SECOND SINO FRENCH FORUM ON HIGH LEVEL TRANSPORT SERVICES FOR LOW EMISSION CITIES

Shanghai, China

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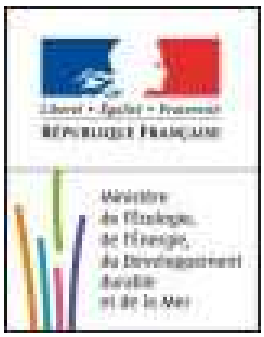
EXECUTIVE SUMMARY



THALES

Février 2010

THNS Forum 2009 Executive Summary

The 2009 session of the THNS Forum took place in the Sino French Centre of TONGJI University Shanghai on November 10th -11th. with more than 100 attendants. The meeting was opened by CHEN Xiaolong, Vice President of TONGJI University and Thierry MATHOU, General Consul of France in Shanghai.

The Forum was launched in accordance with the inter governmental agreement signed in November 2007 on Sustainable Urban Development covering transport and urban & rural planning. The organization was made by the Sino-French Institute for Engineering and Management and ParisTech, the association of French Engineering schools, which cooperate for 10 years in transport and urban sciences for research, exchange of good practice and training, with the support of the Science and technology Committee of the Commission for Urban and Rural Construction of Shanghai Municipality and the Shanghai City Comprehensive Transportation Planning Institute.

Professor PAN Haixiao (College of Architecture and Urban Planning , TONGJI University) and Jean-François JANIN (French Ministry of Ecology, Energy, Sustainable Development and Sea) introduced the participants and thanked them for their precious time: experts, scientists, representatives of municipalities and private companies, transport, industry and service operators, all concerned by urban mobility and sustainable development. They specially thanked AFD and THALES for their generous sponsorship of the event.

The 2008 session of the Forum, whose themes were defined by the College of Transport Engineering of TONGJI University and the French association ITS JU (Intelligent Transport Systems Joint Undertaking), was focused on the organisation and operation of mass transit with a high level of service (THNS). With the College of Architecture and Urban Planning, the 2009 session has extended its scope to the relations between transport and organization of the city at different level of scales. The themes of the workshops were:

- Mobility and transport policies for sustainable cities
- Transport planning, vehicles and infrastructures for the future
- Place of information and new technologies

1. Sustainability , a new requirement for urban mobility policies

Many factors have created a large consensus about the importance of mobility in the consumption of energy, emission of pollution and the consequences of dysfunction of urban transport system on all the activities in the modern cities. Several examples were presented in the Forum on integration of sustainability in concrete actions of planning and operation of transport as well as in organization of urban development:

- For the city of Hangzhou, a city with a high potential for tourism, the fluidity of traffic in the famous environment of “West Lake” is a very strong priority. CHEN Qian, Director of the Comprehensive Transport Research Centre of Hangzhou, detailed the bike sharing project launched in 2008 to solve the problem of transport at short distance: « the last kilometre ». There are now 40 000 bicycles available from 1400 stations. Each bike is used in average 5 times per day. The conviction of the inhabitants and the tourists to use the system has been gained by the quality of the service (location of stations, continuity with public transport, maintenance of bikes, information, associated services...) and low price (the first hour of use is free of charge) The condition for the success of such projects is the perfect cooperation of all the authorities involved.
- As deputy mayor of the city of Bordeaux, Didier CAZABONNE detailed how the transport projects of the municipality support the efficiency of the city and its image for the citizens and the visitors. The deployment of 45 km of tramway has “enlarged” the city, in facilitating the relations between the different districts and between people living there. Technical innovation (ground-level power supply) allows the insertion of a THNS in the historic part of the city mentioned in the UNESCO World Heritage List as *"an outstanding urban and architectural ensemble"* of the 18th century. The city of Bordeaux is open to cooperate with Chinese cities on intermodality and ecocities
- Transportation in Beijing has been improved in recent years by a whole set of measures to promote public transport and limit traffic congestion, with an acceleration to reduce air pollution for the period of Olympic games. The presentations of GUO Jifu & SUN Zhuangzhi of the Transport Research Center of Beijing and of GUO Chun’an of the Urban Planning and Engineering Institute of Beijing detailed the development of metro (9 lines operated in 2009, 11 in construction, regional rail transport) and the restriction of circulation of cars (green/yellow labels, odd-even alternative day-off rule...) The restriction of circulation to one day per week at peak hour, applied since April 2009, seems to give good results. The objective is to reduce pollution in spite of the increase of the population and of the number of cars.
- Christian CODDET, Vice Chairman of the transport organization body of the city of Belfort, described how the progressive reduction of the public transport, identified in 2006, was rapidly replaced by a strong increase of ridership (20 % in 2 years) by a new design of bus lines to fit the passenger's needs and a new tariff (post payment of the tickets with a fixed limit for the monthly invoice)
- LU Ximing, Director of the Shanghai City Comprehensive Transport Planning Institute, presented the strategy of transportation during the Shanghai EXPO 2010. Taking account the theme of the EXPO (“Better City, Better Life”) , quality, comfort and efficiency of the transport services for inhabitants and visitors are a very important challenge . 8 metro stations on 6

