

PREDIT Forum

Environment, safety, city transport: challenges for tomorrow



MET/SC

"I am personally expecting a great deal from research in response to the challenges of our society in a field as essential as that of transport and travel".

Predit, the national land transport research programme, launched in 1996 for a five-year period, has associated the Ministry of Public Works, Transport and Housing, the Ministry of Research, the Ministry of Country Planning and Environment, the Secretariat for Industry, Ademe and Anvar, towards ambitious goals. Scientists, transport operators, manufacturers and public authorities have worked together on more than 1,200 projects.

The symposium on 12, 13 and 14 June will present the results of the programme: new knowledge, technologies, innovative systems, and products and services for the user. It gives me pleasure to highlight three fields in which Predit has made progress possible and which still pose challenges for tomorrow:

The environment: Predit has given us a better knowledge of nuisances and has developed technologies to reduce pollution and greenhouse gases, reduce noise of road vehicles and guided vehicles, and improve the urban environment by seeking a better balance between transport modes and developing intermodality.

Safety: The new technologies optimize traffic management, operations and the reliable working of systems.

City transport: One of the main aims of Predit has been to develop urban transport equipment that is affordable to local authorities and environmentally friendly. Gas-powered buses and systems half-way between a bus and a tramway have been experimented and assessed, giving hopes of export opportunities.

This symposium will enable my colleagues and I to announce the priorities of a future programme and the transport policy issues to be addressed by this programme. I am personally expecting a great deal from research in response to the challenges of our society in a field as essential as that of transport and travel.

Jean-Claude Gaysot,

Minister of Public Works, Transport and Housing

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 the closing forum of
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 into transport over
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1,300 research and innovation projects dedicated to land transport

On 12, 13 and 14 June 2001, the closing forum of Predit (National land transport research and innovation programme) is to be held in Paris.

Three days of meetings, dialogue and information, organized around a scientific symposium and an exhibition. An opportunity to present the results of this interministerial programme launched in 1996 for a five-year period, by the end of which more than a thousand research projects will have been presented.

French and European researchers, academics, elected representatives, operators and manufacturers will take part in the Predit final forum on 12, 13 and 14 June 2001, at La Villette Congress Centre (Cité des Sciences et de l'Industrie).

This event, which includes a scientific symposium and an exhibition, is organized in partnership with Isted. It promotes five years of research and development for the land transport sector. The ministers will chart the future course for transport research in the years to come.

Predit was adopted on 14 March 1996 by the Council of Ministers, as a "strategic framework for action to support the research undertaken in this sector by public authorities over the 1996-2000 period"¹. It followed on from an initial programme (1990-1994) which had paved the way for major technological advances such as the TGV with a 300 kph commercial speed, the first industrial series of the electric vehicle and road information on electric signs. The government was closely involved in Predit from the very beginning: four Ministries² – Research, Environment, Industry and Public Works –, two target agencies – Ademe³, Anvar⁴ – and all the research agencies in this field were mobilized.

As François d'Aubert, Secretary of State for Research, stressed when Predit was launched⁵, "This programme has established three facts. Firstly that the partnership between public research and private research is a tremendous innovation booster. It must therefore be stimulated, which is the aim of the major research and technology programmes (...). Secondly, research must not only aim for excellence but must increasingly provide answers to the practical daily concerns of users (...). Lastly, it is strategic for our economy to dedicate a research effort to a sector that employs 3 million people and is

¹ Address by Bernard Pons, Minister of Public Works, Housing, Transport and Tourism, Press Conference on 14 March 1996.

² Ministry of the Economy, Finance and Industry (MEFI); Ministry of Country Planning and Environment (MATE); Ministry of National Education, Research and Technology (MENRT); Ministry of Public Works, Transport and Housing (METL).

³ Agency for the Environment and Energy Management.

⁴ National Agency for Research Promotion.

