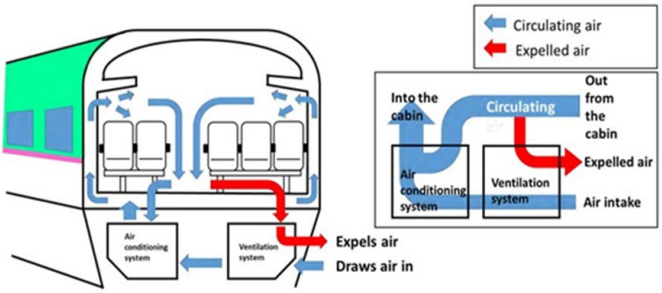
The first guidance document in March focused on potential actions, case studies and practices, legal considerations; the second, in April, focused on potential actions to restore confidence in rail transportation following the Covid-19 pandemic;

The third in May focused on "how the rail sector fought Covid-19 during lockdown". During containment, rail has demonstrated its resilience by supporting the medical sector.

The fourth in June concerned Railsilience and the return to normal.

The fifth in July was the global economic impact of Covid-19 on rail transportation.

Subsequently, two reference guides were released: Masks/Ventilation and Social Distancing and Thermographic Cameras for Measuring People's Temperature to Combat Covid-19.



Masks are more effective at containing the virus exhaled by the wearer. If everyone wears masks, protection is done in both directions.

But distancing alone is not effective if the virus is spread on the train. Wearing a mask is mandatory in most countries of the world. It is recommended that indoor air be renewed by an outdoor air intake and that indirect ventilation systems be preferred.

From an economic perspective, the rail sector (passenger and freight) lost $85 billion in the summer of 2020. In the passenger sector, the shortfall is around €60 billion in 2020. In the freight sector, the shortfall is around €26 billion in 2020.

Panel 4: Evolution of urban transport systems

Ms Cristiana MAZZONI Professor of Architecture at the National School of Architecture of Paris-Belleville, presents the document prepared by **FAN Lang, architect and planner** like herself, who cannot attend the meeting. FAN Lang worked on social life in Shanghai's Chinese residential neighbourhoods for his PhD at the University of Strasbourg. She is now a researcher at the **Shanghai Academy of Social Sciences** and a teacher in **Strasbourg** and **Versailles**. They are now working on shared housing case studies with a focus on mobility, ecosystems and changing practices in residential neighbourhoods during the pandemic. During the last decade of the 20th century, the Shanghai's urban development has grown exponentially, with the new market economy system and a new housing policy. A major transformation of architecture and urban forms has occurred with a sharp increase in population. Residential towers were the most appropriate typological solution to meet this new housing demand. The metro network that was built during this period has given an

efficient mobility solution to the residents of these towers who travel daily to their workplaces spread throughout the metropolis. With the increase in the standard of living of city dwellers, these factors have determined this new urban silhouette on the one hand, and on the other hand the emergence of social problems linked to exclusion.

We can see above these elements of the landscape of Shanghai today, with the infrastructure for rapid mobility (highway and underground metro) at the boundary between old and new housing areas.

To describe the evolution of housing in Shanghai, we proposed the idea of “urban cycles” [slide above] corresponding to successive housing types, each corresponding to a specific lifestyle. The «lilong» is the traditional type organization and the most recent group of towers.
We examined the shared living, entertainment and common activities of residents across the city and the building. We started from the assumption that it is the ground spaces, the so-called “intermediate spaces”, sorts of thresholds between the city and housing, that are organized and designed for this purpose. During the lockdown period, these places were highly appreciated by residents.

Living in the metropolis:
Threshold spaces in process
« SHANGHAI 2040 »

We studied the new organization of housing near Shanghai North Station (Zhongyuan Liangwancheng 中远两湾城) the neighbourhood that seeks to combine interactions and circulations between buildings, with the entire neighbourhood and also with the entire metropolis.
This type of organization is also present in types of mixed buildings, dwellings, offices and shops [slides hereafter] which take the model of the “Multimensional City” in which several levels at the base of the towers allow to shelter large spaces of commerce and conviviality in the nature. These examples of mixed-use buildings could provide ideas in other parts of the world where densification is being sought.

Cristiana MAZZONI, Professor of **ENSA Paris Belleville** presents **ZHANG Xiaohe**, **PhD student at the College of Architecture and Urbanism of the University of Tongji.**

ZHANG Xiaohe: I will talk about **daily mobility in Shanghai during confinement**. It is from January 2020 that the sanitary measures to reduce transport demand were taken in Shanghai. A questionnaire survey was launched at that time to investigate the characteristics of those who moved during this period. The presentation presents the results of the analysis of the 1540 questionnaires completed in this survey.