lines will be used by 300 000 visitors each day. The other 300 000 visitors will use mainly buses, for which lanes will be reserved. The area surrounding the EXPO site (7 km2) will be forbidden for private cars, which will be oriented to parking facilities (20 000 places)

According to J.F. JANIN, development of THNS in France is linked with the mandatory “mobility master plans” prepared by the municipalities and proposed for remarks to the public. Even in cities who are relatively small in population compared with Chinese ones, studies and discussions on these master plans have demonstrate needs for new transport services with a high speed, frequency and comfort. Depending on local context, the solution could be based on buses (eventually on specially reserved lanes) or on tramways if the expected number of travellers per hour (for one way) is higher than 2500. The evaluation of CO2 emissions linked with a specific organization appears as of great importance for the implementation and follow up of these policies.

The rapid urbanization of China creates an unprecedented urgency for studies about the sustainability of the different patterns of urban organization. Professor PAN Haixiao detailed the main questions and uncertainties to face, knowing that there will be less resources available for the future cities than for cities of the past: How to preserve our current standard of living ? How to adapt the behaviour of the inhabitants to the constraints of ecocities ? How to organize the development to assure efficiency, flexibility and economy ? At regional level, cities are concentrating activities and attracting population of villages. The current model of urban areas specialized by functions (residence, offices, shopping, industry …) including large parking areas create difficult conditions to public transport. The absence of precise coordination between urban planning and transport planning induces a large increase of movements of persons and goods. International examples of development oriented on corridors equipped with public transport could be adapted to the Chinese context to create a more intensive development pattern. Increasing the density of housing and mixing it with jobs and exchange opportunities reduce the distance of daily movements and allows the development of bikes and walking in connection with public transport.
To implement this pattern of compact urban development, transport planning, especially planning of mass transit has to be considered as the primary action to organize the use of land.

12. Sustainable transportation systems: multimodality, innovation, a need of evaluation

It will be necessary in the future to organize the coexistence and as far as possible the cooperation of several means of transport, private and public in

the ownership of the vehicle, privately or collectively used according to the place and time, driven by the owner or not ... For public bodies in charge of urban transportation, this organization will have to take account the availability of space and energy, the collective priorities decided for the city, and also the individual preferences because mobility is linked with liberty and willingness to create relations with other people.

WU Yuhua (Regional Director, ALSTOM China, Shanghai) detailed the contribution of the **tramways** to sustainable mobility. Rail transport has a very low emission ratio, a large capacity and high flexibility. Economically, and when considering the whole life of the tramways (30 years) tramways is cheaper than buses when ridership is higher than 2500 people per hour.

The question of the **place of private cars** in future cities is very important for urban planning, transport planning and industry. Yves Boutin (PSA Group, China Branch) presented the context of the development of the use of automobile in China. The social and economic development is largely based on mobility of people and goods and therefore buying an automobile is largely considered as a mean to participate to this positive evolution. At the same time, it is clear, at least from a scientific point of view, that private cars is not a sustainable solution to satisfy all the mobility needs. PSA Group has created the “Institute of the City in the Move” which cooperate actively with Tongji University for better understanding theses needs and their evolution. The requirements of car users are very complex and in fact impossible to satisfy as a whole by public transport: Mobility is not only functional (how to go from a point A to a point B ?) It is also strongly linked with personal abilities (and disabilities) and the liberty to create or not relations with other people during the trip. For the car manufacturers, it appears that the car will be more and more considered not only as an object to be sold but also as a mean to provide services to one or several consumers, which is quite different in terms of business models and organization.