⁵ The forum to launch Predit was held in June 1997 at the Poitiers *Futuroscope*.

unquestionably a strong point of French industry⁶. In fact, Predit is designed to provide solutions to the major challenges facing the land transport sector, particularly French and European industry, which include:

- developing the quality of public transport service to make it more accessible, more comfortable and more reliable, mainly through better multimodal information to users,
- speeding up the marketing of new, cleaner, quieter, more energy-efficient vehicles and transport systems,
- improving the overall safety of vehicles and networks,
- increasing the performance of our companies on international markets, particularly by reducing the cost of equipment and operating systems,
- promoting major European transport network projects by harmonizing their operating conditions and ensuring they blend in well with the landscape and the environment.

⁶ In France, the land transport sector is among the three leading sectors in the national economy (the other two being aircraft and spacecraft construction and the pharmaceutical industry), and directly or indirectly employs nearly three million people in 8,300 companies each with more than 20 employees. Many of these are strongly technology-oriented SME/SMLs.

More than 7 billion French francs

The funding is equal to the issues at stake: around 7.3 billion French francs over five years, 2.5 billion francs of which are national government assistance, added to which are major contributions from the European Union. Predit associates the resources of research agencies, industrial companies, transport operators and local authorities, thus encouraging the pooling of interests between public and private research centres, and cooperation initiatives between French industrial companies and European partners.

Just as important is the association of skills: 350 experts from ministries, public research establishments, universities, and public and private companies, provide guidance for research in conjunction with the administrations.

To ensure general coordination, a *Secrétariat Permanent du Predit* (SPP - Permanent Predit Secretariat) has been set up. It is mainly in charge of developing activities to disseminate, assess and optimize the benefits of research findings. The SPP prepares the work of the steering committee and its bureau. The committee, which is consultative in nature, lays down the main guidelines for the programme. It makes assessments on the progress of research activities. ●●●

Car sharing in Paris

In several European countries, car-share companies offer their members the possibility of sharing a vehicle fleet. This new mobility solution in urban areas combines the advantages of public transport and a private vehicle. The opportunity for individuals or companies to have access to a car for an hour, a day or a weekend is simply a phone call away. Members only pay for the use of the vehicle. They can thus estimate the cost of their trips and choose the mode of transport that best meets their requirements.

Caisse-Commune Company is developing a system of this type to cover the whole of Paris, in partnership with Predit (Interministerial land transport research and innovation programme), Ademe (French agency for the environment and energy management), and Renault Company.

Cars are available to subscribers in easily accessed carparks. A car station is opened in a district when it has at least ten membership applications (two subscription formulas are

available). Subscribers can book their vehicle by phone 24 hours a day, 7 days a week. Then with their membership cards, they collect the vehicle key in a key case in the carpark. The key is



The car-share system enables a vehicle to be reserved 24 hours a day, 7 days a week, for one hour or several days.

associated with an electronic chip that deactivates the anti-theft protection and records mileage. Back in the carpark after the trip, the electronic system makes out the bill, which will then be automatically charged to the user's account.

The first car station was opened in June 1999 in the Square d'Anvers carpark in the 9th District. Since then, a further three stations have been opened (Bastille, Hôtel de Ville and Place d'Italie). At the end of 2000, the company had 350 members with a progression of 10 new memberships a week.

24 vehicles, most of which run on LPG, are available to subscribers. The average trip is 40 km long and lasts for 6 hours 50 mn (many evening and weekend trips).

The first results of sociological surveys show that clients tend to be young active males (72% of members are aged between 25 and 34). This is a highly mobile population that can afford to buy a car. Their main reasons for becoming members are related to the flexibility of the service, including the possibility of reserving a vehicle 24 hours a day, for one hour or several days.

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E-mail: caisse-commune@caisse-commune.com

Tunnels and road safety... a scientific approach

Accidents in tunnels suggest that specific problems are related to the control of vehicles driven in a closed visual environment. That is why research was carried out in 1998¹, which focused on the constraints imposed on users by the geometrical and optical characteristics of the infrastructure. It identified critical parameters, such as geometry, visibility or environmental lighting, liable to affect drivers' perceptual evaluation.

This research made it possible to draw up rules for improvements, devise visual aid solutions to facilitate the driving task, and validate the various improvement solutions through simulations.

The working method evolved by this research consisted in using simulation tools to validate all the technical parameters adopted for planned or existing structures.

Based on a virtual model of the structure that only took account of the geometrical aspects, the CNRS conducted a series of experiments. They were designed to validate perceptual performance in relation to the viewing direction and the structure geometry, based on a series of nomographs developed under the research programme.