Characteristics of People on Mobility: What determines travel is the type of work done by travellers, particularly those who can telework from home (27% of the population) are different from those who have to travel every day to work (30%) There are also people who have some flexibility and travel less often (23%) and people who are not working and who have stayed at home (20%). We see that people who travel every day are older than those who telework. On average, they have a lower income. Many of them work in the production, logistics and transportation sectors. On the contrary, the students were forced to work remotely since the courses were stopped. Business executives were able to choose to stay at least partially at home.

Modes of transport and distances travelled: Health, transport, administration and manufacturing activities occupy the greatest number of people who are obliged to move for the life of the economy and the city. The places where these people live are less distant from the centre than those of executives who may not travel every day. It can be seen that walking, cycling, bus and metro have lost passengers during confinement, while the single car and

scooters have increased their modal share. Two groups of travellers were specially studied:
• Those who use the metro (15% of travellers) travel an average of 14 km, spending more than 45 minutes in transport at 75%. They live quite close to the centre
• Those who use an electric scooter (23% of travellers) travel an average of 4.4 km to 87% less than 30 minutes in transit. They live further away in an area that is poorly served by public transportation.
It is the distance between the place of residence and the bus or metro stops that explain the modal choice. The measures taken to disinfect public transport have made it possible to have only a small decrease in the modal share of the metro.

Cleaning and disinfection measures in the metro
The stations were thoroughly cleaned and disinfected at least twice a day. Trains were thoroughly cleaned and disinfected at least once a day. Trains were thoroughly cleaned and disinfected at least once a day. Sales machines, doors and counters have been cleaned and disinfected more often, as well as reusable tokens that serve as tickets and are touched by many people. The barrier gestures were systematically recalled in the audio announcements. They confirmed their effectiveness in preventing contagion. The health of personnel in contact with the public was also very precisely monitored (taking temperature and wearing the mask before each shift).

Proposals:
The frequency of public transport between hospitals and industrial areas and railway and bus stations should be increased because the people who work there often live in underserved peri-urban areas.

Electric scooters played an important role during this period, especially for people who live on the outskirts away from transit stations. It would be useful to improve the quality of the bike paths and make safety improvements.

Discussion:

Hervé de Tréglodé: Thank you for this very interesting presentation. What do you call «electric scooter»? are they shared?

Zhang Xiaohe: There are a lot of shared bikes in Shanghai, which are connected to a platform that ensures their availability and gets paid by the app. There are still few electric motorized scooters or motorcycles. The electric scooter is a good solution for people who live on the outskirts because they go faster than a bike and cost less than a car.

Zhang Bo: There was an attempt in 2018 to set up a shared electric e-scooter service, but there were technical difficulties on battery maintenance that did not prolong the experience. There was an attempt in 2018 to set up a shared electric e-scooter service, but there were technical difficulties on battery maintenance that did not prolong the experience. Currently, it is individuals who buy them for courses of 2 to 5 km.

Jean-François Janin: Does the increase in the speed of bicycles not represent an increase in the risk of road accidents?

Prof. PAN Haixiao: Drivers of electric scooters must have a driver's license. There is a regulation on the loading of these vehicles which are not to be used for the transport of large objects.

Hervé de Tréglodé: We see that electric scooters are considered a good means of transport in Shanghai. People who talk about these topics in France want to promote cycling, but we already see more scooters in the streets of Paris than bicycles.

Prof. Hans Liudger Dienel: in Germany, electric bicycles currently account for 25% of new bicycle purchases.

Final Roundtable

Participants in this round table were: **Prof. Dr. Hans-Liudger Dienel, Prof. Dr. Pan Haixiao, Prof. Iris Borowy, Jean-François Janin, Olivier Reaud, Prof. Carlos Lopez Galviz**