SUN Lijun (Professor , Dean of College of Transport Engineering, Tongji University) proposed to develop research on the **efficiency of road networks** in different urban areas with various densities. It appears that the congestion can't be reduced by the creation of new roads, because of the perturbations of the traffic generated by new intersections. This research could try to determine the optimum of accessibility according to different contexts.

ZOU Zhijun (Professeur, College of Transportation Engineering,Tongji University) presented a research on planning a **BRT** in linear cities. Based on case studies of WUHU (1,2 M inhabitants) following questions arise: How to connect BRT with road system, metro (if any) and regional (or national) railway stations ?

Bus signal priorities (BSP) is a very useful mean to improve the quality of service delivered by buses, BRT or tramways. LIN Zhengyi (SODIT) presented the results of studies made in Shanghai in cooperation SCCTPI on the conditions needed to use these systems efficiently. French experience

gained in several cities show that a significant improvement of speed and regularity of buses can result from BSP. In the Chinese context, the BSP system will not have its complete effect without some changes in the design of the road near the bus stations and the distance between them and the crossroads.
MA Wanjing (Doctor, College of Transportation Engineering, Tongji University) described the questions to be solved to improve the efficiency of BRT by deploying bus signal priority, following case studies in Jinan.

The last kilometre
Cybercars can help to find flexible solutions for the last kilometer. Michel PARENT (ParisTech INRIA) and Ming YANG (Jiaotong University) presented the state of art of vehicles without driver and their performance in consumption of space and energy. Where questions of road safety are solved, the automation of the vehicles simplifies the management of the fleet to provide a service based on availability and flexibility (automobile just when and where you need it). International cooperation is already active and could be developed on the feasibility (technical, legal and financial) of transport systems based on cybercars in the Chinese context.
GUAN Hongzhi (Professor, College of architecture, Beijing Industry University) presented a research on the legibility of variable message signs given information on the availability of vacant place in **car parking facilities**. Based on experiments, it appears that the color and the volume of data has great importance on legibility, with best effects with yellow and simple message (vacant/ full)

Reduce the needs of transport: the polycentric compact city
The shape of the city and its density are of crucial importance to avoid unnecessary mobility. According to Sébastien GOETHALS (College of Architecture and Urban Planning (CAUP),Tongji University and Brussel University, the pattern of “polycentrism” with nodes of housing and services linked by mass transit with a high level of service can create the best conditions for walking, biking and low speed / low emissions transport system for the last kilometres. He described the organization of park and ride P+R facilities in several countries and the measures taken by cities like Geneva, München, Copenhagen, Lille and Brussels to transform these facilities in real “low carbon hubs”
The effects of **high speed trains** on urban spaces were listed by Marc GUIGON (DATAR) Reducing the travel time between the cities, high speed railways create good conditions for economic development of the most dynamic cities, but for the less active ones, it could be difficult to resist to the attraction of bigger or more equipped ones. The location of the station in the city is very important to maximize the effects of the connections with other cities. The experience shows that a station in the center will have the greater

effect on the value of houses in the area and on the use of existing urban transport services.

TANG Jun, Chief Architect, AREP China described the concepts used for **railway** stations in China. The Ministry of railways, as owner of all the stations has similar requirements for all these equipments. The question is how to introduced the diversity to take account of different characters of the cities.

Urban logistic is the cause of a significant part of congestion and CO2 emissions. The presentation of Michel SAVY (Professor, University Paris-East) was focused on the organization of the companies involved in logistic and the platforms which they use for their operations. A lot of improvements could be made to the urban segments of logistic chains. The main question is the optimal distance between logistic facilities and the centre of the city. The precise location of the platforms need to take care of the consequences on neighbouring use of land. In recent years, one can observe a better preservation of the environment in the management of Chinese logistic platforms, which are generally larger than French ones. These questions are on the agenda of the Sino-French centre "Cities and territories" at Nanjing University cochaired by Michel SAVY.