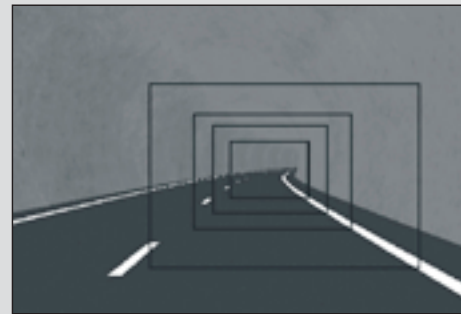
The next stage consisted in constructing more complex images of the project, by integrating elements concerning the facilities. The aim was to study the role of structure geometry, facilities, lighting, textures and the impact of the spatial content of textures on perceptual quality. Nomographs of trajectory discrimination thresholds were related to nomographs on exit times (perception-reaction times) and a visual area was defined in which it would be desirable to position information for drivers.

There then followed the more conventional stages of predicting risks related to tunnel use, which took into account information on geometry, traffic typology, signing and foreseeable travelling speeds and differential speeds, in a risk prediction model.

A final 3-D model of the project was then built, which integrated modelling of the lighting and safety facilities. It was viewed stereoscopically in an immersive auditorium. This technique provides good virtual reality of the project – the aim being to reach a conclusion on behavioural analysis and interactions between equipment – and dynamically validates the project.

A validation of perceptions and an analysis of attitudes will be performed by in-situ observations of users on a driving simulator. Exceptional or even dangerous driving situations can be generated with a view to measuring their biological effects.

¹ ISIS set up a close partnership between the CNRS cognitive neuroscience research laboratory, Oktai, a company specializing in computer graphics, and Scetauroute-DTTS, in charge of underground works.



CNRS/CNRS

Modelling enables virtual reality experiments to be conducted.

Further information can be obtained from:

Isis – Le Décisium – 4, rue Mahatma Gandhi
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●●● Predit is structured into four main R&D and experimentation fields, each coming under the responsibility of a "lead ministry".

The "**strategic research**" domain (joint monitoring by the Ministries of Transport and the Environment) seeks to improve overall understanding of the transport system and to outline possible long-term trends. Strategic research covers the analysis of mobility requirements, changing technologies and services, the transport economy and organization. Research activities in the "**science and technologies**" domain, (Ministry of Research) seek to improve, examine and develop basic scientific knowledge that will be beneficial to land transport. They prioritize horizontal themes common to all the transport modes and focus on three priority themes: energy and the environment; safety, ergonomics and comfort (cf. "Tunnels and road safety... a scientific approach"); design and production.

The third field addresses "**technological objects**" on a more practical basis (Ministry of Industry) and their development: components and subsystems, clean safe vehicles, rolling stock for railways and urban transport.

Project development takes into account environmental, energy, safety and quality-of-service requirements. Special importance is given to projects submitted by automobile and railway equipment SMEs, which are strongly committed to innovation. The European dimension of projects should enable cooperation with foreign partners, particularly on strategic markets such as those of the environmentally-friendly car or urban transport. In this research field, studies are also being conducted on motorized two-wheeled vehicles, the TGV and pendular trains (cf. "The promise of the pendular train") and on the trolleybus.

Lastly in the "**transport systems**" domain (Ministry of Transport), the groups address subjects concerned with urban travel management, the intelligent road, freight transport, railway control and command and new user services (cf. "Car-sharing in Paris").

A total of thirteen thematic groups (see box) each with their own budget, carry out the programming and monitoring of this research.

Mid-term review

As specified in the interministerial agreement of March 1966, a mid-term review was made of activities

carried out by all the partners. The meeting was held in March 1999, in the Grand Palais in Lille. Dominique Bussereau, Chairman of the Predit Steering Committee, emphasized the fact that this review "has made it possible to analyse the network effects generated by the programme and make a strategic analysis of its impact by giving expression to the views of foreign experts. The end result is very favourable, particularly as regards its original structure, scientific and technical relevance and network effects. This programme with its ambitious aims, has formed a platform that enables a large number of actors from very different walks of life to meet and discuss the entire field of land transport in its technical and political aspects. And the satisfactory financial result shows how committed the parties are to this programme".