Olivier Reaud presents the paper prepared by **Francine Depras**, member of the **French Society of Foresight**:
We know from experience that foresight is very useful for decision makers. It goes beyond planning, which limits its short-term focus. In the current situation, everything is accelerated, everything is distorted, the transformations are no longer linear. Nothing is more certain in the present-future. We think this is the time when foresight methods must be used to make good strategies:
• Bring together a large number of people representing the "stakeholders"
• build possible scenarios by opening the future to the medium and long term
• think about what is going to happen and how it is going to happen to imagine as accurately as possible what the world will look like.
The **Société Française de Prospective** Société Française de Prospective (societefrancaisedeprospective.fr) (**SFdP)** was launched by Gaston Berger in the 1950s to carry out practical studies on the future world that suggest the future. The purpose of these texts for the national elites was to prepare a long-term vision for the human resources management of companies and administrations. The context was already a growing uncertainty in the face of interdependence between issues that evolve at different rates.
Our seminars are public and their results are accessible via the Internet. These seminars are intended to help create a new type of planning called adaptive planning, which is both imaginative (foresight method) and structured (planning).
To do this, we need to be collaborative, interactive and regularly review the work already done to truly take into account short and long time.
How to take into account unpredictable phenomena? In our cooperative action, and through collective intelligence, we learn to consider risk as a fact, which we do not know when it will occur, but whose damage it would cause and the measures of all kinds that could be taken to reduce the likelihood and severity of its consequences.
The good news is that this new behaviour gives those who adopt it a new perception of the future. Instead of living individually in fear of everything that will happen, they can collectively live the risk and hope: The future is ahead of us. We know that we can reinvent it, it is within us, no one will do it for us. We can dream if we have the courage to face our future."
As a conclusion, I would say that there is currently a need for more interdisciplinarity, more international cooperation, more intelligence to master the global problems of our societies, on technical and social issues. It is in the action taken together to solve concrete questions that real value and convincing efficiency are created, which make us want to continue in the chosen direction together.

Prof. Dr. Dienel Thank you for a very inspiring presentation for our panel. What are your questions?

Prof. Dr. Haixiao: The Pandemic seems to me a good example of an event that should lead us to reflect and change our paradigm in transportation. We have to determine a very long-term vision and decide to be consistent with it. But everything has changed very quickly already and we have no collective long-term vision at all. How are we going to determine this direction? In my experience in Shanghai, it is very difficult to change lifestyles and behaviours in a short time, when it would be necessary for mobility to evolve. We know that technology could help us do this, but how do we encourage people, especially those who have decisions to make, to act consistently?

Prof. Iris Borowy: I also believe that a lot has changed in a very short time and that this is a very difficult question, but I think we have reason to be optimistic. Our decision-making system is very special, only those who practice it can understand how the opinions of each can be very different and that we can make decisions ac-

cepted by all. I don't think there's a perfect solution to the complexity of the world. It seems to me that the best method is to have a broad public discussion and that we have structures to organize this in China. To talk about transportation technologies, I see two directions in which the world of mobility could go: one could be to use more technologies: autonomous or remotely driven vehicles in increasingly digitized cities, the other choice could be fewer technologies: more space for pedestrians, bicycles … I do not know whether these guidelines are necessarily exclusive or whether it would be possible to imagine making them complementary.

Jean-François Janin: It seems to me that the period we've been through has been very difficult for many people, in part because they don't understand what the authorities want them to do and why. They realized that the telephone was actually a way to talk to each other, to tell their friends what they were doing or not doing, and to ask for their input. While mobility was before the means used to maintain the social bond with some people in the cities become immense, the telephone played this role. This is already true for young children who see the place of the telephone growing in their parents' schedule. This is also true for seniors, who are very attached to the communications they manage to maintain with people they know. Could this be true for academic exchanges?

Prof. Dr. Dienel: I would like to rephrase Professor Pan's question differently: If you had any advice to give to the Minister of Transport of your country today, it would be to give new support to a particular transport system, for example public transport or on the contrary to work towards a transition in mobility, for example by changing the use of urban space?

Prof. Carlos Lopez Galviz: First of all, it's important to listen to people. What do they think about autonomous vehicles? Do those who drive today accept the idea of autonomous vehicles arriving in their city? Who is interested in a digital city? The risk, for the authorities as for academics like us, is to seek the most sophisticated technology, forgetting its consequences on society. It is important that choices are made by people and for humanity as a whole. In particular, since we have to build our future in these exceptional times, we must obviously be careful not to increase social inequalities.

Prof. Dr. Dienel: I think that's a very important point at this moment of our meeting. The need to involve citizens in the public decision-making process is a recommendation that must be renewed on an ongoing basis. This international meeting where we speak English with French and Chinese friends gives me the opportunity to recall what Benjamin Franklin, a great spirit of the 18th century, said of the democracy of which he was a fervent admirer: The democrats have two countries, theirs and France where it was invented.

Prof. Dr. Haixiao: Thank you for your contributions. Although the conditions were completely unusual, this meeting made it possible to exchange very enriching ideas, thanks to the active contributions of all for the preparation and realization of this event and I would like to thank you all very deeply.