CO2 evaluation

The French Agency for Development (AFD) is a specialized financial institution supporting projects aiming to preserve global public goods, including climate. Yves GUICQUERO, coordinator for China, presented the actions of AFD (funding of investments made by public sector, helping cooperation ...) Considering the complexity of urban and transport development, AFD give priority to public policies, like helping mobility master plans. Such a study was recently made in Guyang, with a good integration between transport planning and urban planning. Damien NAVIZET and Stéphane CARCAS presented the "carbon balance method" aiming to allow the managers of projects financed by AFD to analyse their carbon content and consequently get a better understanding of projects by quantifying their greenhouse gas emissions. This method consists in analysing two scenarios, one with the project and another without it, based on simulations over a relevant period (for instance 20 years) The results of the carbon balances of several projects show that the improvement of a public transport system will create a substantial reduction of emissions only if it can attract new ridership coming from car travellers. The ratio between the emissions avoided and the costs of the project can also be used as an indicator of the efficiency of the money to be invested.

It is difficult to take "sustainable" decisions in transport and urban planning as well as to operate infrastructure network and manage fleet of vehicles in the absence of concrete tools to measure the CO2 emissions linked with traffic, congestion, size and weight of vehicles ... The urban mobility in France is linked with 40 % of journeys, but 53% of CO2 emissions due to transport. The

control of the total amount of CO2 emitted by a country or a specific area, to be cost-effective, needs the calculation of indicators corresponding to the emissions linked with the actions of the different stakeholders. The reuse of data generated to real time travel and traffic information could be examine to simulate and control the variation of emissions due to a project.

3. Information systems and telecommunications are the basis for operation and flexibility of the city.

The **Shanghai Municipal Transportation Information Center** was presented by ZHANG Yi (Director) This center is in charge of collecting, processing and distributing data about all the modes of transport and development of ITS projects to identify new sources and better use of data. It will be the basis for operation of the transport systems in Shanghai during the EXPO and for research on improvements for the future.

XUE Meigen, deputy Director, Shanghai City comprehensive transportation planning institute, explained how the multimodal information will be managed during Expo Shanghai 2010. The objective is to satisfy the needs of transport of the visitors and the inhabitants with public transport, with the support of information services, specially in the area restricted to private cars. Data provided by the movements of taxis and mobile phones will be collected and processed.

Real time information

The Shenzhen Urban Transport Planning Center was presented by GUAN Zhichao, Director who insisted on the use of real time information. These data, concerning road traffic, public transport and movements of pedestrians are necessary to operate the transport systems and to prepare transport and urban planning.

LI Zhiming (Orange) detailed the real time information services for public transport of people. Car, bus, tramways and trains must deliver real time information to their clients in order to keep their place in the competition with private cars. Communication between vehicle and operation center was the first objective of deploying new technologies in public transport. It is time now to create services for the passengers (perturbations, navigation, entertainment, professional …) knowing that the use of different technologies (satellite, WiFi, 3G...) can be optimised to limit the global cost of the services.

Multimodal information and electronic payment in public transport were presented by Roger Lambert (MEEDDM) . The information services are more and more used by travelers, to prepare their journey and to take real time decisions to face perturbations and changes in their destination. It is a responsibility of the public bodies in charge of the organization of transport to collect and distribute information about the services available in their territory. At national level, standardization of the data is the main objective, to insure an uniform and permanent access to information. Smart cards are used in the

main French cities to facilitate the payment of public transport. New generations of mobile phones will likely provide services of payments and ticketing as soon as agreements can be found between all the stakeholders on technical standards and sharing costs and responsibilities.

HUI Ying (College of transport engineering, Tongji University) presented a research on **car sharing**, which is not yet developed in Shanghai. Several factors could be in favour of car sharing: the possibility to use a car with a low cost, the lack of parking facilities in central districts and the development of new urban poles like Songjiang where public transport is not very convenient, but there is not yet any operator able to collect and distribute offers and demands of car sharing services and to organize evaluation and monitoring of such system.

The geographical information systems (**GIS)** were presented by Laurent DEZOU (MobiGIS) . They have many advantages to collect, process and distribute data as soon as location is at stake. Exchange of data between transport operators and public bodies can take advantage of GIS as well as studies on accessibility. The maps representing the travel times between different places of a city are very powerful tools to study the level of service provided by its actual or future transport system.

DONG Decun (Professor, College of Transportation Engineering, Tongji University) presented the conception of information system of a large equipment such as the new airport of Hongqiao. There are requirements on the system coming from the objective of control of every modes of transport and other requirements induced by the objective of integration of all the flows between them in a unique and optimized system. The result can only be achieved by using standards and methods to solve technical questions, to build a safe and robust system and to manage a complex project. Transport can impulse progress in underlying technologies and take advantage of their improvement.