The final forum, organized in June, is intended to optimize the use of the most promising results of Predit 1996-2000 and should enable the results of the French programme to be related to European and international research. It will also provide an opportunity to open up forward-looking discussions and announce the research priorities for transport of the future. ●

Research issue groups

Issue Group No.1:	Strategic Research
Issue Group No.2.1:	Energy, Environment
Issue Group No.2.2:	Safety, Ergonomics, Comfort
Issue Group No.2.3:	Design, Production
Issue Group No.3.1:	Components and Subsystems
Issue Group No.3.2:	Clean, safe vehicles
Issue Group No.3.3:	Rail Transport Equipment
Issue Group No.3.4:	Urban Transport Equipment
Issue Group No.4.1:	Urban Travel Management
Issue Group No.4.2:	The Intelligent Road
Issue Group No.4.3:	Freight
Issue Group No.4.4:	Railway Control and Command
Issue Group No.4.5:	New Services for Users

Further information can be obtained from:

Predit Permanent Secretariat

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Tel.: 33 (0)1 40 81 14 17 – Fax: 33 (0)1 40 81 15 22
E-mail: Janine.Forestier@equipement.gouv.fr
Website: <http://www.predit.prd.fr>

Exhibition General Secretariat: Isted

La Grande Arche, Paroi Sud
92055 La Défense Cedex
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Tel.: 33 (0)1 40 81 24 87 – Fax: 33 (0)1 40 81 23 31
E-mail: anne.baron@i-carre.net
Website: <http://www.isted.com>

The promise of the pendular train

Today's pendular TGVs¹ offer the prospect of reducing transport times on conventional railway lines by up to 20%. This new technology should enable optimum operating of new lines on existing and future infrastructure, while improving transfer movements on conventional lines without having to change trains.

These are the first findings of the research programme conducted by SNCF (French Railways) and Alstom Company from 1996 to 2000, with a view to:

- demonstrating that a TGV can be pendular on a conventional line while retaining its performance levels on a new line,
- developing an efficient pendulation system that is consistent with TGV operating constraints in terms of comfort, reliability and maintainability; building a demonstration trainset to validate the adopted technical solutions,
- studying the limiting conditions for operating pendular trains in terms of passenger comfort (motion sickness) and stresses imposed on the tracks (safety and wear criteria).

The results were soon shown to be equal to the technical imperatives. A TGV articulated unit was modified and fitted with pendular train bogies. It ran in April 1998, passed approval tests after six months of trials on various lines in the French network and demonstrated that the pendular TGV was capable of travelling at 300 kph on a new line and with 260 mm



The pendular TGV train undergoing trials.

uncompensated superelevation on a conventional line (while remaining within permissible load limits for the track).

To enhance comfort, an "anticipatory" curve detection

system was developed. It entirely offset the delay in detecting curves and individually adjusted the tilting of the coaches to their speed and position in the trainset. The risk of motion sickness (kinetosis) due to a series of curves at great speeds was thus considerably reduced.

The tilting of the rail car bodies on their bogies was provided by a redundant system of electrically-operated cylinders, which provided significant gains in terms of reliability, maintenance, size, weight and power consumption compared with hydraulically operated systems.

The results of the research programme have already made it possible to consider converting existing TGV trains to pendular TGV trains and building new TGV or TER² trains using the same technical solutions.

Studies are currently in progress on the conversion of a few TGV trainsets for the Paris-Limoges-Toulouse line. A study has also been conducted to apply this to regional electric trains.

¹ The "conventional" *Train à Grande Vitesse* (TGV high-speed train) has a commercial speed of 300 kph on its own right-of-way.

² *Train Express Régional* (Regional express train).

Further information can be obtained from:

Alstom – 48, rue Albert Dhalenne – 93482 Saint-Ouen Cedex
Tel.: 33 (0)1 41 66 90 00 – Fax: 33 (0)1 41 66 96 66
Website: <http://www.transport.alstom.com>

Information

(Metl). It is intended as a website to access information, documents, symposia, publications and databanks in this sector. It seeks to promote the impact of urban planning, housing and travel in France and to be a forum for the collective expression of all the partners. The creation of this website is based on the input network of the Urbamet bibliographic databank, which groups more than 50 bodies (administrations, local authorities, consultants, universities), including Isted.

► **Contact:**

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E-mail: marie-veronique.allot@
equipement.gouv.fr
Website:
<http://www.urbamet.com>

¹ National bibliographic database on planning, urban development and housing in France, Europe, large world cities and developing countries.

GATEWAY TO MINEFI WEBSITES



All you need to know about the Ministry of Economy, Finance and Industry (MINEFI), at a single address:

www.minefi.gouv.fr.

The home page offers more than 120 direct access links to all the MINEFI fields of competence, major current issues, regional department webspace, personalized summaries by socioprofessional categories, interactive services, etc. Internauts can also access all information on the Ministry (such as

departments and services), legislation, regulations and a presentation of public finance, statistical results and MINEFI departmental studies.

Events

IRF 2001 WORLD ROAD CONGRESS



Paris (France) will host the XIVth World Road Congress of the International Road Federation (IRF) from 11 to 14 June 2001. An exhibition will complete the congress information sessions and will present a wide range of products and services of the international road and transport industry. Isted will coordinate a French pavilion that will group together companies wishing to promote their skills, around the technical services of the Ministry of Public Works.

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Website: <http://www.isted.com>

Training

INTERNATIONAL CONTINUOUS TRAINING PROGRAMMES



The new edition of the catalogue of international continuous training programmes is now available. This brochure presents all the courses proposed in 2001 by the École Nationale des Ponts et Chaussées (ENPC) on the following subjects: management, environment, urban management, housing, infrastructure, transport, partnerships and networks, customized projects... Courses include "Cesroute" and "Development and control of port concessions" jointly organized with Isted.

► **Contact:**

ENPC/PFE
International Department
28, rue des Saints-Pères
75343 Paris Cedex 07 – France
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Fax: 33 (0)1 44 58 28 30
E-mail: mauger-m@paris.enpc.fr
Website: <http://www.pfe.enpc.fr>

CEBTP 2001 COURSES



The Experimental Centre for research and studies in

News

URBAMET ON LINE

Professionals in the urban planning, housing and transport sectors have recently set up a website. This thematic gateway is managed and run by the Urbamet Association¹, with the help of the Ministry of Public Works, Transport and Housing

building and public works (CEBTP) has published its *Formation 2001* catalogue of training courses. This covers the main areas of activity in the building sector: acoustics, superintendance of works, construction law, environment, foundations, materials, soil mechanics, pathologies, quality, regulations, rehabilitation, finishings, structures, earthworks, heat engineering.

► **Contact:**
CEBTP
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Domaine de Saint-Paul
78470 Saint-Rémy-lès-Chevreuse
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Fax: 33 (0)1 30 85 24 87
E-mail: info@cebtpt.fr
Website: <http://www.cebtpt.fr>



**MINISTRY OF PUBLIC WORKS,
TRANSPORT AND HOUSING**

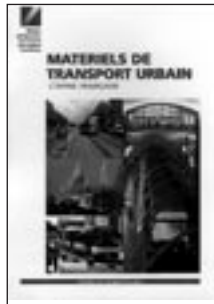


The Ministry of Public Works, Transport and Housing (MetI) prepares and implements government policy in the fields of public works, land development, urban planning, construction, housing, transport and transport infrastructure, tourism and the sea. This document, drawn up by the Directorate of Economic and International Affairs (DAEI), makes a survey of all the ministerial departments and

services, schools and training centres. It is available in French, English and Spanish.

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<http://www.equipement.gouv.fr>

**URBAN TRANSPORT
EQUIPMENT IN FRANCE**



This brochure, drawn up by the Directorate of Land Transport of the Ministry of Public Works, Transport and Housing (MetI-DTT) presents French urban transport equipment. No exhaustive lists or detailed technical descriptions but an insight into the wide range of equipment, facilities and systems proposed by French Industry.

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<http://www.equipement.gouv.fr>

PUBLIC TRANSPORT IN FRANCE

**From urban services
to national services**



This work describes the range of services made

available by the French public transport industry and presents rolling stock (with data sheets), operating and information systems. Readers will find several basic benchmarks for transport systems, such as diagrams of speed and flow, and investment and operating cost ratios. This technical document is published by the Centre for studies on road networks, transportation, urban planning and public construction (Certu).