Platforms

Jean-Jacques HENRY, Chairman of SODIT and ITS JU presented the concept of platform as a mean to link several information systems and assure their cooperation. Among the conditions of success of the platform are the existence of a first group of persons with a common interest to work together and reduce their costs by using the standards for communications. If the platform is sufficiently open, it can attract other participants and enlarge its scope: the platform by itself can even provide services to its members, for instance assuring the interoperability between the applications which they propose in the market place and promoting them to the end users. The advantage for the service providers is to enlarge the number of possible clients and the advantage for the users is to be sure that all the application they will buy have been tested to work together efficiently.

The objectives of the Thales China Integration Center were presented by

Serge DRUAIS (Director) and KONG Fanlu (Business Development Manager) THALES is a leading world actor in the domains of high technologies for aeronautics, space, defense, transport and security. Advanced Train Control and Ticketing systems are well known all over the world including China. THALES can already provide to its clients systems of supervision for transport and other urban services. The MAESTRO system is also able to support training programs based on real or simulated situations. The systems prepared now are open-platforms based on international standards allowing the many authorities in a city to cooperate for common objectives of safety and conservation of environment and energy. The concept of «Smart Cities» was launched a few years ago in USA. It relates to the likely impact of new technologies in the operation of urban networks (water, energy, transport...) and the perception of the urban environment by the inhabitants and visitors. The conditions necessary to implement “ambient intelligence” include interoperability based on standards and opensourced softwares for communications and infrastructures, because they are necessary for security, stability and flexibility of information systems.

4. Exchange of knowledge and training were mentioned as a very important aspect of cooperation. Until now, exchange of knowledge occurs in different ways: visit of official delegations (from national administrations and cities) , Sino French training programs (ParisTech, Technical Universities...), China-Europa Convention (Le Havre, December 2009), decentralized cooperation (Nanjing, June 2010), Chinese students in French programs, participation of French experts in Chinese programs (agreements between DATAR and several education bodies, like CELAP-Shanghai, Administrative Institute of Shanghai and National Commission for Development and Reform)
The objectives and methodology of the China Europa Forum were presented by YU Shuo (Professor , Northeast Normal University) As a private initiative launched by European and Chinese Scientists, the China Europa Forum organizes plenary meetings every two years on several domains where Chinese and European cultures and traditions are very different and can interfere in mutual understanding. A workshop on management of city, transport ans energy was organized in parallel with the THNS Forum .

Conclusions

There is nowhere existing solutions to face the challenge of sustainable mobility in Chinese cities. International experience can't be used directly but can inspire the solutions to be invented. A deep understanding of the context in which transport systems are created in China and abroad is necessary to adapt technologies to the Chinese situation of today and tomorrow. Specialized cooperation can help to solve the difficulties of communications between persons and organizations. It can be done in several ways:

- scientific papers, especially if they are written in cooperation between experts living in different countries

- case studies, especially if it is possible to ask questions to the authors and read documents about the context
- workshop on specific domains, because it gives a concrete experience of different approaches of the same subject
- demonstration of a system in a new environment, with active participation of academics to assure helpful evaluation of the results

The THNS Forum can be an appropriate platform to impulse such cooperation. Some ideas have already emerged:

- disseminate the proceedings of the 2d session of the Forum to enlarge its audience
- upload on the Internet platform of the Forum (http://www.urba2000.com/forum-THNS http://ivmchina.org.cn/thns2009 and https://artic.theresis.org) the documents related to the communications in order to build a library of case studies and related documents to help researchers and students to explore these domains
- launch a call for communications to prepare the 3d session of the Forum, to be hold in the second semester 2010
- encourage discussions on these questions (presence of some participants of the Forum to the conference on sustainable urban development on May 19th in the French pavilion of EXPO Shanghai 2010, to the meeting of decentralized cooperation in Nanjing, June 2010, and other events, to be decided)
- encourage scientific and technical cooperation on following subjects and involve as far as possible Chinese and French municipalities in it:
  - Low carbon hubs including cybercars and services associated
  - Bus signal priority
  - Urban logistics
  - Smart cities, including evaluation of CO2 emissions, based on reuse of real time data (traffic, public transport, taxis...)
  - Applications of open geographical information systems for mobility
- examine how to include sustainable mobility and compact cities in the projects of training organized by ParisTech and IFCIM.