► **Contact:**
Certu
Sales Office
9, rue Juliette Récamier
69456 Lyon Cedex 06
France
Tel.: 33 (0)4 72 74 59 59
Fax: 33 (0)4 72 74 59 00
Website: <http://www.certu.fr>
Price: 400 F

**CERTU: 2000 CATALOGUE
OF PUBLICATIONS**



The new catalogue of publications (documents and software) from the Centre for studies on road networks, transportation, urban planning and public construction (Certu) has just been published. This document reviews more than 300 references classified under six themes and covering Certu's areas of activity: planning and urban development, planning and operation of roads, transport and mobility, public construction, environment, technologies and information systems. The catalogue will be sent free of charge on request. It is also available on the website <http://www.certu.fr> where a "Just Out" section announces recent publications.

► **Contact:**
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69456 Lyon Cedex 06 – France
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THE CONTRACT BOND



"In the face of increasing worldwide infrastructure requirements and aspirations for sustainable development, the contract bond is a remarkable tool for improving security and transparency of contracts", observes the Association of International French Contractors (Sefi). To inform project owners, financiers, investors, contractors and taxpayers about this system, Sefi has just published a bilingual French-English brochure entitled "The contract bond: security of contracts and transparency of procedures".

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10, rue Washington
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Website: <http://www.sefifrance.fr>

LOCAL FINANCE

**In eleven countries
of Central, Eastern
and Baltic Europe**



This book has been written by Dexia, leading

bank group for the financing of public sector facilities and financial services in Europe, to review local sectors in eleven countries of Central, Eastern and Baltic Europe: institutional organization, skills, financial resources. In the first part, a cross-cutting analysis compares the different situations of CEEC local authorities and refers to the situation in Western Europe. The second part addresses the characteristics of local sectors in each of the countries, in monographic form, using a method of approach common to the eleven countries under study.

► **Contact:**

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Tour Cristal
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Fax: 33 (0)1 43 92 76 72
Website: <http://www.dexia-pfb.com>
Price: 15 € - 98,39 F

AIR QUALITY IN THE VICINITY OF ROAD TUNNELS



This "Guide on how to take account of air quality in the vicinity of road tunnels" is published by the Tunnel Engineering Centre (Cetu). It is intended for tunnel engineers and owners and for consultants and reflects the state-of-the-art in this field. It presents a methodology and information to enable the problem to be understood and its importance assessed, and to organize studies, define and monitor the study programme to be assigned

to specialists, and process the results in order to access project acceptability.

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FINANCING INFRASTRUCTURE AND COMMUNITY SERVICES

Public-private partnerships



Public-private partnerships provide a cost-effective response to the ever-increasing demand for facilities and community services. They are today's key instruments for modernizing global economies. French companies have already placed their long-standing tradition in this field at the service of a number of countries. To enable this experience to be shared, the Ministry of Public Works, Transport and Housing (Metl) has called on the services of recognized experts to draw up a composite work on public-private partnerships. Its main features are:

- basic principles for successful partnerships in economic, legal and financial terms;
- the process of preparing, making and performing a contract;
- useful recommendations derived from many years of practical experience;

- a description of the characteristics of major working sectors, based on concrete examples of partnerships for the various types of transport facilities and urban services in many parts of the world.

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RESEARCH AND EXPERTISE



For its 50th edition, *Villes en Développement* proposes an issue entirely devoted to research and expertise in the urban sector. The editorial has been written by Philippe Lazar, President of IRD (Institute for Development Research, formerly Orstom). Contents: Urban research in the new IRD approach; Expert, researcher, consultant, development worker and exporter; Urban research support for development; CERTU intervenes in Abidjan and Ivory Coast with funding from the World Bank. This issue and previous issues are available on the Isted website.

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Isted, a non-profit organization, is a platform for study and debate, information and action, at the service of its public and private members in the public works, transport, planning and environment sectors. It facilitates their international activities, optimizes the use of French knowhow throughout the world and helps to implement international programmes with third country leaders.

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